

# Foreign Direct Investment in Ukraine’s Post-War Reconstruction

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**ABSTRACT.** This article examines the impact of foreign direct investment on Ukraine’s economic growth in wartime and the prospects for attracting such investment in the post-war period. It analyses academic works by domestic and foreign scholars who have focused on the relationship between FDI and economic growth. The leading role of FDI as a key instrument for economic stabilisation, modernisation of production and infrastructure restoration is identified, as is the need to attract such investment for the long-term post-war reconstruction. Emphasis is placed on Ukraine’s losses during the war and the need for reconstruction and restoration. The agricultural sector, which is the most export-oriented sector and where Ukraine is one of the largest producers of agricultural products on the global market, is analysed. An econometric model was constructed using the E-Views software to assess the relationship between GDP growth, FDI volumes and the Corruption Perceptions Index. The results of the modelling confirmed the significant influence of both investment and institutional factors on economic dynamics. The article tests the model for autocorrelation and heteroscedasticity, confirming its adequacy and statistical reliability, and identifies causal relationships between economic growth, FDI and the Corruption Perceptions Index. A substantiated relationship is established between economic growth and FDI aimed at post-war recovery. It is demonstrated that attracting FDI has a multiplier effect, as it stimulates the development of related sectors, boosts employment, increases tax revenues and integrates Ukraine into global production chains. At the same time, the article highlights institutional weaknesses and high levels of corruption, which reduce the effectiveness of investment impact. It is recommended to intensify the implementation of reforms and promote guarantees for the security of private capital. The long-term factors of Ukraine’s economic recovery are identified and analysed, which the article identifies as: the attraction and effective use of FDI, the reconstruction and modernisation of infrastructure and the promotion of ‘green’ investments, institutional modernisation, the development of human capital, and European integration as a priority vector for Ukraine’s future development. It is argued that achieving pre-war GDP levels is possible within three to five years after the end of the war, provided that large-scale financial support, effective investment policy and the implementation of anti-corruption reforms are ensured. Potential risks and

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caveats regarding the modelling and forecasting of economic growth in Ukraine are identified. The article highlights Ukraine's experience, which is relevant to other countries with transition economies facing the challenges of post-crisis recovery and a shortage of domestic capital.

KEYWORDS: FDI, economic growth, corruption index, post-war reconstruction, return of migrants, human capital, institutional reforms, macroeconomic stability, sustainable development, international aid, innovation, EU integration, economic security, risks, financial support.

## Introduction

The impact of foreign direct investment on economic development is a topic of growing interest, as policymakers and academics seek to understand the extent to which this impact can contribute to economic growth. In the context of Ukraine, it is particularly relevant to investigate the extent to which such an impact will contribute to recovery and economic growth, as well as to ensuring security and mitigating future threats. This research aims to examine the relationship between capital flows, including those directed towards the recovery of the national economy, and economic development in Ukraine, by studying various key sectors of the economy.

In general, many researchers focus their studies on the fact that FDI has a significant positive impact on the development of the recipient country. The role of FDI in economic growth, particularly in the post-COVID period, has also been examined in our previous works<sup>2</sup>; as well as in the works of scholars such as Rokocha V.<sup>3</sup> in the context of identifying the role of FDI in an open economy; in the work of Vartsaba V., which examines the specifics of attracting FDI to Ukraine during the war and post-war reconstruction<sup>4</sup>; in the work of Dunska A. and Boiko O., which describes the relationship between FDI and Ukraine's macroeconomic indicators<sup>5</sup>; and many others. This issue is also relevant for developing countries. Among scholars from these countries, the following works are noteworthy: T. Jayaraman and B. Singh, who investigated the relationship between FDI, employment and GDP, concluded that there is a long-term unidirectional

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<sup>2</sup> Tkalenko, S., Derii, Zh., Butenko, N., Makedon, H., Semchenko-Kovalchuk, O. "Foreign direct investments and economic growth in the post-COVID-19 period: a causality analysis for Ukraine" *Financial and credit activity: problems of theory and practice* Vol. 3, No. 44 (2022): 357-366 <https://doi.org/10.55643/fcaptop.3.44.2022.3665>

<sup>3</sup> Rokocha, V., Tkalenko, S., Sukurova, N., Honcharova, A., Murashko, O. "Foreign direct investments in the economic growth of the open economy of Ukraine" *Financial and credit activity: problems of theory and practice*. Vol. 3, No. 38 (2021): 111-124. DOI: <https://doi.org/10.18371/fcaptop.v3i38.237429>

<sup>4</sup> Vartsaba V. V. Foreign direct investment in Ukraine: the military context. *Scientific Bulletin of Uzhhorod University*. 2024. No. 1(63). pp. 201-209. [https://doi.org/10.24144/2409-6857.2024.1\(63\).201-209](https://doi.org/10.24144/2409-6857.2024.1(63).201-209)

<sup>5</sup> Dunska, A. R., & Boiko, O. V. Foreign direct investment as a factor in the development of Ukraine's economy. *Economic Bulletin of the National Technical University of Ukraine "Kyiv Polytechnic Institute"*. 2016. No. 13. DOI:10.20535/2307-5651.13.2016.80625

random correlation between FDI and GDP, with the direction flowing from foreign investment towards economic growth<sup>6</sup>; as well as works by other researchers, where the main conclusion is based on the fact that: FDI stimulates economic growth in the long term, although in the short term it may have a negative impact<sup>7</sup>; in the short term, FDI can improve countries' GDP under certain conditions<sup>8</sup>; foreign direct investment in developing countries has a significant impact<sup>9</sup>. The experience of attracting foreign investment during post-war reconstruction may also be useful for other developing countries facing similar challenges: a shortage of financial resources, the need to modernise industry and infrastructure, and an unstable investment environment.

Consequently, host countries (both developing countries and countries with economies in transition, including Ukraine) have an interest in attracting foreign investment, particularly where domestic capital is insufficient. It should be noted that, in addition to the direct impact of investment on a country's economy, FDI serves as a source of know-how and technology transfer and facilitates the establishment and development of international business links, which has a positive impact on the economies of these countries. For Ukraine, which has been at war since early 2022, has undergone profound structural changes and suffered significant losses, and where a substantial portion of funds is directed towards financing the defence sector, facilitating the attraction of foreign direct investment for post-war reconstruction is a particularly pressing and priority task. Both in the current circumstances and during the post-war recovery period, the state's own budgetary and private funds are insufficient to implement large-scale programmes for post-war reconstruction, infrastructure modernisation and support for economic growth. This is precisely why attracting foreign direct investment is of crucial importance. It serves as a source of long-term capital that can offset the shortage of domestic financial resources, facilitate the modernisation of production capacity, the introduction of innovative technologies, the creation of new jobs, and the enhancement of the competitiveness of Ukrainian enterprises, taking into account Ukraine's European integration trajectory. For Ukraine, as a country with a transition economy, attracting FDI is also relevant due to a number of structural problems: an underdeveloped financial system, high levels of

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<sup>6</sup> Jayaraman, T. and Singh, B. "Foreign Direct Investment and Employment Creation in Pacific Island Countries: An Empirical Study of Fiji" Asia-Pacific Research and Training Network on Trade. Working Paper Series. (2007): 35 pp.

<sup>7</sup> Dinh, T-H, Vo, D, Th,e Vo A, Nguyen, T. "Foreign Direct Investment and Economic Growth in the Short Run and Long Run: Empirical Evidence from Developing Countries". Journal of Risk and Financial Management No. 12(4), (2019) URL: <https://doi.org/10.3390/jrfm12040176>

<sup>8</sup> Rosdiana, Sijabat. "The Association between Foreign Investment and Gross Domestic Product in Ten ASEAN Countries" Economies No. 11(7), (2023). <https://doi.org/10.3390/economies11070188>

<sup>9</sup> Aouar, A. and Tahraoui, A. "The effect of foreign direct investment (FDI) on economic growth: The case of AMU". Reviews of Socio-Economic Perspectives Vol. 8, Issue 4, (2023). DOI: <https://doi.org/10.19275/rsep169/>

business risk, and the need to modernise industrial and infrastructure facilities. FDI acts not only as a source of capital but also as a mechanism for transferring knowledge, technology and managerial expertise, which is particularly important for the modernisation of the economy. Furthermore, foreign investment has a multiplier effect – it stimulates related sectors, increases tax revenues to the budget, and contributes to the creation of a stable investment environment and Ukraine's integration into global production chains. In our view, and that of most scholars, in the post-war period FDI will play a strategic role in the reconstruction of critical infrastructure, the development of the energy sector, transport logistics, the agro-industrial complex and the IT industry. At the same time, attracting such resources requires investment security guarantees, transparent business rules and international support through risk insurance, the participation of international financial institutions and the creation of special recovery investment funds.

Thus, in wartime conditions, when state resources are sorely lacking, foreign investment becomes a critically important factor in ensuring economic stability and the future post-war reconstruction of Ukraine, acting as the main source of funding for development, modernisation and integration into the global economy. Foreign investment directed towards post-war reconstruction projects will contribute not only to stabilising the macroeconomic situation after the war ends, but also to the long-term development of the economy. Consequently, understanding the role of FDI and the mechanisms for its effective attraction enables the development of a well-founded investment policy and strategic programmes that take into account wartime risks, the characteristics of a transition economy, and the need to modernise critical infrastructure. An analysis of this process is also valuable for other countries, as it demonstrates the importance of combining state support, international cooperation and foreign direct investment for sustainable economic development in post-crisis conditions.

**The aim of this article** is to examine the impact of foreign direct investment on Ukraine's economic growth in wartime and to substantiate its role and prospects for attracting investment in the process of post-war economic recovery, based on an econometric analysis of the relationship between GDP, FDI volumes and institutional factors.

### **Key methodological aspects of the study**

It is considered relevant to study the impact of foreign direct investment (FDI) flows on a country's economic development, using Ukraine as an example, which by 2025 will have been in a state of war for four years; the

study will be based on an analysis of statistical data (quantitative indicators, including those for the period of Russian aggression on Ukrainian territory) to understand the necessary volume of investment attraction in the context of post-war reconstruction. At the same time, there remain qualitative indicators and subjective factors that may influence FDI volumes in the future.

The research question is as follows: what impact do foreign direct investment flows have on Ukraine's economic development; what long-term factors will contribute to economic recovery after the war; how quickly will Ukraine return to its pre-war GDP level.

It should be noted that foreign investment fulfils several key functions in the context of post-war reconstruction:

- firstly, they are a source of long-term financial capital, which helps to compensate for the shortfall in public funds and support the innovative development of enterprises;
- secondly, FDI stimulates the modernisation of production capacity and the introduction of modern technologies and management practices, thereby enhancing the competitiveness of the Ukrainian economy on a global scale;
- thirdly, foreign investment contributes to the creation of new jobs, increased profitability of companies operating in the domestic market, increased tax revenues to the budget, and the development of other sectors of the economy, which collectively leads to a multiplier effect in the context of Ukraine's economic recovery and growth.

The analysis was conducted on the basis of an econometric model (using the e-Views software). The study utilised a multidimensional approach by incorporating a broader range of variables that combine economic growth parameters (GDP) and indicators of Ukraine's integration into the global economic system. The research hypothesis is based on the assumption regarding the existence and nature of the impact of foreign direct investment on the indicators of Ukraine's post-war economic recovery. In particular, an increase in FDI volumes has a positive and statistically significant impact on the pace of Ukraine's post-war economic recovery, as evidenced by growth in GDP, employment levels, exports and the restoration of production infrastructure, etc.

The general form of the model of FDI's impact on economic growth is described by the equation:

$$\text{GDP growth} = f(x_1, x_2, \dots, x_N) \quad (1)$$

where, GDP growth – GDP growth

$x_1, x_2, \dots, x_N$  – potential factors influencing Ukraine's economic growth

## Foreign direct investment as the basis for Ukraine's post-war economic reconstruction

Once the war ends, Ukraine will require significant investment resources to rebuild its economy and achieve economic growth. According to the World Bank, from the start of the full-scale invasion and as of 31 December 2024, the needs for recovery and reconstruction over the next decade are estimated at nearly US\$524 billion (Table 1); this includes the needs of both the public and private sectors<sup>10</sup>; <sup>11</sup>.

*Table 1*

**TOTAL REHABILITATION AND RECONSTRUCTION NEEDS, AS OF EARLY 2025**

Sectoral needs	US\$ billion	Share of sector
<b>Social sector, including:</b>	<b>184.4</b>	<b>35.3%</b>
Housing	83.7	
Education and science	32.9	
Health	19.4	
Social protection and livelihoods	38.9	
Culture and tourism	10.5	
<b>Infrastructure sector, including:</b>	<b>169.3</b>	<b>32.4%</b>
Energy	67.8	
Transport	77.5	
Telecommunications, digital technologies and media	5.9	
Water supply and sanitation	11.3	
Utilities	6.9	
<b>Manufacturing sector, including:</b>	<b>132.9</b>	<b>25.4%</b>
Finance and banking	2.1	
Trade and industry	64.4	
Irrigation and water resources	10.9	
Agriculture	55.5	
<b>Cross-sectoral sector, including:</b>	<b>36.0</b>	<b>6.9%</b>
Management of explosive hazards	29.8	
Emergency response and civil protection	2.4	
Environment and forestry	2.8	
Justice and public administration	0.9	
<b>Total</b>	<b>522.6</b>	<b>100%</b>

*Source:* compiled by the author based on data from<sup>12</sup>.

<sup>10</sup> Shalal, A. "Ukraine needs \$524 billion to recover, rebuild after three years of war, World Bank says". (February 2025) URL: <https://www.reuters.com/world/europe/ukraine-needs-524-billion-recover-rebuild-after-three-years-war-world-bank-says-2025-02-25>.

<sup>11</sup> Jayaraman, T. and Singh, B. "Foreign Direct Investment and Employment Creation in Pacific Island Countries: An Empirical Study of Fiji" Asia-Pacific Research and Training Network on Trade. Working Paper Series. (2007): 35 pp. — p. 10.

<sup>12</sup> Ukraine rapid damage and needs assessment (RDNA4). World Bank. (February 2025): 195 pp. URL: <https://documents1.worldbank.org/curated/en/099022025114040022/pdf/P180174-ca39eccd-ea67-4bd8-b537-ff73a675a0a8.pdf> (p. 40).

These are significant needs, particularly those arising from damage and destruction in major cities and other regions, and are approximately 2.8 times Ukraine's estimated nominal GDP for 2024. According to PwC's findings, 'strategic investments in recovery and modernisation are critical for Ukraine's accession to the European Union and ensuring its long-term stability, as well as providing an opportunity to rebuild and strengthen key sectors of the economy'<sup>13</sup>.

Reconstruction and rehabilitation needs cover the following sectors<sup>14</sup>:

- housing – nearly US\$84 billion, or 16% of total long-term needs;
- transport – around US\$78 billion or 15%;
- energy and extractive sectors – US\$68 billion or 13%;
- trade and industry – US\$64 billion or 12%;
- agriculture – US\$55 billion or 10%.

Across all sectors, the cost of simply clearing and managing debris amounts to almost US\$13 billion. The Donetsk, Kharkiv, Zaporizhzhia, Luhansk and Kherson regions require the most investment.

Thus, there are numerous investment opportunities in Ukraine, even under current conditions; however, investing during wartime can be risky and requires a thorough analysis of the market situation. Among the relatively stable sectors in Ukraine during the war, for example, we can highlight the agricultural sector, where Ukraine is one of the largest producers of agricultural products and one of the most export-oriented sectors. At the same time, the agricultural sector has suffered enormous losses during the war (Table 2).

*Table 2*

**STRUCTURE OF DIRECT AND INDIRECT LOSSES IN THE AGRICULTURAL SECTOR  
AND LAND RESOURCES UNDER MARTIAL LAW**

Total losses of the agricultural sector	September 2022		November 2024	
	billion US dollars	%	US\$ billion	%
Direct losses	6.6	100	10.3	100
Indirect losses	34.25	100	40.3	100

*Source:*<sup>15</sup>.

<sup>13</sup> Agriculture, mineral resources and energy — priority sectors for investment in Ukraine's reconstruction — PwC report. 2025. PwC. <https://www.pwc.com/ua/uk/survey/2025/haluzi-dlya-investytsiy-u-vidbudovu-ukrayiny.html>. (p. 10).

<sup>14</sup> Tkalenko, S., Derii, Z., Kudyenko, L., Liubachivska, R., Hrytsku-Andriesh, Y., Kosytska, V. "Long-term determinants of economic development: the impact of migration flows on the economy of Ukraine" Financial and credit activity problems of theory and practice. Vol. 6 (59), (2024): 402–419 DOI: <https://doi.org/10.55643/fcaptop.6.59.2024.4559> (p. 19).

<sup>15</sup> Report on direct infrastructure damage and indirect economic losses resulting from destruction caused by Russia's military aggression against Ukraine as of June 2023. KSE. July 2023. URL: [https://kse.ua/wp-content/uploads/2023/09/June\\_Damages\\_UKR\\_-Report.pdf](https://kse.ua/wp-content/uploads/2023/09/June_Damages_UKR_-Report.pdf)

In terms of direct losses, the frontline regions have been hardest hit, accounting for 90% of direct losses. Indirect losses in Ukraine's agricultural sector due to reduced agricultural production, the blockade of ports and increased production costs are estimated at US\$40.3 billion, accounting for 15% of all indirect losses by sector<sup>16</sup>. Agricultural companies have suffered huge losses.

### **Econometric modelling of the impact of foreign direct investment on Ukraine's post-war reconstruction**

In the course of econometric modelling, we analysed indicators such as the volume of FDI, the Security Index, exports and imports, the inflation rate, and the Global Peace Index. The study selected the most significant factors influencing economic growth (Table 3), and thus the model takes the following form:

$$\text{GDP growth} = f(\text{FDI}, \text{SI}) \quad (2)$$

FDI – cumulative foreign direct investment, in million US dollars;

CPI – Corruption Perceptions Index (points, where a higher score indicates a lower level of corruption).

This analysis enabled the following regression equation to be constructed:

$$\text{GDP growth} = C(1) * \text{FDI} + C(2) * \text{CI} + \varepsilon \quad (3)$$

C(1), C(2) – significance coefficients

$\varepsilon$  – random error.

*Table 3*

**FACTORS INFLUENCING ECONOMIC GROWTH IN UKRAINE, 2014–2024**

Year	GDP growth, %	FDI volume, net inflow, billion US dollars	Corruption Perceptions Index (0–100), points
	GDPg	FDI	IC
2014	-10.1	0.847	26
2015	-9.8	-0.198	27
2016	2.4	4.128	29
2017	2.4	3.68	30
2018	3.5	4.975	32
2019	3.2	5.796	30

<sup>16</sup> Ibid.

Year	GDP growth, %	FDI volume, net inflow, billion US dollars	Corruption Perceptions Index (0–100), points
	GDPg	FDI	IC
2020	-3.8	0.304	33
2021	3.4	7.954	32
2022	-28.8	0.221	33
2023	5.5	4.752	36
2024	2.9	3,796	35

*Source:* compiled by the author based on data from<sup>17</sup>; <sup>18</sup>.

By examining the most significant and verified factors, a correlation matrix was constructed using the e-Views software, which allows the strength of the relationship between the selected data to be determined (Table 4): strong positive correlations were found between GDP growth and FDI (correlation coefficient 73.9%), as well as between FDI growth and the Corruption Perceptions Index (correlation coefficient 45.3%). The results of the regression analysis are presented in Table 5.

*Table 4*

**CORRELATION MATRIX**

Variables	GDPg	FDI	IC
GDPg	1	0.7387	0.4533
FDI	0.7387	1	0.0982
IC	0.4533	0.0982	1

*Source:* compiled by the author

*Table 5*

**RESULTS OF REGRESSION ANALYSIS OF GDP GROWTH**

Dependent Variable: GDPG / Method: Least Squares				
Sample: 2014–2024 / Included observations: 11				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	2.701754	0.759827	3.555750	0.0074
IC	16.40774	8.414323	1.949978	0.0870
C	-59.02539	24.29989	-2.429039	0.0413

<sup>17</sup> Transparency International 2024. URL: <https://www.transparency.org/en/cpi/2024>

<sup>18</sup> World Bank Group. Foreign direct investment, net inflows (BoP, current US dollars) / GDP growth (annual %) — Ukraine. URL: <https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD?locations=UA>

Dependent Variable: GDPG / Method: Least Squares				
Sample: 2014–2024 / Included observations: 11				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
R-squared	0.692099	Mean dependent variable		-2.654545
Adjusted R-squared	0.615124	Standard deviation of dependent variable		10.24035
Standard error of regression	6.352947	Akaike information criterion		6.762715
Sum of squared residuals	322.8794	Schwarz criterion		6.871232
Log-likelihood	-34.19493	Hannan-Quinn criterion		6.694311
F-statistic	8.991193	Durbin-Watson statistic		1.850600
Prob(F-statistic)	0.008988			

Source: compiled by the author

Analysis of the regression table for GDP growth yielded the following results:

– firstly, a positive correlation between *GDP growth* and *FDI* with a coefficient of 2.70, and a positive correlation with *IC* with a coefficient of 16.41;

– Secondly, the coefficient of determination *RI* indicates the extent to which the selected variables in this model are associated with GDP growth. *RI*=69.2%, confirming that *GDP growth* depends on the factors we have selected; consequently, there is a fairly strong correlation. It should be noted that there are other factors, both quantitative and qualitative, that influence *GDP growth*. Furthermore, the adjusted *RI*=61.5%, which is also at an acceptable level. Therefore, the selected factors are significant and provide a fairly strong explanation of their influence on the potential for Ukraine's GDP growth;

– thirdly, we set a threshold significance level of 5–10% in the model. The probability of accepting  $H_0$  is close to zero (F-statistic = 0.008), which confirms the hypothesis regarding the significance of the equation as a whole. *Prob. FDI* = 0.0074, which is < 0.01, i.e. the effect is highly significant; *Prob. IC* = 0.0087, which falls within the range of 0.01–0.05, i.e. the effect is highly significant at the 5% level and marginally significant at the 10 per cent level. Thus, the variables confirm and meet the established significance level and are below the 5% significance level. The constant is statistically significant – 0.04%;

– analysis of the Durbin-Watson criterion allows us to test the equation for the presence of first-order autocorrelation. The DW criterion value lies within the range of 0 to 4. This criterion (DW) in the constructed model is

1.85. The DW statistic allows us to determine the significant (critical) points  $d_L$  and  $d_U$ . At a significance level of  $\alpha=5\%$  for 11 observations and 2 variables,  $0.658 < DW < 1.604$ . At a stricter significance level of  $\alpha=1\%$  for 11 observations and 2 variables, we have  $0.319 < DW < 1.297$ . The ideal situation is when  $DW \approx 2$  in the model. Since  $DW=1.85$ , this means that we reject the hypothesis of positive autocorrelation, i.e. there is no significant autocorrelation of the residuals in the model. At the same time, the DW statistic value of 1.85 exceeds the upper critical limit of  $\alpha = 5\%$ , indicating the absence of first-order autocorrelation in the model's residuals. Therefore, the model is adequate in terms of the independence of random errors, and the assumption of the least squares method is not violated;

– the Akaike (AIC) and Schwarz (BIC) information criteria are used to compare models. The lower the values of these criteria compared to other models, the better the model is considered to be. In this case, these criteria are  $AIC=6.76$ ,  $BIC=6.87$ . Thus, the model is reasonably balanced in terms of accuracy and the number of parameters, and the values of the criteria are normal.

A test for the presence of higher-order (second-order) autocorrelation was also carried out using various tests (Table 6), which boil down to testing the null hypothesis.

*Table 6*

**RESULTS OF THE HETEROSCEDASTICITY TEST FOR THE MODEL**

Test	F-statistic	Prob. F		Conclusion
<b>White</b>	1.394060	Prob. F(5,5)	0.3622	$p > 0.05$ indicates homoscedasticity, i.e. everything is fine
<b>Breusch-Pagan-Godfrey</b>	2.976940	Prob. F(2,8)	0.1080	$p > 0.05$ indicates that no heteroscedasticity was detected
<b>Harvey</b>	3.223128	Prob. F(2,8)	0.0940	$p > 0.05$ , slight but not critical heteroscedasticity
<b>Glejser</b>	4.820649	Prob. F(2,8)	0.0523	$p \approx 0.05$ , i.e. on the borderline of statistical significance, but not below it; there may be weak signs of heteroscedasticity
<b>ARCH</b>	0.486242	Prob. F(1,8)	0.5054	$p > 0.05$ , no autoheteroscedasticity

*Source:* compiled by the author

The results of the tests for heteroscedasticity – the test for homogeneity of residual variance – are important for assessing the reliability of the econometric model. This test confirmed the absence of higher-order (second-order) autocorrelation regarding random deviations; therefore, the null

hypothesis ( $H_0$ ) can be accepted. All the tests listed (White, Breusch–Pagan–Godfrey, Harvey, Glejser, ARCH) test the same null hypothesis:  $H_0$ , the variance of the residuals is constant (homoscedasticity); and  $H_1$ , the variance of the residuals varies (heteroscedasticity is present). If Prob. F is greater than 0.05, there is no reason to reject  $H_0$  and there is no heteroscedasticity. If  $p\text{-value} \leq 0.05$ , the hypothesis of homoscedasticity is rejected and the problem of heteroscedasticity is present. According to the test results, no significant heteroscedasticity was detected in the model, i.e. the variance of the residuals is stable and constant, and the least squares estimates remain valid and reliable.

The next indicator is the Ramsey test. It shows whether a linear equation is suitable for our task. The Ramsey RESET indicator is 41.35% (Table 7). Therefore, we have a linear regression equation and the curve has been selected correctly; the equation has been identified.

Table 7

## RAMSEY TEST

	Value	df	Probability	
t-statistic	0.869202	7	0.4135	
F-statistic	0.755512	(1, 7)	0.4135	
Likelihood ratio	1.127430	1	0.2883	
Variable	Coefficient	Standard Error	t-Statistic	<b>Prob.</b>
FDI	1.099070	1.998837	0.549855	0.5995
IC	5.689814	15.00269	0.379253	0.7157
C	-18.07647	53.18403	-0.339885	0.7439
FITTED^2	-0.063822	0.073426	-0.869202	0.4135
R-squared	0.722094	Mean dependent variable		-2.654545
Adjusted R-squared	0.602991	Standard deviation of dependent variable		10.24035
Standard error of regression	6.452306	Akaike information criterion		6.842040
Sum of squared residuals	291.4258	Schwarz criterion		6.986729
Log-likelihood	-33.63122	Hannan-Quinn criterion		6.750834
F-statistic	6.062779	Durbin-Watson statistic		2.175202
Prob(F-statistic)	0.023312			

Source: compiled by the author

We investigate the causal relationship between the selected variables (FDI and the Corruption Perceptions Index) and GDP growth using the Granger causality test. The data presented in Table 8 indicate the existence of a causal relationship between the variables.

Table 8

CAUSALITY TEST (GRANGER)

Pairwise Granger Causality Tests						
Null hypothesis		Lag 2			Lag 3	
		F-Statistic	Prob.	Conclusion	F-statistic	Prob.
1	FDI does not Granger-cause GDPG	3.46304	0.1340	accept	6.80841	0.2729
	GDPG does not Granger cause FDI	1.06819	0.4249	accept	0.24129	0.8654
2	IC does not Granger cause GDPG	9.26332	0.0315	accept	8.55724	0.2450
	GDPG does not Granger cause IC	1.69175	0.2935	accept	1.61481	0.5112
3	IC does not Granger cause FDI	0.88815	0.4795	accept	139.262	0.0622
	FDI does not Granger cause IC	0.54049	0.6198	accept	29.0023	0.1355

Source: compiled by the author

The results of the Granger causality test showed that the Corruption Perceptions Index at a lag of 2 has a particularly strong effect on economic growth, indicating its important role in stimulating GDP in the short term. Longer lags do not show statistical significance, suggesting a local effect – specific to Ukraine.

The next step in the modelling process is to test the constructed model for explanatory power and quality. (Fig. 1, Fig. 2)

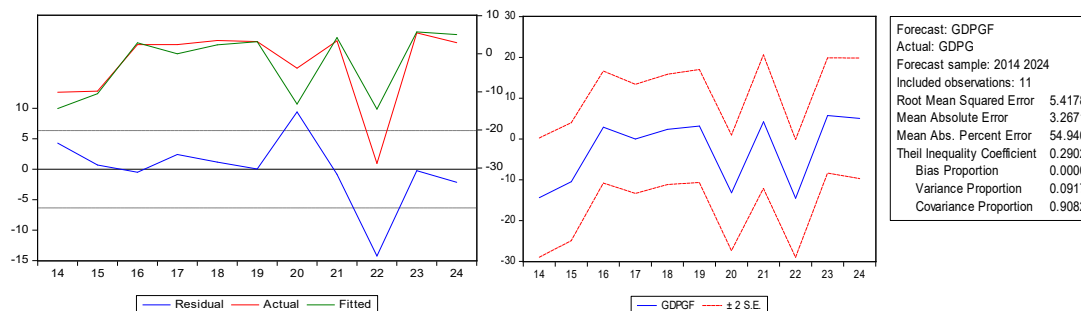


Fig. 1. Explanatory power of the model

Fig. 2. Model forecast

Source: compiled by the author.

The main R-squared value is 54.9%, confirming the high accuracy of the forecast in the constructed model. The average percentage error between the forecast and actual values is less than 10%. In the short and long term, there is a positive trend towards growth. The current situation is characterised by a slowdown in capital inflows and currency risk linked to the war.

Thus, we have an equation that is statistically significant, with a high coefficient of determination:

$$\text{GDPgrow} = 2.7017 * \text{FDI} + 16.4077 * \text{IC} - 59.0253 \quad (4)$$

The multiple regression model of economic growth's dependence on selected factors (independent variables) has been successfully validated. All checks and tests confirm the validity of this model for attracting investment into Ukraine's post-war reconstruction.

The coefficient for FDI = 2.7017 means that with a one-unit increase in foreign direct investment (US\$ billion), GDP growth rises by an average of 2.7 per cent, all other things being equal.

The coefficient for the corruption index IC = 16.4077 shows that a 1-point increase in the corruption index (indicating a reduction in the level of corruption) contributes to an average GDP growth of 16.41 per cent. This confirms the significant impact of institutional quality on economic development, and the problem of corruption in Ukraine is considerably more significant than FDI in terms of its impact on economic growth (the contribution of the corruption index is significantly stronger than that of investment).

Thus, according to the model, economic growth in Ukraine depends significantly on the dynamics of attracting foreign direct investment and improving institutional quality (reducing corruption).

### **Discussion, potential risks and lessons**

Modelling the impact of foreign direct investment flows and the Corruption Perceptions Index on Ukraine's economic development illustrates that these indicators are among the key factors in the country's economic development, particularly for Ukraine as a transition economy and in the post-war period. FDI ensures an inflow of additional capital, which will be directed towards the modernisation of production and infrastructure in line with the 2030 Sustainable Development Strategy and the achievement of the SDGs, stimulates the introduction of modern technologies, and leads to growth in employment, among other benefits.

Empirical studies in Ukraine show that FDI correlates positively with GDP growth rates and production activity, particularly in the industrial, IT and energy sectors (the sector hardest hit by the war). Researchers at

the Kyiv School of Economics believe that the most viable strategy for achieving growth for Ukraine during the war is to adopt the EU-Central and Eastern Europe model for attracting Western FDI<sup>19</sup>.

At the same time, the effectiveness of FDI depends heavily on the institutional environment and the level of corruption in the public sector (the corruption perception index in our model is even more significant than FDI). High levels of corruption stifle investment activity, increase transaction costs and risks for investors, and consequently reduce the effectiveness of FDI in stimulating economic growth. For Ukraine, where corruption risks are traditionally high, even significant FDI inflows may not fully translate into sustainable economic growth without appropriate government policies on transparency, anti-corruption reforms and investor protection.

Among the long-term factors that will contribute to effective post-war reconstruction, in our view, the most significant should be highlighted:

Firstly, the attraction and effective utilisation of FDI. Most researchers focus their attention on this factor. FDI is critical for post-war reconstruction, as it provides long-term financial resources, technology transfer and new jobs. However, the effectiveness of this impact depends directly on the level of trust in state institutions and macroeconomic stability. To ensure a sustainable flow of investment, it is necessary to create a favourable investment climate, which will include capital security guarantees, insurance against war risks, partnerships with international financial organisations (the World Bank, EBRD, IFC) and the promotion of green and technological investments;

Secondly, the reconstruction and modernisation of infrastructure. Infrastructure is the backbone of the economy, and its restoration is not only a humanitarian but also a strategic task, forming the basis for economic activity. Furthermore, investment in transport, energy, logistics, communications and digital infrastructure has a multiplier effect. The key issue is not merely the restoration of what has been destroyed, but modernisation – the construction of energy-efficient, environmentally friendly and innovative systems that meet EU standards. It should also be noted that economic recovery should not follow old models, but rather involve a transition to an innovative, knowledge-based economy. The development of IT, 'green' energy, biotechnology, mechanical engineering and agricultural technology are priority areas. Post-war Ukraine has a unique opportunity to leapfrog the stages of industrial development and immediately implement digital technologies, robotization and automation. State incentives and support for scientific research could drive this process;

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<sup>19</sup> 'Stimulating Growth in Ukraine and Policies for Migrants'. Economic Council Paper No. 2. Report of the Economic Policy Advisory Council. 6 June (2024): 27. URL: [https://kse.ua/wp-content/uploads/2024/06/Economic\\_Council\\_Paper\\_2\\_Stimulating\\_Growth\\_in\\_Ukraine\\_and\\_Policies.pdf](https://kse.ua/wp-content/uploads/2024/06/Economic_Council_Paper_2_Stimulating_Growth_in_Ukraine_and_Policies.pdf) (p. 7).

thirdly, the institutional factor. One of the fundamental factors of sustainable economic development is institutional quality. Strong, transparent and accountable institutions ensure the rule of law, reduce corruption risks and build investor confidence. According to the Corruption Perceptions Index, Ukraine ranked 104th out of 180 in 2023 and 105th in 2024, indicating the need for further strengthening of anti-corruption reforms<sup>20</sup>. Institutional stability also implies an effective judicial system, predictable tax policy, the digitalisation of public administration, and the minimisation of bureaucratic barriers. The experience of Central and Eastern European countries following the transformations of the 1990s shows that it was institutional modernisation that ensured their sustained growth after periods of crisis. Improving the institutional environment is critical for long-term economic recovery, as it reduces transaction costs and the risks of doing business;

fourthly, human capital. The main levers of influence on the economy, apart from financial resources and infrastructure (which is constantly subject to attacks and destruction), are human factors (migration flows). Long-term development is impossible without a highly skilled and productive workforce. The war has led to a significant outflow of the population, primarily young and educated Ukrainians. Therefore, one of the priorities must be the return and reintegration of labour migrants, support for employment, and investment in education and staff retraining;

The fifth factor is integration into the EU. Ukraine's long-term reconstruction is impossible without international financial and technical assistance, the involvement of international investment and financial institutions, and integration into global production chains. International cooperation provides access to capital, technology and markets. Deepening trade and partnership with the EU creates all the necessary preconditions for post-war reconstruction.

Economic recovery will certainly take place, but the timeframe for economic recovery depends on the strategies and methodology chosen for such recovery. Firstly, domestic businesses are still operating and continuing to develop under extremely difficult conditions, which ensures the availability of jobs; there are indeed gaps in the form of a lack of finance against the backdrop of the overall economic picture, and a decline in wages due to inflation; secondly, support from foreign partners has helped to assist the most vulnerable sections of the population and rebuild destroyed cities<sup>21</sup>.

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<sup>20</sup> Transparency International 2024. URL: <https://www.transparency.org/en/cpi/2024>

<sup>21</sup> Tkalenko, S, Derii, Zh., Butenko, N, Makedon, H., Semchenko-Kovalchuk, O. "Foreign direct investments and economic growth in the post-COVID-19 period: a causality analysis for Ukraine" *Financial and credit activity: problems of theory and practice* Vol. 3, No. 44 (2022): 357-366 DOI: <https://doi.org/10.55643/fcaptop.3.44.2022.3665>

Thus, Ukraine's post-war economic recovery is a rather long-term phase of further economic development, requiring a comprehensive approach that combines financial support, institutional reforms, human capital development, innovation and international integration. Only the synergy of these factors will ensure not merely a return to pre-war economic levels, but a qualitative leap towards a new development model – one that is more resilient, competitive and oriented towards European values – and will facilitate Ukraine's integration into the global economy.

Ukraine's return to its pre-war GDP level (2021) depends on the duration of the war (as of the end of 2025, the war is ongoing), the scale and timeliness of funding for recovery and reconstruction, and institutional reforms. Following the shock of 2022–2023, Ukraine recovered a significant portion of its losses, but real GDP in 2024 remained below the pre-war (2021) level – at around 92% of the 2021 level, according to the latest reports from<sup>22</sup>. Currently, KSE researchers forecast that Ukraine's real GDP will grow by 2.5–3.0% annually during the war and by approximately 2 percentage points more after it; for 2027, growth of 5.0% is forecast, with nominal GDP at 11,586 billion UAH (242.2 billion USD)<sup>23</sup>. The EBRD provides more pessimistic estimates: GDP growth in 2027 is forecast at 2.8% (3.9%)<sup>24</sup>. At the same time, in our view, the course of the war may alter these calculations. Furthermore, reaching pre-war GDP levels is not the same as restoring potential output or per capita income (losses of fixed capital and population mean that the structural level of output may be permanently lower unless it is rebuilt). If recovery is driven primarily by government spending on reconstruction, aggregate GDP may rise rapidly, but long-term productivity gains require private investment, technology transfer and institutional reforms. Even if aggregate GDP recovers, regional disparities and social damage (displaced persons, destroyed enterprises) require targeted policies. Therefore, security and stability are key prerequisites for a significant return of FDI and large-scale reconstruction. Attracting FDI, particularly in manufacturing, energy, logistics and the digital sectors, will have a greater multiplier effect on GDP.

In conducting this study, a number of potential risks warrant attention:

- due to military operations, official statistics are incomplete and constantly changing, which complicates the construction of high-quality econometric models;

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<sup>22</sup> BDO Ukraine. The current situation in Ukraine: A Comprehensive Overview of Security, Recovery, and Economic Outlook (September 2025). [https://www.bdo.ua/en-gb/insights-1/information-materials/2025/ukraine-security-economy-recovery-september-2025?utm\\_source=chatgpt.com](https://www.bdo.ua/en-gb/insights-1/information-materials/2025/ukraine-security-economy-recovery-september-2025?utm_source=chatgpt.com)

<sup>23</sup> Ukraine Macroeconomic Handbook. July 2025. 28 pp. [https://kse.ua/wp-content/uploads/2025/07/UA-Macro-Handbook\\_Jul2025.pdf?utm\\_source](https://kse.ua/wp-content/uploads/2025/07/UA-Macro-Handbook_Jul2025.pdf?utm_source)

<sup>24</sup> BDO in Ukraine on the current situation in Ukraine: A Comprehensive Overview of Security, Recovery, and Economic Outlook (September 2025). <https://eba.com.ua/en/bdo-v-ukrayini-pro-potochnu-sytuatsiyu-v-ukrayini-kompleksnyj-oglyad-bezpeky-vidnovlennya-ta-ekonomichnyh-perspektyv-veresen-2025-roku/>

- the difficulty in measuring institutional factors – levels of corruption, investor confidence, the effectiveness of government reforms, etc.;
- a high level of macroeconomic instability – inflation, exchange rate fluctuations and debt risks may distort the results of the analysis;
- the impact of force majeure circumstances – threats of further escalation, which could negate the effect of investments;
- continued uncertainty regarding development conditions – the political and security situation following the war is difficult to predict, so long-term forecasts may be unreliable;
- geopolitical risks – foreign policy relations and the stance of partners (the EU, the US, international financial organisations) may change significantly and affect the scale of FDI;
- dependence on donor aid;
- the risk of over-optimism in assessments – the positive impact of FDI may be overstated, whilst the importance of domestic reforms and the state's institutional capacity is underestimated.

The full-scale war in Ukraine has become not only a humanitarian and security disaster, but also a powerful economic shock, which has demonstrated a number of lessons that are important for countries facing the risk of conflict or experiencing instability.

Firstly, the vulnerability of infrastructure and the economy to armed conflict. Ukraine has demonstrated just how quickly transport, energy and industrial infrastructure can be destroyed, bringing the economy to a standstill. For other countries, this serves as a warning of the need to develop critical infrastructure systems with security considerations in mind.

Secondly, the importance of economic and foreign trade diversification. Heavy reliance on individual markets or export channels becomes a weak point in times of crisis. Ukraine's experience highlights the importance of diversifying suppliers, markets and sources of investment.

Thirdly, international support plays a significant role. Economic survival and reconstruction in wartime depend to a large extent on assistance from international partners – financial, humanitarian and military. Other economies facing the risk of conflict should build foreign policy alliances in advance.

Fourthly, the need for institutional resilience. The war has shown that strong state institutions, capable of making rapid decisions and coordinating resources, are a critical factor in the economy's survival. Countries with high conflict risks must invest in strengthening public administration.

Fifth, human capital as a key resource. Millions of Ukrainians were forced to leave their homes, but retained the skills and potential to rebuild the country. For other states, this is a lesson on the need to support the population, develop education and retain talent even in times of crisis.

Sixth, the cost of corruption and lack of transparency. In a war economy, transparency in the use of resources and trust in the state become cru-

cial. Ukraine's experience underscores that the fight against corruption is not merely a matter of development, but also of national security.

Seventh, the opportunity for post-war transformation. War creates the conditions for radical reforms: infrastructure modernisation, the transition to 'green' energy, and the digitalisation of governance. Other countries can learn that even after destruction, there is an opportunity for a more modern and resilient economy.

Thus, the war in Ukraine demonstrates that even under the most difficult conditions, a country can maintain economic activity and lay the foundations for future reconstruction. For states with conflict potential, this experience serves as a warning and, at the same time, an example that economic resilience depends not only on resources but also on the ability of society and the state to mobilise, form partnerships and implement strategic reforms.

## Conclusion

Ukraine's post-war economic recovery is a complex, multi-layered process requiring not only short-term anti-crisis measures but also a strategic vision for development spanning decades ahead. The war has led to significant losses, particularly in terms of productive capacity, the destruction of infrastructure, an outflow of labour, and a decline in investment activity. At the same time, this period presents a 'window of opportunity' for the structural modernisation of the economy, integration into global markets, and the establishment of resilient institutions.

The study found that foreign direct investment plays a decisive role in the post-war recovery of Ukraine's economy. Econometric analysis confirmed the positive and statistically significant impact of FDI on GDP growth rates. In the process of building the model, some of the most significant factors for future economic growth were selected, which allowed for a comparison of the impact of FDI and the Corruption Perceptions Index on economic development:

- firstly, FDI has a positive impact on economic growth, but this effect is weakened in regions and sectors with high levels of corruption;
- secondly, the Corruption Perceptions Index moderates the effect of FDI, i.e. in countries with a low CPI (high corruption), FDI is less effective, whereas in more transparent economies the same investments have a stronger stimulating effect. The level of institutional transparency, particularly the corruption index, has an even stronger effect on economic dynamics than the volume of investment itself. This highlights the need to strengthen anti-corruption measures, boost investor confidence and create a favourable business climate;

- thirdly, the state's policy on combating corruption and safeguarding investors' rights is critical to transforming FDI into real economic development.

At the same time, ensuring Ukraine's sustainable economic development requires a comprehensive approach that combines attracting foreign capital, reforming state institutions, modernising infrastructure, developing human capital and integrating into the European economic area. FDI in the restoration of industry, energy, transport, digital technologies and the agricultural sector will contribute not only to restoring pre-war GDP levels but also to building a competitive, innovative and sustainable economy. The impact of FDI on post-war recovery and economic growth could be significantly greater if Ukraine follows a strategy of attracting investment from Western European countries<sup>25</sup>. Thus, for Ukraine, foreign direct investment has the potential to have a highly positive impact on the economy, and promoting transparency, improving the business climate and the institutional framework are key factors in ensuring that FDI becomes a catalyst for sustainable economic development and the country's post-war reconstruction. Ukraine's experience serves as a model for other countries with economies in transition, as it demonstrates that an effective combination of investment, institutional stability and international support is the key to rapid economic recovery in the post-crisis period.

\*This article was translated from its original in Ukrainian.

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