

From War to Cooperation: Crisis-Driven Innovation and Romania's Modernization Model

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Abstract: This paper examines European integration as a historically grounded response to systemic crises, with a particular focus on the transformative impact of war and economic disruptions. Rather than interpreting integration as a linear or inevitable process, the study highlights the role of crisis as a catalyst for institutional innovation, policy learning, and shifts in governance paradigms. By exploring how the trauma of the two World Wars reshaped political thinking, the research illustrates the transition from competition to interdependence through the supranational management of resources. Furthermore, the paper incorporates a case study focused on Romania (1989-2026), highlighting how the post-communist transition and recent shocks have been managed through the European Union's "External Anchor". Romania's experience demonstrates the conversion of structural vulnerabilities into opportunities for modernization, empirically evidenced by the leap in GDP per capita from 26% to over 80% of the EU average (with an estimated 83% in 2026) and its advancement to 23rd place globally in the Economic Complexity Index. Combining a macro-historical perspective with quantitative analysis, the paper argues that the European model represents a viable framework for adaptation applicable to contemporary challenges, contributing to debates on polycrisis management and the evolution of economic cooperation.

Keywords: European integration, systemic crisis, institutional innovation, Romania, external anchor, economic convergence.

1 Introduction

The economic history of the continent demonstrates that major systemic shocks act, in most cases, as the primary catalyst for institutional innovation. Although the post-war foundations of European integration were publicly legitimized through an appeal to the collective memory of conflict, the mechanism that ensured the project's actual survival was strictly economic. By placing strategic sectors under a

supranational authority, European states were compelled to abandon economic nationalism in favor of irreversible market interdependence [1]. Thus, common governance became a sophisticated instrument of resilience, capable of absorbing crises through spillover effects and continuous structural adaptation [2].

The absolute driver of this transformation at the regional level was the influx of a stock of Foreign Direct Investment (FDI) which currently exceeds the historical threshold of 100 billion euros. This mass of capital has completely restructured the domestic productive apparatus. In less than two decades, Romania has evolved from a transition economy based on cheap labor and primary textile exports into a diversified industrial force, climbing substantially in the *Atlas of Economic Complexity* produced by Harvard University to 23rd place globally in profile evaluations [3]. This technological sophistication is visible at the micro level through the development of high-performance industrial hubs, such as the automotive poles (Dacia-Renault in Mioveni and Ford Otosan in Craiova), which have generated extensive networks of local suppliers with high value-added [4]. In the same global complexity benchmark, positions immediately above are occupied by major innovative powers such as the United States (20th), France (21st), and Denmark (22nd) [3].

Paradoxically, although Romania is recognized as a high-income country, occupying 43rd place in a hierarchy of the wealthiest economies per capita out of 145 studied by the Harvard Growth Lab, its productive structure is much more complex than would be expected for its current income level [3]. However, aggregate convergence figures often mask severe internal discrepancies, a critical aspect that this analysis addresses head-on. That huge stock of foreign investment is disproportionately concentrated in the Bucharest-Ilfov area and in the western counties, leaving macro-regions like North-East or South-West vulnerable from a productive standpoint [5].

Furthermore, the economic architecture remains exposed to external shocks. The recent period of poly-crises (2022-2025) revealed serious macroeconomic fragilities: inflationary pressures exceeding the 15% threshold and concerning current account deficits, which constantly oscillate between 6% and 9% of GDP [6]. The fact that Romania operates under the restrictions of the Excessive Deficit Procedure (EDP) triggered by the European Commission underscores the limits of a growth model largely sustained by consumption [6]. Faced with these turbulences, state resilience was no longer based on conjunctural political interventions, but on independent economic instruments. The National Bank of Romania (BNR) provided a shield of stability through a strictly managed liquidity approach and a monetary policy interest rate maintained at 7%, protecting the purchasing power of the national currency [7].

Regarding investment, the National Recovery and Resilience Plan (PNRR), approved in its modified version by the EU Council in December 2023, injects 28.5

billion euros into infrastructure and structural reforms, of which 14.9 billion euros are allocated as loans and 13.6 billion euros as grants (including the REPowerEU package), conditioning each financial tranche on the implementation of substantive fiscal reforms [8]. This introduction sets the analytical framework of the paper: to overcome its status as an assembly economy and secure long-term convergence, Romania must transition from formal integration, based on legislative alignment, to internal structural resilience, characterized by technological innovation, budgetary discipline, and regional cohesion.

2 Research Questions and Methodology

To move beyond purely descriptive approaches and to dissect the structural dynamics of the convergence model, this research is guided by three fundamental questions:

1. To what extent has the "External Anchor" represented by the EU driven a qualitative mutation in the Romanian productive apparatus, moving beyond mere formal institutional compliance?
2. What is the actual impact of asymmetries in the territorial distribution of capital flows (FDI) on the widening of subnational economic disparities?
3. How has Romania's macro-monetary stabilization architecture interacted with the asymmetric shocks of the poly-crisis period (2022-2025), under the conditions of a chronic structural fiscal deficit?

Methodologically, this study is framed as an institutional political economy case study, employing a mixed qualitative-structural analysis. This conceptual lens was chosen over a purely linear quantitative econometric model because our primary objective is not to isolate a statistical regression function, but rather to dissect the behavioral mechanics of regulatory institutions during periods of systemic stress. To quantify structural transformation, the research utilizes a comparative analysis of real convergence indicators, specifically GDP per capita at Purchasing Power Parity (PPS), alongside industrial sophistication metrics sourced from the Harvard Growth Lab's Atlas of Economic Complexity. [3] The correlation between capital flows and convergence is evaluated by examining the evolution of the Foreign Direct Investment (FDI) stock as reported by the National Bank of Romania [7], cross-referenced with Eurostat data on regional asymmetries [5]. This methodology enables us to isolate microeconomic spillover effects (via case studies on industrial clusters) while simultaneously assessing macroeconomic vulnerabilities through the lens of the Excessive Deficit Procedure [6].

To validate the macroeconomic hypotheses and dissect the mechanisms through which European integration has generated structural transformations, this paper

analyzes two microeconomic case studies representative of Romania's coupling to global value chains: the industrial clusters of Mioveni (Dacia-Renault) and Craiova (Ford Otosan). These serve as units of analysis to observe how the transfer of technology and know-how from multinational corporations to the local supplier ecosystem has stimulated industrial convergence. At the same time, these case studies offer a critical perspective on the limits of indigenous innovation, demonstrating that while integration has been a success in terms of assembly and sophistication, the capacity to generate one's own value-added remains conditioned by R&D policies and the retention of highly skilled human capital.

3 The Case of Romania: Systemic Transition and the EU's "External Anchor"

Romania's post-communist transition serves as an ideal empirical laboratory for analyzing adaptive governance under the pressure of systemic crises. The collapse of the Council for Mutual Economic Assistance (COMECON) trade networks and the abrupt deindustrialization of the 1990s created a macroeconomic environment characterized by extreme volatility, hyperinflation, and institutional fragmentation. Within this context of structural vulnerability, the opening of EU accession negotiations (Helsinki, 1999) acted as a vital exogenous stabilization anchor [9].

From a theoretical perspective, the analytical bridge between post-1945 Western European resource management and Romania's post-1989 synchronization does not aim to identify similarities in raw industrial sectors. Rather, it operates strictly at the level of the mechanism of sovereignty transfer. In both cases, the forced adoption of exogenous governance rules, driven by the imperative of crisis survival, functioned as the sole vector capable of dissolving rigidities and resistance to reform within domestic state structures. The management of pre-accession programs (Phare, ISPA, SAPARD) imposed a strict procedural discipline, forcing the domestic bureaucracy to internalize rigorous standards of audit and fiscal transparency [10].

The effects of the EU's external anchor were not confined to the modernization of public institutions. The accession process also increased Romania's credibility in the eyes of international investors by reducing uncertainty and reinforcing expectations of long-term stability. Consequently, the institutional reforms required by European integration were accompanied by a substantial increase in Foreign Direct Investment, which became one of the main drivers of economic transformation.

3.1 Foreign Direct Investment and Industrial Complexity

The effects of the EU's external anchor extended far beyond administrative reform. As Romania moved closer to membership, the accession process increased the country's credibility in the eyes of international investors by reducing uncertainty and reinforcing expectations of long-term political and economic stability. The opening of accession negotiations in 2000 provided a clear roadmap for legislative and institutional modernization, while signaling Romania's future integration into the European Single Market.

As a result, the country experienced an unprecedented surge in Foreign Direct Investment (FDI). Between 2003 and 2008, annual FDI inflows increased from approximately USD 2.2 billion to a record USD 13.5 billion. This remarkable expansion was driven by the combination of EU-driven institutional reforms, an accelerated privatization process, and favorable international economic conditions. By 2008, Romania had become one of the most attractive destinations for foreign capital in Central and Eastern Europe, demonstrating how European conditionality could translate into tangible economic transformation [11].

The importance of this investment boom lies not only in its scale but also in its structural impact. A significant share of foreign investment was directed toward industry, contributing to technology transfer, productivity growth, export upgrading, and the integration of Romanian firms into European and global production networks. Foreign-owned companies introduced new managerial practices, modern technologies, and higher production standards, helping domestic suppliers become more competitive and accelerating the modernization of the productive sector. In this sense, FDI functioned as a catalyst for industrial upgrading rather than merely as a source of external financing.

The results of this transformation are clearly visible in Romania's position within the global economy. Over the course of two decades, the country evolved from a transition economy associated primarily with low-cost labor and labor-intensive exports into a far more diversified and technologically sophisticated manufacturing base [3]. This shift is reflected in Romania's steady rise in the Economic Complexity Index, which measures the diversity and sophistication of a country's productive capabilities.

This qualitative mutation is faithfully reflected in The Atlas of Economic Complexity, where the country has recorded a remarkable ascent, consolidating its position within the upper echelon of sophisticated economies [3]. Furthermore, the predictive power of this development model was documented as early as the seminal Boston-based research editions, where long-term growth projections placed Romania 16th globally and 6th in the Eastern Europe and Central Asia region regarding estimated GDP per capita dynamics for the 2009-2020 interval. This early performance was theoretically grounded precisely in the positive asymmetry

between the structural complexity already accumulated by the domestic productive apparatus (corresponding to 52nd place globally in 2009) and its level of monetization at that time. The predictive gap indicated that Romania possessed untapped technical know-how, capable of propelling the average income from 7,500 USD to a projected value of 10,823 USD by 2020, thus validating in advance the success of the real convergence model that followed [12].

A crucial methodological aspect, highlighted in the definitive data published by Harvard for the 2024 horizon, is the positive asymmetry between gross income levels and the country's technological capacity. While Romania ranks 43rd globally in terms of gross wealth per capita in profile evaluations, its structural performance from the perspective of the Economic Complexity Index (ECI) places it considerably higher, at 23rd worldwide [3].

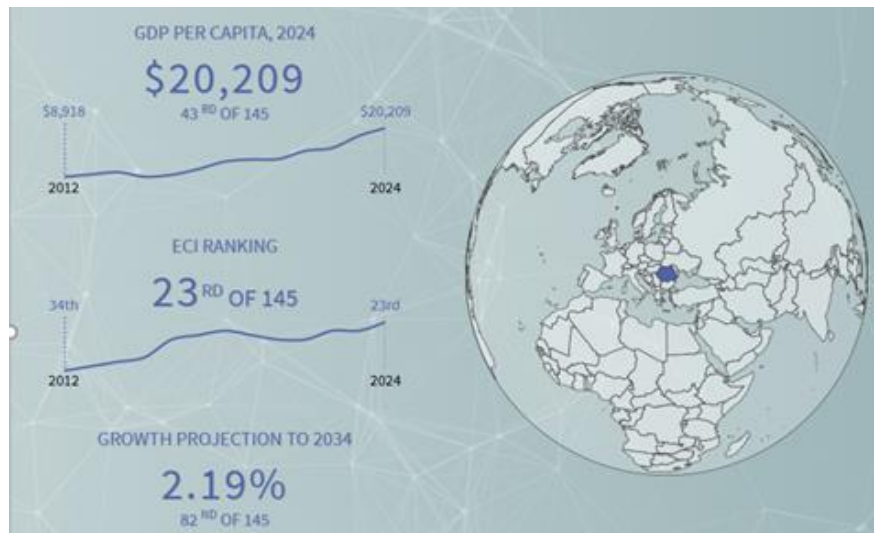


Figure 1

Harvard Growth Lab. Romania's Economic Complexity Profile, The Atlas of Economic Complexity, Harvard University, Boston, 2024
<https://atlas.hks.harvard.edu/countries/642>

This exceptional positioning places Romania in the immediate vicinity of frontier economies such as the United States (20th), France (21st), and Denmark (22nd), while also revealing a striking macroeconomic paradox: it net-surpasses Norway, which currently sits at 39th in the same global benchmark [3].

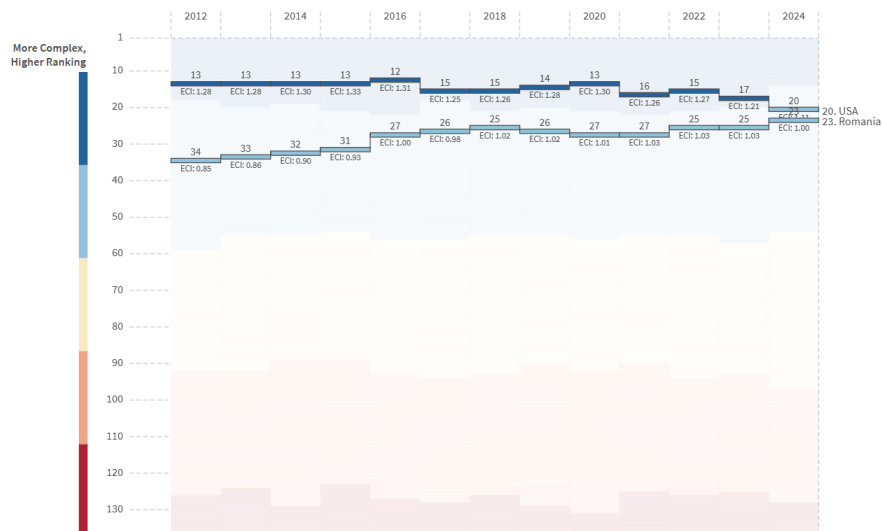


Figure 2
Complexity Rankings and Growth Projections
<https://atlas.hks.harvard.edu/rankings/>

At the micro-level, this technological sophistication is clearly visible in the density of high-performance domestic hubs - such as the automotive clusters in Mioveni (Dacia-Renault) and Craiova (Ford Otosan) - which are capable of vertically integrating extensive networks of local suppliers into high value-added processes [4]. However, this model reveals a major structural flaw: territorial distribution remains profoundly asymmetric. As highlighted in Figure 3, the massive concentration of capital within the Bucharest-Ilfov region and the technological hubs of the west leaves the country's geographical periphery in a state of productive isolation.

Development Region	Share of Total FDI Stock (%)	GDP per capita in PPS (% of EU average)
București - Ilfov	61.2%	> 160%
Vest (Timiș, Arad)	11.5%	85%
Centru (Brașov, Sibiu)	8.8%	78%
Nord-Est (Moldova)	3.1%	46%
Sud-Vest Oltenia	2.4%	51%

Table 1

Regional Distribution of FDI Stock and Regional GDP Gaps in Romania

Source: Synthesis based on National Bank of Romania (BNR) Regional FDI Reports [7] and Eurostat regional accounts data [5]. The table maps the severe spatial polarization of foreign capital, demonstrating a direct mathematical link between localized FDI concentration and subnational economic divergence [13].

National wage dynamics confirm deep-seated disparities across economic sectors, directly mirroring the hierarchy of economic complexity and the varying capacities to absorb high value-added investments. Data synthesized by the National Institute of Statistics in its Monthly Statistical Bulletin (No. 12/2025) [14] reveals a significant structural gap favoring advanced technological sectors in both gross and net average monthly earnings.

A comparative analysis of the Bulletin's indicators (Tables 47, 48) shows that net compensation in high-tech industrial branches - such as electronics manufacturing, computer production, and advanced automotive transport - consistently outperforms the industrial sector average. This wage premium, ranging between 25% and 35%, serves as more than just a proxy for sectoral profitability; it acts as a primary driver of regional economic divergence, effectively pulling highly skilled labor toward major industrial hubs and urban growth poles [14].

3.2 Real Convergence and Macroeconomic Vulnerabilities

At the aggregate level, closing the gap with the European Union average represents an undeniable success of this economic integration model. Historical data demonstrates a sharp acceleration in real convergence indicators, with Romania surpassing the 80% threshold of the EU average by 2026 [5]. Labor productivity per employed person has followed a similar trajectory, bolstered by the rapid digitalization of services and the aforementioned industrial sophistication [6].

This upward path has been accompanied by a profound reconfiguration of the country's financial status on the global stage. According to synthesis structural analyses issued by the World Bank, accumulated performance has allowed Romania - alongside a select group including Bulgaria, Panama, and Costa Rica - to officially reach high-income status. This marks a historic transition, with the country advancing from its previous classification as a “frontier market” to the higher tier of “emerging markets” between 2012 and 2025 [15].

Reference Year	GDP per capita in PPS (% of EU average)	Labor Productivity (% of EU average)	Current Account Deficit (% of GDP)	Structural Fiscal Deficit (% of GDP)
2000 (Start of negotiations)	26%	31%	-3.7%	-4.2%
2007 (Effective accession)	44%	49%	-13.4%	-2.9%
2023 (Post-pandemic)	78%	72%	-7.1%	-6.3%
2026 (Current estimates)	83%	79%	-6.8%	-5.9%

Table 2

Evolution of Core Macroeconomic Convergence Indicators (2000-2026)

Source: Constructed by the author using data from Eurostat (2026) [5], World Bank Macro Poverty Outlook [6], and IMF Country Reports [16]. The operational metrics track the core paradox of the Romanian model: a spectacular catch-up process occurring simultaneously with the accumulation of internal and external macroeconomic imbalances.

This spectacular convergence trajectory, however, masks the buildup of chronic macroeconomic vulnerabilities typical of a small, open economy heavily reliant on external financial cycles [6]. The "twin deficits" - manifested by a persistent structural fiscal deficit coupled with a significant current account shortfall consistently oscillating between 6% and 9% of GDP - place Romania in a precarious position regarding capital market volatility [16]. Remaining under the Excessive Deficit Procedure (EDP) reflects severe budgetary rigidity, where current state expenditures leave extremely limited fiscal space for public investment financed from national funds [6].

During the recent poly-crisis period (2022-2025), characterized by asymmetric shocks to energy supply chains and an inflationary spike exceeding 15%, Romania's macroeconomic resilience was tested to its limits [6]. In this crisis scenario, stabilization did not emerge from pro-cyclical fiscal policies, but rather from an

autonomous institution: the National Bank of Romania. As a case study in micro-monetary adaptive governance, the NBR implemented a rigorous strategy to counter exogenous shocks. By finely tuning liquidity management in the interbank market and firmly raising the key policy rate to 7%, the central bank succeeded in anchoring inflation expectations and stabilizing the leu's exchange rate, thereby preventing a massive capital outflow [7]. This institutional shield provided the necessary breathing room for structural funds from the multiannual financial framework and PNRR injections - a 28.5 billion euro allocation approved in December 2023, structured into specific loans and grants - to begin restructuring the real economy, while conditioning further funding on the implementation of fiscal sustainability reforms [8].

3.3 Integration into Global Value Chains and Analysis of Complexity Indicators (2025-2026)

To understand the depth of this substantial integration, beyond the classical indicators of nominal convergence, it is imperative to dissect how the domestic productive apparatus has coupled with global value chains (GVCs). A landmark analysis published in the structural assessment reports issued by PwC Romania indicates that the country's accelerated rise in the Global Economic Complexity Index has been the primary vector that enabled it to surpass the critical threshold of 80% of the European Union's average GDP per capita [17]. This sophistication is not an abstract phenomenon; the performance is directly attributable to the development of high value-added industries. From this perspective, the production of industrial equipment, the manufacturing of high-power electrical transformers, and the development of the precision electronics segment have fundamentally reconfigured the profile of Romanian exports [17].

The qualitative shift from the traditional model, once based on low-wage labor, toward advanced manufacturing is further confirmed by operational data from the National Institute of Statistics (INS). According to official statistics, net wage earnings in high-tech sectors - with a particular focus on the pharmaceutical industry and the production of advanced automotive components - are 25-35% higher than the average recorded across the entire national industrial sector. This wage gap demonstrates the maturation of the labor market and the capacity of growth poles to attract highly skilled workers, thereby solidifying the transition toward substantive integration [14].

The OECD Economic Survey for Romania reinforces this paradigm, highlighting a convergence in income and productivity driven by profound structural reforms [18]. The implementation of projects financed through the National Recovery and Resilience Plan (PNRR) has acted as the primary growth engine, partially offsetting global economic uncertainties and transforming structural vulnerabilities into a

regional competitive advantage [8]. This structural resilience has been underpinned by a robust financial system; official data from the Financial Stability Report published by the National Bank of Romania demonstrates that the banking sector's performance and the prudential standards implemented by the NBR have served as an effective shield against global shocks [7].

However, it must be emphasized, as a note of analytical caution, that the convergence target estimated at 83% for the end of the 2026 fiscal year represents a baseline scenario contingent upon the stability of the regional geopolitical context. The latest OECD macroeconomic report (2026) indicates a temporary slowdown in real GDP growth in the short term, burdened by sovereign debt risks and domestic wage pressures [18]. Therefore, the 83% figure should be decoded not as a mathematical certainty, but as a projection strictly conditional upon the maintenance of the European security architecture and the acceleration of the effective absorption rate of PNRR funds before the August 2026 deadline [8]. Furthermore, an inherent limitation of the "External Anchor" model lies in its heavy reliance on the decisions of multinational corporations managing FDI flows in key technological sectors [4].

Currently, aggregate data do not precisely quantify what percentage of net value-added remains stored within the local economy to autonomously finance domestic research and development (R&D) programs. Future research will need to monitor the spillover effect on local SMEs to determine whether Romania is transitioning toward an indigenous innovation model or will retain the status of a "satellite" economy - albeit a high-tech one - within global supply networks.

3.4 Critical Discussions on the Sustainability of the Romanian Convergence Model

A rigorous scientific evaluation of Romania's post-communist trajectory requires abandoning exclusively triumphalist narratives in favor of a head-on analysis of the systemic vulnerabilities that jeopardize the long-term sustainability of convergence. In academic literature focused on Central and Eastern Europe, the economic model adopted by Romania is often conceptualized as a "dependent market economy" [19]. This structural paradigm reveals that while exogenous anchoring in European Union rules has ensured a massive infusion of capital, it has simultaneously generated a tactical subordination to the macro-strategic decisions of multinational corporations. The primary weakness of this mechanism lies in the risk of being caught in the "middle-income trap" - a plateau phase in which an economy loses its competitive advantages based on low labor costs, yet lacks the internal technological maturity to encompass or compete directly with economies based on pure innovation [20]. In this complex structural context, the fundamental question dominating current macroeconomic debates is whether this regional model centered

on massive FDI inflows can still evolve toward a new qualitative chapter of development, or whether its systemic rigidities irreversibly block the transition to frontier industries based on indigenous innovation [4].

A chronic barrier to economic autonomy is the systemic underfunding of the Research and Development (R&D) sector. With a consolidated budget allocation that has historically hovered below the 0.5% of GDP threshold (far below the 3% strategic target set by the European agenda) Romania fails to internalize and multiply the value added by foreign investors, officially earning it the label of a "modest innovator" in EU scoreboard evaluations [21]. The cutting-edge technology operated within the automotive clusters in Mioveni or Craiova is, in essence, imported know-how, while the domestic capacity to generate local industrial patents remains extremely limited. This structural gap turns real convergence into an asymmetric process: the country is rapidly closing the gap in terms of consumption and GDP per capita, yet it maintains a subordinate position within global value chains, functioning primarily as a provider of highly skilled, yet outsourced, technical labor.

These structural rigidities are compounded by a profound demographic crisis, structurally amplified by the phenomenon of international labor migration (brain drain) [22]. The loss of a significant share of the active human capital, particularly from segments with tertiary education and advanced technical qualifications, places severe pressure on the sustainability of social protection systems and limits the expansion capacity of regional industrial hubs. Thus, in the absence of aggressive public policies to stimulate indigenous innovation and correct the fiscal asymmetries of the Excessive Deficit Procedure, the Romanian model risks burning through the historical fuel provided by the first phase of integration, remaining trapped in the role of a satellite economy with fragile resilience against future asymmetric global shocks.

The Social Limits of Convergence

Despite these important achievements, economic convergence has not fully translated into social and territorial equality. Romania has experienced strong economic growth since joining the European Union, but significant inequalities remain. In 2023, Romania's Gini coefficient was around 32, above the EU average of approximately 30, indicating that the benefits of economic growth and European integration have not been equally shared among all regions and social groups.

Regional disparities remain one of the country's major challenges. Rural areas continue to be among the most vulnerable parts of Romania, representing around half of the population and facing greater difficulties in access to infrastructure, healthcare, education, and public services. The North-East region is one of the clearest examples of this imbalance, with a GDP per capita level of only around