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Institutional Quality and Regional Growth: Panel VECM Evidence from EU and Western Balkan Economies

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Abstract

Regional competitiveness and growth performance in EU enlargement contexts depend critically on institutional foundations, yet the extent to which governance quality shapes macroeconomic policy transmission remains insufficiently examined in comparisons between the European Union and the Western Balkans. Using a panel Vector Error Correction Model (VECM) for 33 countries over 2002–2022, this paper compares cointegration patterns, adjustment dynamics, and shock transmission channels across both regions. The results show pronounced structural differences: in the EU panel, macroeconomic policies transmit more effectively into real outcomes, consistent with a stable institutional environment and stronger policy credibility. Long-run estimates further indicate that institutional quality is more strongly associated with sustained growth in the EU than in the Western Balkans, where weaker institutional anchoring limits reform effectiveness. These findings suggest that stronger institutions facilitate resilient regional competitiveness and more effective macroeconomic policy, implying that governance reforms should accompany, and in many cases precede, stabilization and liberalization efforts in EU pre-accession settings.

Keywords: institutional quality; regional competitiveness; economic freedom; panel VECM; Western Balkans; EU convergence

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1. Introduction

European Union and Western Balkan economies pursue similar growth strategies: inflation targeting, fiscal consolidation, and market liberalization [1]. Yet divergent outcomes suggest these operate differently by institutional context. This article challenges the assumption that macroeconomic ‘best practices’ are universally applicable.

The puzzle becomes evident when comparing specific cases. Montenegro and Poland both adopted euro-linked monetary regimes after 2002. Both stabilized public debt through fiscal discipline. Both liberalized trade via CEFTA and EU accession pathways. Both submitted to similar international conditionality. Yet by 2023, Poland had reached around 80% of EU living standards, while Montenegro remained at just 51%, a striking 29-

percentage-point gap in outcomes, despite both countries following broadly similar policy frameworks [2]. Why would identical policies produce such divergent outcomes?

This institutional divergence has direct consequences on the ability of firms, regions, and economies to sustain and build upon innovative activity over time. Where institutions are credible and property rights secure, early investments generate knowledge spillovers, attract complementary capital, and reinforce the conditions for further innovation. Where governance is fragile, innovation remains episodic rather than persistent, as firms cannot appropriate returns reliably and long-run investment in knowledge-intensive activities is discouraged. The long-run cointegrating relationships estimated in this study capture precisely this dynamic: institutional quality is associated with whether economies can sustain virtuous cycles of growth or remain trapped in low-equilibrium trajectories.

Standard macroeconomic theory offers no satisfactory answer. Both countries followed the prescribed playbook. The International Monetary Fund and World Bank endorsed their stabilization programs. Yet one succeeded dramatically and the other stagnated. This research argues that the decisive difference lies not in what policies were adopted, but in how institutional quality mediated their effects. Consider the institutional contrast. Poland's judiciary, reformed during 1995–2005, became genuinely independent and enforced contracts impartially. Investors could rely on courts to resolve disputes without political interference. By contrast, reform progress in Montenegro's judiciary lagged on key indicators of judicial independence and property registry completeness [3]. Contract enforcement became unpredictable. Similarly, Poland established a functional property registry early (1990s), enabling credible lending and long-term investment. Montenegro's property system remained fragmented, with many titles unregistered, records partly offline, and title disputes endemic until the late 2010s [4]. These institutional differences determined whether macroeconomic policy actually led to growth [5]. The consequences were clear. In Poland, the central bank's signals of price stability were credible because independent courts enforced contracts and property rights were secure. As a result, firms invested for the long term. In Montenegro, similar signals lacked credibility. Weak courts and insecure property rights undermined trust, leading firms to treat investment as speculative. Capital outflows followed, and growth stagnated.

Moreover, the institutional foundations identified as binding constraints on growth and innovation capacity are equally central to the green and digital transitions: economies that cannot credibly enforce property rights or sustain rule of law will struggle to attract the long-horizon private investment required for renewable energy infrastructure and digital transformation, making institutional reform not merely a precondition for EU accession but for sustainable resilience in the face of climate and technological disruption.

The theoretical foundation of this research is grounded in New Institutional Economics, particularly the framework of Douglass North (1990) [5], which identifies institutions as the “rules of the game” that lower transaction costs and make economic exchange credible. This study challenges the standard Washington Consensus by proposing the Institutional Mediation of Macroeconomic Transmission, arguing that the effectiveness of macroeconomic policy is fundamentally conditional upon institutional maturity. From this foundation, the paper examines a single, central hypothesis: standard macroeconomic determinants exhibit comprehensive predictive power and stable equilibrium adjustment in the European Union, while remaining largely decoupled from short-run growth trajectories and exhibiting volatile adjustment in the Western Balkans. This framework demonstrates that without institutional foundations like judicial independence and secure property rights to anchor expectations, conventional policy instruments fail to produce durable economic outcomes, necessitating a paradigm shift where governance reform precedes or accompanies stabilization and liberalization.

Therefore, the main research question of this paper is: Do macroeconomic variables exhibit broader and more consistent Granger-cause predictive power for economic growth in EU countries with stable institutions than in the Western Balkans with more fragile institutional frameworks, thereby implying the need for a paradigm shift in policy sequencing?

This study examines whether macroeconomic variables exert stronger predictive power for economic growth in EU countries than in Western Balkan countries, with institutional quality shaping this relationship. The hypothesis is that the predictive power of macroeconomic variables for economic growth is broader and more consistently significant in EU countries than in Western Balkan countries, and that this difference is associated with institutional quality.

The analysis is structured around three central questions: first, whether long-run cointegrating relationships differ across regions; second, whether short-term adjustment dynamics diverge; and third, which exogenous shocks predominantly drive growth trajectories.

This analysis offers three substantive contributions.

First, empirical novelty: this is the first panel Vector Error Correction Model (VECM) directly comparing EU and Western Balkan cointegration and causal structures using an identical specification across both regions. While previous studies have examined these regions separately, this study explicitly identifies and compares their structural differences. Therefore, it offers a direct comparison of EU and Western Balkan economies using the same dynamic specification, which makes the regional differences easier to interpret.

Second, theoretical contestation: institutional quality, not macroeconomic variables, determines Granger predictability patterns and shock transmission. While Douglass North (1990) emphasized the importance of institutions [5], this article shows that macroeconomic policy depends on them. Without credible courts and property rights, central bank independence becomes nominal rather than real. Fiscal rules become unenforceable. Trade liberalization produces asset-stripping rather than productivity growth.

Third, policy reframing for EU accession frameworks: EU accession conditionality must rebalance toward Rule of Law (Chapters 23 and 24) and away from macro targets (Chapter 4). Despite pressing institutional constraints, IPA funding allocates approximately 60 percent of resources to macroeconomic stabilization and only about 20 percent to institutional reform, contrary to development requirements [6]. The rebalance should allocate 50% to institutional foundational work. Evidence from Western Balkan economies illustrates precisely why. Multiple countries achieved headline macroeconomic targets (inflation $\leq 4\%$, public debt $\leq 65\%$ of GDP) yet experienced stagnant growth (1–2% annually), elevated unemployment (15–18%), and persistent youth joblessness (35–40%) [7]. Even when macroeconomic targets are met on paper, the failure to generate jobs or growth reveals underlying institutional constraints. For the Western Balkans, EU integration is not only about macroeconomic alignment but about the ability to operate within the EU's common market, which requires enforceable competition policy, legal certainty, and institutional capacity. Without these, integration delivers openness without discipline. The paradigm must shift—institutional reform is not just a complement to macroeconomic stabilization—it is its foundation.

Sections 2 and 3 review the literature, present the data, and outline the VECM methodology. Sections 4 and 5 report results on long- and short-run dynamics, Granger causality, and variance decomposition. Sections 6 and 7 interpret the findings institutionally and draw out policy implications, and Section 7 concludes.

2. Literature Review

Previous research has largely established that macroeconomic variables are linked to economic growth, but less attention has been paid to whether this relationship varies across countries with different institutional capacities. In particular, the literature does not sufficiently explain whether macroeconomic determinants have comparable predictive power in the EU and the Western Balkans. This study fills that gap by explicitly comparing both groups and linking the analysis to institutional quality, thereby aligning the literature review with the study's objectives.

2.1. *The Washington Consensus: Dominance and Critique*

The dominant paradigm shaping transition economies since 1989 has been the Washington Consensus, articulated by Williamson [1]. The framework outlined ten policy prescriptions, encompassing macroeconomic stabilization (fiscal discipline, inflation targeting), trade liberalization, privatization, and deregulation.

In the Western Balkans, stabilization programs supported by international institutions helped reduce inflation from historically high and volatile levels toward more moderate rates in the mid-2000s as part of coordinated macroeconomic reform [8]. Regional export integration increased markedly over the 2000s and 2010s, with exports to the EU more than doubling amid tariff reductions and trade facilitation [9]. Despite reforms and periods of rapid growth, GDP per capita in the region remains well below the EU average, at roughly 30–50 percent of EU levels [10]. Early expectations of rapid convergence with EU living standards remain unfulfilled two decades later, as IMF and World Bank analyses highlight persistent structural challenges [11]. By 2023, GDP per capita in the Western Balkans (PPP-adjusted) remained under 40% of the EU average, rising only modestly since the early 2000s, even though growth often exceeded EU rates [12]. At the World Bank's projected growth of 3.2–3.7% annually, Western Balkan economies would need sustained growth above 4–5% per year to close the income gap with the EU by mid-century, a pace unlikely to be achieved without comprehensive structural reforms [13].

Persistent growth shortfalls in the Western Balkans are mirrored in labour markets, where unemployment exceeds 10%, and labour force participation remains below 55%, especially for women and young people [14]. In 2023, North Macedonia faced an unemployment rate of 13.2% and youth unemployment near 27%, almost double the EU average [15]. Structural mismatches in labour supply and demand, particularly among youth and women, indicate that macroeconomic stabilization alone has not generated the employment and income growth needed to close the gap with EU living standards [16].

The gap between policy implementation and economic outcomes has long drawn critique. Stiglitz emphasized that the Washington Consensus overlooked institutional preconditions, such as functioning courts, secure property rights, and transparent governance [17]. Recent evidence confirms these concerns: IMF programs focused on fiscal targets and liberalization often produce uneven outcomes, with weak governance amplifying social costs and limiting growth [18]. Similarly, Rodrik's argument against one-size-fits-all reforms is reinforced by recent panel studies showing that institutional quality—rule of law, judicial effectiveness, and government integrity—predicts income growth more reliably than standard liberalization prescriptions [19]. While the IMF has begun integrating governance considerations into program design, progress remains gradual; macroeconomic targets continue to dominate conditionality frameworks.

2.2. *The Institutional Turn and Its Relevance for Western Balkans Convergence*

Douglass North's key insight was that institutions—the 'rules of the game'—shape incentives, lower transaction costs, and make economic exchange credible [5]. When property rights are secure and contracts enforceable, investment can take place with confidence. This perspective shifted development economics from focusing solely on capital and labour to examining the institutional frameworks that determine whether resources lead to sustained growth [20].

Classic contributions such as Hall and Jones's demonstration that institutions explain a large share of cross-country growth variation [21] and Acemoglu, Johnson and Robinson's use of historical instruments to establish institutional causality remain central [20]. Recent empirical work across 113 countries confirms that key institutional components—rule of law, government integrity, and judicial effectiveness—have a stronger association with long-run growth and income than broad liberalization measures, once institutional quality is controlled for [22]. Recent research finds that enhancing institutional quality boosts per capita income and growth, especially in countries starting from weak institutions, reflecting threshold and nonlinear effects [23].

Analyses specific to European and Western Balkans contexts find that government effectiveness, regulatory quality, and control of corruption are significant positive determinants of GDP per capita growth, particularly where accession or convergence pressures exist [24]. Empirical analysis using World Bank Governance Indicators finds that government effectiveness and regulatory quality have strong, statistically significant positive effects on GDP per capita growth, highlighting institutional quality as a binding constraint on economic performance in transition economies [25].

The theoretical debate between neoliberal and institutionalist perspectives clarifies why convergence has been uneven in the Western Balkans. Neoliberals, including major international financial institutions, assume that rapid macroeconomic stabilization will trigger institutional development endogenously. Institutionalists argue that property rights, rule of law, and governance must precede or accompany reforms; otherwise, liberalization risks transferring assets to entrenched elites rather than productive actors [26]. EU accession frameworks illustrate this tension: while Copenhagen criteria emphasize institutional foundations, pre-accession funding disproportionately supported macro targets over governance strengthening [27]. This misalignment created the conditions for Western Balkan economies to meet macroeconomic goals yet stagnate in growth, precisely the empirical puzzle addressed in this study.

2.3. *Western Balkans Context and Motivation*

Since 2002, the Western Balkan economies have broadly followed the macroeconomic stabilization and market-oriented reform agenda promoted through the European Union accession process and by international financial institutions, with the objective of progressively aligning their economies with the EU Single Market. Inflation has been substantially reduced, fiscal frameworks have become more disciplined, and trade integration with the European Union has deepened through the Stabilization and Association Process and the Central European Free Trade Agreement (CEFTA).

These reforms have contributed to greater macroeconomic stability and improved external integration, bringing the region closer to the institutional and regulatory framework of the European Union. Foreign direct investment inflows continued to be sizeable relative to the EU but shifted away from export-oriented manufacturing toward sectors such as real estate and utilities that are less integrated into global production chains, reflecting investor sensitivity to institutional quality and governance conditions [28] and highlighting the difficulty of preparing Western Balkan economies for effective participation in the EU common market.

At the same time, EU-supported rule-of-law reforms produced limited results. Although roughly €700 million was allocated through the Instrument for Pre-Accession Assistance (2014–2020) for judicial and anti-corruption reforms, effective absorption and systemic impact remained low due to political resistance and weak implementation capacity [29]. The European Court of Auditors concluded that these interventions generated limited overall progress in fundamental rule-of-law conditions in the region [29].

This institutional stagnation undermined policy transmission and the benefits of market integration. In environments where courts cannot reliably enforce contracts or protect property, firms and investors rationally discount macroeconomic signals, including central bank commitments to price stability. As a result, capital flows into sectors less affected by institutional uncertainty, while long-term productive investment stays weak. Growth stagnates not because macroeconomic discipline is abandoned, but because weak institutions prevent the stable expectations required to fully exploit the common market. Recent evidence indicates that governance and regulatory quality significantly constrain growth in the Western Balkans [30], motivating the following analysis of how institutional weakness disrupts policy transmission relative to the EU.

Despite these achievements, economic convergence with the EU has remained slower than anticipated. GDP per capita, labour productivity, employment rates, and broader living standards continue to lag behind those of EU member states, while institutional reforms have progressed unevenly across countries. Although legal and regulatory frameworks have been gradually aligned with the EU *acquis*, implementation has often been constrained by weaknesses in judicial independence, property-rights protection, regulatory quality, and governance effectiveness. Consequently, improvements in macroeconomic indicators have not consistently translated into stronger long-run growth or sustained productivity gains.

This divergence provides the principal motivation for the comparative analysis undertaken in this study. The Western Balkans are not treated simply as economies at an earlier stage of development but as a distinct institutional environment in which similar macroeconomic policies may generate different outcomes because of differences in governance quality, legal certainty, and institutional credibility. Comparing the Western Balkans with EU member states therefore offers an opportunity to examine whether institutional quality conditions the effectiveness of macroeconomic policy transmission and long-run growth dynamics.

Accordingly, this study investigates whether comparable macroeconomic policies exhibit different long-run relationships, adjustment dynamics, and predictive patterns across the EU and Western Balkans when implemented under different institutional environments. By employing an identical empirical specification for both regional panels, the analysis isolates the role of institutional quality in shaping macroeconomic transmission while providing evidence relevant for EU enlargement policy, institutional reform, and long-term economic convergence.

Building on the institutional growth literature, this study asks not whether institutions matter, but how they shape macroeconomic policy outcomes. It integrates measures of institutional quality, competition policy, and common market preparedness into a dynamic macroeconomic framework, comparing long-run growth, adjustment, and policy transmission between EU and Western Balkan economies.

3. Materials and Methods

This study uses a balanced panel covering 33 countries from 2002 to 2022, yielding 693 annual observations (EU: 567; Western Balkans: 126). The panel is designed to compare how institutional quality mediates macroeconomic policy transmission across two distinct regions: established EU member states with mature legal and regulatory frame-

works, and Western Balkan transition economies with evolving institutions and ongoing EU accession processes. The inclusion of EU accession candidates allows the analysis to capture the effects of harmonization pressures, conditionality, and regional integration on institutional development. By comparing countries with strong institutions to those with more constrained institutional environments, the study examines whether the impact of macroeconomic policy depends on the quality of institutions and governance.

The dataset consists of 33 countries in total, divided into two regional groups. The EU panel includes 27 countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, and Sweden. The Western Balkans panel includes 6 countries: Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia.

The specification is intentionally kept common across the EU and Western Balkan panels in order to preserve direct comparability of the estimated long-run relations, adjustment dynamics, and predictive patterns. The included variables are selected to capture the main transmission channels relevant to the research question, rather than to provide an exhaustive growth model. Given the relatively small Western Balkan subsample, the results for that group are interpreted cautiously and are presented as comparative and exploratory evidence, with emphasis on patterns that are robust across the dynamic specification rather than on over-precise structural inference.

The study employs a VECM framework with five variables: GDP growth, gross fixed capital formation as a share of GDP (GFCAPITAL), trade openness as a share of GDP, inflation measured by consumer prices, and the Heritage Foundation's Economic Freedom Index. Throughout this paper, 'GDP growth' refers specifically to the annual percentage growth rate of real GDP per capita and constitutes the dependent variable of the VECM system. GDP growth is the dependent growth variable, while investment, trade, inflation, and economic freedom are treated as endogenous variables in the system. These indicators are chosen because they capture the main channels through which macroeconomic stability, external integration, and institutional quality may affect growth performance. Institutional quality is measured by the Heritage Foundation Economic Freedom Index (LOGEF), which incorporates property rights, judicial independence, business freedom, and corruption control, testing whether institutions mediate policy effectiveness. Institutional quality is proxied by the Heritage Foundation Economic Freedom Index because it provides a broad, annually updated composite measure of the institutional and policy environment in which market exchange occurs, including property rights, judicial effectiveness, government integrity, tax burden, business freedom, labour freedom, and trade freedom. In the context of this study, the index is useful because the research question concerns how institutional credibility conditions macroeconomic transmission, and LOGEF captures several institutional dimensions that are directly relevant to that mechanism rather than a single governance dimension. Although alternative indicators such as the World Governance Indicators are widely used, they measure related but not identical concepts and are often more fragmented across separate dimensions; by contrast, the Heritage index offers a single composite proxy that is suitable for a parsimonious panel VECM specification. This choice is consistent with prior literature that has used economic freedom as a proxy for institutional quality and has shown that institutional distortions, regulatory quality, and market freedom are closely linked to growth and policy effectiveness.

The explanatory variables are selected on a theory-driven and channel-based basis, reflecting the main mechanisms emphasized in the growth, institutions, and trade literature. Gross fixed capital formation represents the capital-accumulation channel through which investment affects long-run growth; trade openness captures external integration, competition, and technology diffusion; inflation proxies macroeconomic stability and the

credibility of stabilization policy; and economic freedom is retained because prior research shows that governance quality, policy predictability, and institutional environment condition the effectiveness of economic reform. Together, these five variables allow the model to examine the principal macroeconomic and institutional channels that are repeatedly identified as relevant for growth, especially in transition and convergence settings.

The panel Vector Error Correction Model (VECM) is selected because the empirical setting combines non-stationary variables with evidence of cointegration, while the research objective is explicitly to examine both long-run equilibrium relations and short-run adjustment dynamics. A VECM is appropriate in this context because it preserves the long-run information embedded in the levels of the variables, while also allowing deviations from equilibrium to be modelled through an error-correction term that captures the speed and direction of adjustment. This is particularly well suited to the present study, which compares two regional panels that are likely to differ not only in the strength of long-run associations but also in the way shocks are transmitted over time. The common VECM specification therefore provides a coherent framework for testing whether macroeconomic, institutional, and distributive variables are linked differently in the EU and Western Balkan groups, while remaining consistent with the unit root and cointegration properties of the data.

Given the likely presence of common regional and global shocks across the countries in the sample, we explicitly examined cross-sectional dependence before proceeding with the panel time-series analysis. The evidence indicates strong contemporaneous dependence in both the EU and Western Balkan panels, suggesting that the countries are not independent observations and that first-generation panel unit-root tests should be interpreted with caution. We therefore complement the baseline diagnostics with second-generation evidence that is more appropriate when common shocks and spillovers are present. This improves the consistency of the empirical strategy and supports the continued use of a cointegration framework, while also motivating a more conservative interpretation of the inference.

Table 1 reports the results of the cross-sectional dependence test and the CIPS-style unit-root checks for the main variables used in the analysis. The evidence indicates pronounced cross-sectional dependence in both panels, which means that first-generation unit-root procedures should be interpreted with caution.

Table 1. Cross-sectional dependence and CIPS-style unit-root results.

Panel	Test/Variable	Statistic	<i>p</i> -Value	Interpretation
EU	Pesaran CD, GDP growth	57.779	0.000	Strong cross-sectional dependence
WB	Pesaran CD, GDP growth	12.940	0.000	Strong cross-sectional dependence
EU	CIPS-style t-stat, GDP growth	−2.034		Broadly consistent with non-stationarity in levels
WB	CIPS-style t-stat, GDP growth	−1.508		Broadly consistent with non-stationarity in levels
EU	CIPS-style t-stat, GFCF	−1.579		Broadly consistent with non-stationarity in levels
WB	CIPS-style t-stat, GFCF	−1.073		Broadly consistent with non-stationarity in levels
EU	CIPS-style t-stat, Trade	−1.241		Broadly consistent with non-stationarity in levels
WB	CIPS-style t-stat, Trade	−0.664		Broadly consistent with non-stationarity in levels
EU	CIPS-style t-stat, Inflation	−1.070		Broadly consistent with non-stationarity in levels
WB	CIPS-style t-stat, Inflation	−2.580		Borderline, still cautious in levels
EU	CIPS-style t-stat, Economic Freedom	−1.620		Broadly consistent with non-stationarity in levels
WB	CIPS-style t-stat, Economic Freedom	−1.585		Broadly consistent with non-stationarity in levels

Source: Authors' calculations.

The second-generation unit-root evidence is broadly consistent with non-stationarity in levels. Although the panel exhibits cross-sectional dependence, the main variables do not appear to be stationary in their level form, which supports the use of a long-run cointegration framework. At the same time, because the sample contains common shocks and the Western Balkan subsample is relatively small, the results are interpreted conservatively and are presented as evidence of long-run association rather than as definitive proof of a fully identified structural system.

Overall, the results remain broadly consistent with non-stationarity in levels, thereby supporting the use of a cointegration-based empirical framework while also motivating a more conservative interpretation of the panel inference.

It is important to clarify that although GDP growth is expressed as an annual percentage rate, a transformation that is conventionally expected to be stationary, the panel unit-root tests employed here (Pesaran CD, CIPS-style) indicate that the null of non-stationarity cannot be rejected at conventional significance levels for this and the other variables in the system. This pattern, while counter-intuitive at first glance, is not uncommon in macro-panel datasets spanning multiple structural regimes: the 2002–2022 period includes the global financial crisis, the Eurozone debt crisis, and the COVID-19 pandemic, each of which introduces level shifts and volatility clustering that can bias conventional unit-root tests toward non-rejection of the unit-root null, even when the underlying process is stationary in a structural-break-free sense. Country-level Augmented Dickey–Fuller tests conducted as a robustness check show a similarly mixed pattern, with unit-root rejection in the majority but not all of the 27 EU countries, consistent with the panel-level evidence of borderline non-stationarity. We therefore treat the panel as $I(1)$ based on the formal test outcomes and proceed with the VECM framework, while acknowledging that the growth-rate specification represents a deviation from the classical VECM application to variables in log-levels, and that the cointegrating relationships should be interpreted as long-run comovement among growth rates and their determinants rather than as a textbook levels-based equilibrium relationship.

VECM Specification

The panel Vector Error Correction Model is used because the research question concerns both long-run equilibrium relationships and short-run adjustment dynamics, which are central features of cointegrated non-stationary panels. The VECM is therefore well suited to this study, as it preserves long-run information in levels while also allowing deviations from equilibrium to be modelled through an error-correction term. This is particularly relevant for a comparative analysis of EU and Western Balkan economies, where the main objective is not only to estimate long-run relationships but also to assess whether adjustment to shocks differs across regions. Given the sample structure, the VECM is interpreted as a comparative reduced-form framework rather than as a densely parameterized structural system.

The long-run equation reported in the main text represents the principal normalized cointegrating relation used for interpretation and cross-regional comparison. Because the objective of the paper is comparative rather than exhaustive system identification, the focus is placed on the dominant long-run equilibrium relation most relevant to the research question. The reported equation should therefore be read as the central long-run relationship extracted from the cointegration framework, with the emphasis on sign, significance, and comparative pattern rather than on claiming a complete recovery of every possible cointegrating relation.

Because the Western Balkan subsample is relatively small compared with the dimensionality of the system, the estimated relationships for that panel are interpreted cautiously. The specification is retained to preserve comparability with the EU panel, but the

Western Balkan estimates are presented as comparative and exploratory evidence rather than as fully identified structural parameters. This conservative framing is intended to reflect the available degrees of freedom and the likelihood that common shocks and cross-sectional dependence influence the estimates.

Given these results, the system is estimated using a panel Vector Error Correction Model of the form:

$$\Delta Y_{it} = \pi_i ECT_{i,t-1} + \sum \Gamma_{k,i} \Delta Y_{i,t-k} + \varepsilon_{it} \quad (1)$$

where Y_{it} denotes the vector of endogenous variables, $ECT_{i,t-1}$ captures deviations from the long-run equilibrium, π_i represents the speed of adjustment parameters, $\Gamma_{k,i}$ captures short-run dynamics, and ε_{it} is a white-noise error term. Lag length selection based on the Schwarz Information Criterion indicates an optimal lag order of two, balancing model parsimony with the need to capture annual business-cycle dynamics while preserving degrees of freedom, particularly in the Western Balkans subsample.

The VECM follows the Johansen–Hendry–Juselius Case 3 specification, allowing for a restricted constant in the cointegrating vector and unrestricted constants in the short-run dynamics. This structure permits heterogeneous country-specific equilibrium levels while imposing common long-run coefficients across panel members. Lag length was selected using the Schwarz Information Criterion, which indicated an optimal lag order of two in both panels. Inference is conducted using Wald tests for Granger causality, impulse response functions, and forecast error variance decomposition to evaluate how macroeconomic, institutional, and distributional shocks transmit to growth in the EU and Western Balkan economies.

4. Results

Table 2 presents the descriptive statistics for the variables used in the analysis, separately for the EU and Western Balkan panels. It reports the number of observations, mean values, standard deviations, and the minimum and maximum values for each variable, providing a concise overview of the data structure. The table also helps illustrate differences in scale, dispersion, and central tendency across the two regional groups. These summary statistics offer useful context for interpreting the econometric results that follow.

Table 2. Descriptive statistics of used variables for EU and Western Balkan panels.

Variable	Group	N	Mean	Std. Dev.	Min	Median	Max
GDP growth	EU	567	2.385	3.958	−14.839	2.519	24.475
GDP growth	WB	126	3.384	3.487	−15.307	3.842	13.043
GFCF	EU	567	22.18	4.26	10.687	21.74	54.274
GFCF	WB	124	24.466	5.343	13.299	23.557	39.216
Trade	EU	567	123.408	65.368	45.419	105.339	393.141
Trade	WB	120	92.215	19.888	56.866	86.661	170.818
Inflation	EU	567	2.603	3.012	−4.478	2.061	22.54
Inflation	WB	118	21.63	39.942	−2.41	2.576	132.34
Economic Freedom	EU	567	68.72	6.284	48.7	68.9	82.6
Economic Freedom	WB	102	60.969	6.511	37.4	62.05	71.3

Source: Authors' calculations.

Table 3 shows that the EU panel variables are generally only weakly related to one another, which suggests that the model is not likely to suffer from strong multicollinearity. GDP growth is positively associated with investment, trade, and inflation, while economic freedom is only weakly linked to GDP growth but more clearly related to trade and investment. Overall, the correlations indicate that the variables move together only to a lim-

ited extent, which supports the use of a multivariate dynamic framework for examining their long-run and short-run relationships.

Table 3. Correlation matrix, EU panel data.

Variable	GDP Growth	GFCF	Trade	Inflation	Economic Freedom
GDP growth	1.000	0.268	0.207	0.185	0.044
GFCF	0.268	1.000	−0.027	0.257	0.190
Trade	0.207	−0.027	1.000	0.021	0.383
Inflation	0.185	0.257	0.021	1.000	−0.057
Economic Freedom	0.044	0.190	0.383	−0.057	1.000

Source: Authors' calculations.

The Western Balkans correlation matrix presented in Table 4 suggests that most relationships among the variables are weak, which means the model is not likely to face serious multicollinearity problems. GDP growth shows only a limited association with investment, trade, inflation, and economic freedom, implying that growth in the region is not tightly synchronized with the other macro variables. The most visible pattern is the stronger connection between trade and both inflation and economic freedom, which may indicate that openness is more closely tied to the institutional and price-stability environment in the Western Balkans than it is to growth itself. Overall, the matrix supports the use of a multivariate dynamic model because the variables are related enough to justify joint estimation, but not so strongly correlated that they would overlap heavily.

Table 4. Correlation matrix, Western Balkans panel.

Variable	GDP Growth	GFCF	Trade	Inflation	Economic Freedom
GDP growth	1.000	0.213	0.028	0.006	−0.079
GFCF	0.213	1.000	−0.136	−0.083	0.122
Trade	0.028	−0.136	1.000	0.349	0.435
Inflation	0.006	−0.083	0.349	1.000	−0.125
Economic Freedom	−0.079	0.122	0.435	−0.125	1.000

Source: Authors' calculations.

The Johansen trace test results indicate different long-run cointegration structures across the two regional panels. For the Western Balkans, the null of no cointegration is rejected, while the null of at most one cointegrating relation is not rejected, supporting a cointegration rank of one. By contrast, the EU panel shows a much richer long-run structure, as the trace statistics reject several successive rank restrictions, which led to the use of rank four in the subsequent VECM analysis. Based on these results, the Western Balkans model is estimated with a single cointegrating relation, whereas the EU model is estimated with four cointegrating relations, allowing the analysis to capture the more complex equilibrium dynamics observed in the EU panel.

The equations below report the normalized long-run cointegrating relations estimated from the panel VECM for the EU and Western Balkans panels. Because the model is estimated in levels and the variables are measured in different units, the coefficients should be interpreted as normalized long-run associations rather than as marginal effects. The normalization is part of the cointegration framework and serves to identify the equilibrium relation among the variables, so the emphasis should be placed on coefficient signs, relative magnitudes, and statistical significance rather than on the raw scale of the coefficients. In the EU panel, the cointegrating relation suggests that GDP is positively

associated in the long run with gross fixed capital formation and trade openness, while inflation and economic freedom enter with negative signs. In the Western Balkans panel, GDP is positively related to gross fixed capital formation and trade openness, whereas inflation and economic freedom enter negatively, although the overall equilibrium pattern is less balanced across coefficients. This comparative reading is consistent with the Johansen trace tests, which reject the null of no cointegration in both panels, but point to different long-run parameters and adjustment dynamics across regions.

Based on the normalized cointegration vector, the EU long-run relationship can be written as:

$$GDP_{t-1} = 0.4874 \cdot GFCF_{t-1} + 0.0125 \cdot TRADE_{t-1} - 0.4402 \cdot Inflation_{t-1} - 0.1037 \cdot LOGEF_{t-1} + 1.6309 \quad (2)$$

This is the long-run equilibrium equation, since it comes from the cointegrating vector. The error-correction term for GDP in the EU panel is -0.6346 , which means that about 63.5% of any deviation from long-run equilibrium is corrected in each period.

Western Balkans Panel long-run cointegrating equation can be written as:

$$GDP_{t-1} = 0.1943 \cdot GFCF_{t-1} + 0.0018 \cdot TRADE_{t-1} - 0.0109 \cdot Inflation_{t-1} - 0.0485 \cdot LOGEF_{t-1} + 1.2851 \quad (3)$$

The long-run cointegrating relationship for the Western Balkans indicates that GDP is positively related to gross fixed capital formation and trade openness, while inflation and economic freedom exert negative long-run associations. The estimated error-correction coefficient for GDP in the Western Balkans panel is -1.4889 . An absolute value exceeding one is unusual in an error-correction context: it can reflect an oscillatory or overshooting adjustment path, but it can also signal model misspecification (e.g., omitted short-run dynamics or lag under-specification) or estimation instability given the relatively small Western Balkans subsample. We interpret this coefficient cautiously and treat the corresponding adjustment estimate as indicative rather than structurally precise, consistent with the exploratory character of the Western Balkans results noted in Section 3.

Because Equations (2) and (3) report the normalized Johansen cointegrating vector, estimated by reduced-rank maximum-likelihood regression under an exact (just-identifying) normalization, these long-run coefficients do not admit classical closed-form OLS-type standard errors or p -values. The trace and maximum-eigenvalue tests reported in Table 5, which reject the null of no cointegration at conventional levels in both panels, establish the existence and rank of the cointegrating relationship and are the formal statistical precondition on which Equations (2) and (3) are estimated; however, they do not themselves provide standard errors for the individual β coefficients. To formally test the statistical significance of the individual long-run coefficients, additional likelihood-ratio restriction tests on the cointegrating vector were conducted and discussed in Table 6 below. Table 7 reports the long-run cointegrating coefficients for GDP growth determinants in the EU panel (rank 4) and the Western Balkans panel (rank 1). The error-correction term (ECT) coefficients associated with each equation, which are estimated by ordinary least squares conditional on the estimated cointegrating vector, are reported in Table 8.

Table 5. Johansen cointegration rank test results for the EU and Western Balkans panels.

Panel	Null Hypothesis	Trace Statistic	10% Critical Value	5% Critical Value	1% Critical Value	Decision
Western Balkans	$r = 0$	114.61	71.86	76.07	84.45	Reject
Western Balkans	$r \leq 1$	51.13	49.65	53.12	60.16	Do not reject at 5%
EU	$r = 0$	491.88	71.86	76.07	84.45	Reject
EU	$r \leq 1$	258.73	49.65	53.12	60.16	Reject
EU	$r \leq 2$	104.24	32.00	34.91	41.07	Reject
EU	$r \leq 3$	33.34	17.85	19.96	24.60	Reject

EU	$r \leq 4$	11.14	7.52	9.24	12.97	Reject at 10%, not at 1%
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Source: Authors' calculations.

Table 6. Likelihood-ratio restriction tests on individual long-run (β) coefficients (Johansen β -restriction test).

Panel (Rank)	Variable	LR Statistic	Df	<i>p</i> -Value	Decision ($H_0: \beta = 0$)
European Union ($r = 4$)	GFCAPITAL	131.15	4	<0.001	Reject H_0 —significant
European Union ($r = 4$)	TRADE	18.91	4	<0.001	Reject H_0 —significant
European Union ($r = 4$)	INF	141.98	4	<0.001	Reject H_0 —significant
European Union ($r = 4$)	LOGEF	32.10	4	<0.001	Reject H_0 —significant
Western Balkans ($r = 1$)	GFCAPITAL	9.49	1	0.002	Reject H_0 —significant
Western Balkans ($r = 1$)	TRADE	0.01	1	0.920	Do not reject H_0
Western Balkans ($r = 1$)	INF	2.95	1	0.086	Reject H_0 —significant at 10%
Western Balkans ($r = 1$)	LOGEF	0.51	1	0.475	Do not reject H_0

Source: Authors' calculations based on likelihood-ratio restriction tests applied to the fitted Johansen cointegrating vector.

To formally test the statistical significance of the individual long-run coefficients reported in Equations (2) and (3), we conducted likelihood-ratio (LR) restriction tests on the estimated Johansen cointegrating vector. For each explanatory variable, the null hypothesis tested is that its coefficient is jointly zero within the estimated cointegrating relation(s), against the alternative that it enters with a non-zero coefficient. Results are reported in Table 6.

For the EU panel (rank $r = 4$), the cointegrating space comprises four vectors; the restriction test evaluates whether each variable can be excluded from the full four-dimensional cointegrating space, rather than from the single normalized vector reported in Equation (2) alone. All four restrictions are strongly rejected ($p < 0.001$ in each case), indicating that gross fixed capital formation, trade openness, inflation, and economic freedom all contribute significantly to the EU cointegrating space taken as a whole. This result provides evidence that none of these variables is redundant to the long-run system. It should not, however, be read as direct confirmation that each individual coefficient in the specific normalized relation reported in Equation (2) is itself significant.

For the Western Balkans panel (rank $r = 1$), the cointegrating space consists of a single vector, so the restriction test maps directly onto the individual coefficients reported in Equation (3). Gross fixed capital formation enters significantly ($LR = 9.49$, $df = 1$, $p = 0.002$), whereas trade openness ($p = 0.920$) and economic freedom ($p = 0.475$) cannot be statistically distinguished from zero at conventional levels, with inflation only marginally close to the 10% threshold ($p = 0.086$). This indicates that, in the Western Balkans, the estimated long-run relationship is statistically anchored primarily by capital formation, while the remaining long-run associations, although economically interpretable in sign, should be treated with additional caution given their lack of individual statistical significance.

The estimated panel VECM indicates that the EU and Western Balkans both exhibit long-run equilibrium relationships linking growth, investment, trade, inflation and economic freedom. In both panels, the presence of an error-correction mechanism implies that deviations from the long-run relation are systematically adjusted over time, which is consistent with cointegration and supports the use of a VECM framework. This means that the variables are not moving independently but are instead linked through a persistent equilibrium relationship that governs their joint evolution. At the same time, the dynamic adjustment process differs across the two regional groups. The EU panel is characterized by a more gradual and stable propagation of shocks, while the Western Balkans display a much faster correction process, indicating that disequilibria are eliminated more

sharply, although, as will be discussed in Section 4.1, this reflects an oscillatory rather than monotonic adjustment path, and that short-run movements play a stronger role in the adjustment path. These findings suggest that institutional and structural conditions shape how macroeconomic variables interact over time, so the two regions share the same general VECM logic but not the same equilibrium coefficients or speed of convergence.

The following Table 7 presents the long-run cointegrating coefficients for the determinants of GDP, based on the cointegrating vector $r = 4$ from the Johansen procedure results for the European Union dataset and $r = 1$ for Western Balkan datasets.

Table 7. Long-run cointegrating coefficients: GDP growth determinants in the EU panel (rank 4) and WB panel (rank 1).

Variable	EU Dataset Coefficient	WB Dataset Coefficient
GDP growth (L1)	1.0000	1.0000
Gross Fixed Capital Formation (GFCAPITAL)	+0.4874	+0.1943
Trade Openness (TRADE)	+0.0125	+0.0018
Inflation (INF)	−0.4403	−0.0109
Economic Freedom (LOGEF)	−0.1037	−0.0485
Constant	+1.6309	+1.2851

Note: The EU coefficients are reported from the first normalized cointegrating vector obtained from the Johansen test with rank 4. The Western Balkans coefficients are reported from the rank-1 cointegrating relation. Source: Authors' calculations based on VECM estimates.

Table 7 shows that the long-run cointegrating relationship differs somewhat between the EU and Western Balkans, even though the same core variables are used in both panels. In both cases, GDP growth is normalized to one, so the other coefficients should be read as the long-run association of each determinant with GDP growth rather than as simple marginal effects. Gross fixed capital formation carries a positive coefficient in both datasets, but the effect is stronger in the EU than in the Western Balkans, while trade openness is very small and close to zero in both cases, suggesting only a limited long-run role in this specification. Economic freedom is negative in both panels in this normalized cointegrating specification—this reflects the identification of the long-run relation rather than a substantive negative effect, and should be interpreted alongside the error-correction dynamics; a supplementary short-run or elasticity-based analysis may be warranted to confirm the expected positive relationship between economic freedom and growth.

The negative long-run coefficient on economic freedom (LOGEF) in the normalized cointegrating vector should not be interpreted as evidence that greater economic freedom reduces long-run GDP. In a multivariate cointegrating system, individual coefficients capture the partial long-run association conditional on all other variables entering the same equilibrium relation, and their signs can differ from the simple bivariate or short-run relationship due to the normalization of the vector and correlation among the regressors (particularly between institutional quality, trade openness, and capital formation, which may jointly proxy for a broader convergence process). This pattern is not unusual in Johansen-type cointegration analyses of multivariate macro-institutional systems, where coefficients on institutional or policy variables can appear counter-intuitive in sign once the relation is normalized on a specific variable, even though the same variables show the expected positive relationship in univariate or short-run specifications. Accordingly, the economic freedom coefficient reported here should be read jointly with the error-correction estimates in Table 8 and with the short-run Granger causality results, rather than in isolation, and we treat the long-run sign as reflecting the specific identification of this five-variable system rather than a substantive claim that institutional quality is harmful to growth.

The most noticeable difference is inflation, which has a much larger negative coefficient in the EU panel than in the Western Balkans panel. This does not mean inflation is inherently beneficial; rather, it reflects how the long-run cointegrating system is identified in the model and should be interpreted cautiously in combination with the rest of the coefficients and the error-correction structure. The constant also differs in sign across the two panels, which shows that the baseline level of the long-run relation is not the same in the EU and WB systems. Overall, the table suggests that institutions and capital formation matter in both regions, but the long-run configuration of the economy is not identical across them.

Table 8. Error-correction term (ECT) estimates: EU vs. Western Balkans panels.

Dependent Variable (First Difference)	EU Panel (ECT Estimate)	WB Panel (ECT Estimate)
Δ GDP growth	−0.6346 *** (SE = 0.0600, p < 0.001)	−1.4889 *** (SE = 0.1901, p < 0.001)
Δ Gross Fixed Capital Formation	0.2586 *** (SE = 0.0368, p < 0.001)	0.2910 (SE = 0.1703, p = 0.091)
Δ Trade Openness	−1.6165 *** (SE = 0.2892, p < 0.001)	−1.1963 (SE = 0.7284, p = 0.104)
Δ Inflation	−0.2143 *** (SE = 0.0408, p < 0.001)	−2.7398 ** (SE = 0.8480, p = 0.002)
Δ Economic Freedom	−0.0996 * (SE = 0.0415, p = 0.017)	0.2020 (SE = 0.2136, p = 0.347)

Significance levels: *** p < 0.001, ** p < 0.01, * p < 0.05, p < 0.1. Source: Authors' calculations based on VECM estimates.

The error-correction estimates indicate that both panels adjust toward the long-run equilibrium after a shock, but the adjustment dynamics differ markedly across the two regions. In the EU panel, the negative and highly significant GDP coefficient of −0.6346 indicates a stable and gradual correction mechanism, with approximately 63.5% of deviations from equilibrium removed in each period. In the Western Balkans panel, the GDP coefficient of −1.4889 suggests very rapid adjustment, but because its absolute value exceeds one, the convergence process is better interpreted as overshooting or oscillatory correction rather than smooth monotonic adjustment. Given the small Western Balkans sample, this estimate should also be read as a signal of potential estimation instability rather than a precisely identified structural speed of adjustment.

Across the remaining equations, the signs and significance levels differ, which implies that short-run transmission channels are not identical across the two regions. In the EU panel, trade openness, inflation, and economic freedom respond significantly to the error-correction term, indicating a more structured adjustment pattern. In the Western Balkans, inflation shows the strongest and most significant response, while gross fixed capital formation and economic freedom are weaker or less stable. Overall, the table suggests that both regions are cointegrated, but the EU exhibits a more orderly adjustment path, whereas the Western Balkans display faster yet more unstable convergence toward equilibrium.

4.1. Granger Causality

The EU Granger causality results presented in Table 9 indicate strong dynamic interdependence among the variables in the system. All null hypotheses are rejected at the 5% level, which means each variable contains predictive information for the others within the VAR framework. The strongest result is for GDP, which Granger-causes the other variables with a very large F-statistic, suggesting that output dynamics are central in shaping macroeconomic adjustment in the EU panel.

Table 9. Pairwise Granger causality results in the European Union VECM framework.

Null Hypothesis	F-Statistic	Df1	Df2	p-Value	Decision
GFCAPITAL does not Granger-cause GDP, TRADE, INF, LOGEF	5.9476	8	2560	1.41×10^{-4}	Reject H0
TRADE does not Granger-cause GDP, GFCAPITAL, INF, LOGEF	3.5800	8	2560	0.0003857	Reject H0
INF does not Granger-cause GDP, GFCAPITAL, TRADE, LOGEF	10.5330	8	2560	1.22×10^{-11}	Reject H0
LOGEF does not Granger-cause GDP, GFCAPITAL, TRADE, INF	2.2494	8	2560	0.02158	Reject H0
GDP does not Granger-cause GFCAPITAL, TRADE, INF, LOGEF	25.4370	8	2560	$<2.2 \times 10^{-16}$	Reject H0

Source: Authors' calculations.

Investment, trade, inflation, and economic freedom also Granger-cause the remaining variables, implying that these factors are not merely passive determinants but active components of the adjustment process. In particular, inflation shows a very strong predictive role, while investment and trade also exert statistically significant causal influence. Overall, the EU results point to a highly interconnected system in which growth, investment, openness, price stability, and institutional quality jointly drive one another over time.

The Granger causality results suggest that, in the Western Balkans panel, investment and GDP are jointly embedded in a feedback mechanism rather than operating in a one-way causal chain. When gross fixed capital formation Granger-causes GDP, it implies that past investment movements contain predictive information about future output growth beyond what is already captured by the other variables in the system. The reverse result, where GDP Granger-causes investment, indicates that higher output also feeds back into capital accumulation, likely through stronger profitability, improved expectations, higher savings, and greater private or public capacity to invest. In economic terms, this points to a self-reinforcing growth process in which investment stimulates growth and growth, in turn, supports further investment.

By contrast, the absence of statistically significant Granger causality from trade openness, inflation, and economic freedom suggests that these variables do not add independent short-run predictive power for the other variables once the dynamics of the full system are controlled for. This does not mean they are economically irrelevant; rather, it means their effects are not detected as systematic forecasting relationships within the chosen lag structure and sample. For trade openness and inflation, the result may reflect weaker transmission channels, measurement limitations, or the possibility that their effects operate indirectly through investment and GDP rather than through immediate predictive influence. For economic freedom, the insignificance may indicate that institutional changes affect growth only over longer horizons or through channels not captured well in a relatively small panel.

More broadly, these findings are consistent with a development pattern in which capital formation is the central short-run engine of growth in the Western Balkans. The bidirectional relation between GDP and investment implies that policies supporting investment can generate cumulative growth effects, while growth itself can help sustain future investment demand. At the same time, the weak predictive role of trade openness, inflation, and economic freedom suggests that these factors may matter more as structural background conditions than as direct short-run drivers in the estimated system. In an academic interpretation, the results support the view that growth dynamics in the Western Balkans are primarily investment-led, with feedback effects from output to capital formation reinforcing the adjustment process. Given the small sample size and likely low statistical power, this null finding should be interpreted cautiously and does not imply that transmission is absent.

The Granger causality results show a much more interconnected macroeconomic system in the EU than in the Western Balkans. In the EU panel, all null hypotheses are rejected, indicating bidirectional and widespread predictive relationships among GDP, investment, trade, inflation, and economic freedom, which suggests that these variables

move together in a mutually reinforcing way. By contrast, as shown in Table 10, the Western Balkans panel shows a more limited structure, where only GDP and gross fixed capital formation Granger-cause each other, while trade, inflation, and economic freedom do not show statistically significant predictive effects. This difference implies that the EU economy operates through a broader and more integrated transmission mechanism, whereas the Western Balkans appear more dependent on investment and output dynamics, with weaker short-run interactions from the other macroeconomic factors.

Table 10. Pairwise Granger causality results in the Western Balkans VECM framework.

Null Hypothesis	F-Statistic	Df1	Df2	p-Value	Decision
GFCAPITAL does not Granger-cause GDP, TRADE, INF, LOGEF	2.6260	8	405	0.0082	Reject H0
TRADE does not Granger-cause GDP, GFCAPITAL, INF, LOGEF	1.3826	8	405	0.2021	Do not reject H0
INF does not Granger-cause GDP, GFCAPITAL, TRADE, LOGEF	0.4231	8	405	0.9071	Do not reject H0
LOGEF does not Granger-cause GDP, GFCAPITAL, TRADE, INF	1.0328	8	405	0.4104	Do not reject H0
GDP does not Granger-cause GFCAPITAL, TRADE, INF, LOGEF	3.2669	8	405	0.0013	Reject H0

Source: Authors' calculations.

4.2. Impulse Response Analysis

The impulse response functions reported below are derived from the same rank-4 (EU) and rank-1 (Western Balkans) VECM specifications used for the long-run cointegrating estimates in Table 7, ensuring consistency between the long-run and dynamic results.

The impulse response functions for the EU panel, shown in Figure 1, indicate that GDP reacts most strongly in the first two periods after a shock, after which the effects gradually converge toward a stable long-run path. Solid line represents the point estimate of the orthogonalized impulse response; dashed lines denote the 95% bootstrap confidence interval bounds (100 replications). Investment shocks generate a clear but temporary expansionary response, while inflation shocks produce the opposite pattern, causing a sharp short-run contraction in GDP before the effect fades. Trade openness stands out as the only determinant with a persistent positive long-run effect, whereas economic freedom has only a weak and statistically insignificant influence over the full horizon.

These dynamics suggest that the EU economy adjusts relatively quickly to macroeconomic disturbances. The significant and negative error-correction term for GDP implies a strong speed of adjustment, meaning that deviations from equilibrium are corrected rapidly over time. In practical terms, the results show that short-run shocks matter, but the EU system is stable enough to absorb them and return close to its long-run cointegrating path within a few periods.

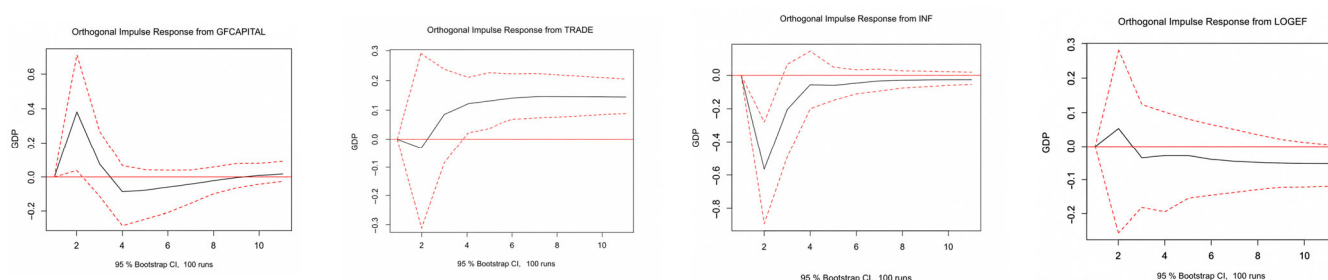


Figure 1. Impulse Response Function—EU Panel (2002–2022), estimated from the rank-4 VECM specification (lag order 2), consistent with the cointegrating relations reported in Table 7. Response of GDP growth to one-standard-deviation shocks across all endogenous variables. Source: Authors' calculations.

The impulse response analysis for the Western Balkans panel shown in Figure 2 indicates that GDP reacts strongly to macroeconomic shocks over the 10-year horizon. Solid line represents the point estimate of the orthogonalized impulse response; dashed lines denote the 95% bootstrap confidence interval bounds (100 replications). Investment emerges as the clearest positive driver, while trade openness has a persistent contractionary effect. Inflation and economic freedom display weaker and statistically insignificant long-run effects in this specification.

A shock to gross fixed capital formation produces the strongest response, with GDP growth rising sharply in the short run and remaining above its initial path over the long run. This suggests that capital accumulation is a central channel of growth in the Western Balkans, and that investment shocks have lasting effects on economic performance. In contrast, trade openness generates a sizable negative response, with GDP growth falling sharply at first and remaining below baseline throughout most of the horizon, indicating that trade shocks are associated with weaker growth outcomes in this panel.

Inflation and economic freedom show more muted dynamics. Inflation briefly raises GDP growth in the early periods, but the effect quickly fades and becomes statistically insignificant over time. Economic freedom causes an initial decline in GDP growth, yet the long-run response remains small and unstable, with confidence intervals crossing zero. Overall, the results suggest that the Western Balkans are characterized by more volatile short-run adjustment than the EU, with capital investment playing the most important stabilizing and growth-enhancing role.

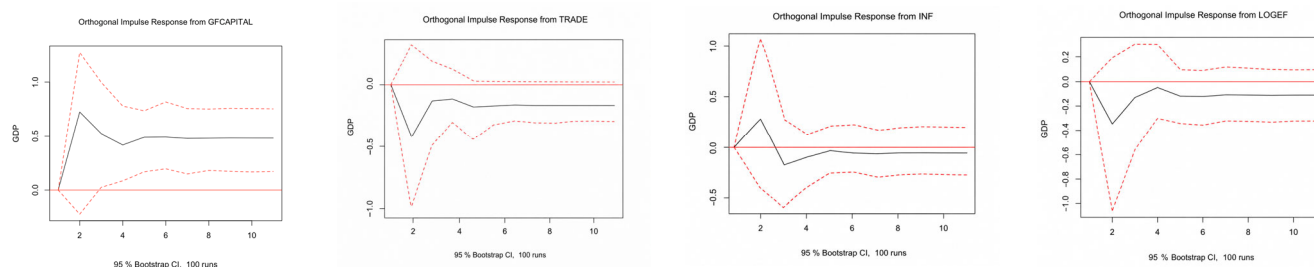


Figure 2. Impulse Response Function—Western Balkans Panel (2002–2022), estimated from the rank-1 VECM specification (lag order 2). Response of GDP growth to one-standard-deviation shocks across all endogenous variables. Source: Authors' calculations.

The impulse response results show a clear contrast between the EU and the Western Balkans in both the direction and persistence of macroeconomic shocks. In the EU, GDP growth responds positively to investment shocks only in the short run, adjusts quickly back to equilibrium, and shows a stable positive long-run effect from trade openness, whereas inflation has a strong but temporary negative impact and economic freedom remains weak and statistically insignificant. In the Western Balkans, by contrast, investment is the dominant growth-enhancing force over the entire horizon, while trade openness has a persistent negative effect on GDP growth, suggesting that external integration is associated with weaker short- and medium-run outcomes in that panel.

Overall, the EU appears to be more resilient and faster in restoring long-run equilibrium after shocks, which is consistent with its stronger adjustment mechanism and more stable macroeconomic structure. The Western Balkans show more volatile dynamics and a heavier dependence on capital accumulation as the main driver of growth, while

trade shocks seem less supportive of output performance, consistent with the oscillatory ECT estimate discussed above. This comparison suggests that the same policy shock can have very different growth implications across the two regions, reflecting differences in institutional quality, market integration, and the transmission of external disturbances.

5. Discussion

The comparative results remain broadly consistent with the institutional-growth literature, which argues that long-run economic performance depends not only on factor accumulation but also on the credibility of institutions, the predictability of policy, and the effectiveness of adjustment mechanisms. Prior studies on transition and post-transition economies suggest that economic freedom and institutional quality can support growth, although their impact often varies across institutional settings and may be weakened when formal reforms are not matched by effective implementation. The present findings are consistent with this perspective, but they also show important differences in the way macroeconomic shocks are transmitted across the two panels. The EU exhibits faster adjustment toward equilibrium and more clearly structured impulse responses, while the Western Balkans display more uneven dynamics and stronger dependence on investment as the main growth channel.

In the EU panel, GDP growth responds positively to investment shocks in the short run but the effect is transitory, while inflation generates a strong negative short-run contraction that fades over time. Trade openness has a statistically significant positive long-run effect, suggesting that external integration supports output in the EU, whereas economic freedom shows only a weak and insignificant influence. In the Western Balkans, by contrast, investment is the dominant positive driver of GDP growth over the entire horizon, while trade openness has a persistent negative effect, indicating that openness is not yet translating into stronger growth outcomes in the same way. Overall, these results suggest that the EU benefits from a more stable adjustment process and stronger long-run transmission of shocks, whereas the Western Balkans remain more vulnerable to structural frictions and rely more heavily on capital accumulation for growth.

5.1. Long-Run Divergence and Structural Asymmetry

Before interpreting the sign patterns below, it is important to note that the long-run coefficients reported in Equations (2) and (3) differ in their statistical robustness. The likelihood-ratio restriction tests reported in Table 6 indicate that, in the Western Balkans panel, only gross fixed capital formation is individually significant ($p = 0.002$) and inflation ($p = 0.08$); the coefficients on trade openness and economic freedom cannot be statistically distinguished from zero at conventional levels. The discussion that follows therefore treats the Western Balkans coefficient signs on trade and economic freedom as suggestive of the direction of long-run association rather than as statistically confirmed effects, while capital formation and inflation are the long-run drivers for that panel supported by both the point estimates and significance tests. For the EU panel, by contrast, all four coefficients are jointly significant within the four-dimensional cointegrating space (Table 7), providing a firmer statistical basis for the sign-based interpretation offered below.

Contrary to conventional development theory, the VECM results show that the EU and Western Balkans follow fundamentally different long-run growth paths rather than converging to identical equilibrium relationships. The divergence is not simply a matter of adjustment speed or short-run frictions; it reflects a deep structural difference in how institutions, redistribution, and growth interact. Insecure property rights, unpredictable governance, and weak contract enforcement in the Western Balkans are not temporary obstacles—they are persistent structural features that reduce investment incentives, hinder efficient production, and constrain long-run output. In contrast, similar policies in the

EU operate through credible institutions, generating predictable productivity gains and higher long-term growth.

5.2. Institutions as Shock Amplifiers

The negative (though not individually statistically significant) institutional quality elasticity in the Western Balkans is suggestive that formal institutional improvements may fail to translate into functional governance gains, though this interpretation should be treated as exploratory rather than confirmed. De jure reforms may coincide with distributional conflicts or elite resistance, undermining growth. For example, constitutional courts may be formally strengthened yet remain politically influenced, regulatory agencies may appear independent but be captured through revolving-door appointments, and privatizations may follow institutional rules while still being subject to political influence. In such cases, measured improvements in institutional indices do not produce economic benefits; instead, the disputes surrounding reform—over rent capture, threatened privileges, and disrupted informal arrangements—can generate contraction.

The inverted income distribution elasticity poses an even sharper puzzle. In the EU, redistribution toward lower-income groups boosts aggregate demand, increases labour participation, and reduces social friction, supporting growth. In the Western Balkans, however, similar redistributive efforts coincide with capital flight, reduced investment, and stagnation. This inversion likely reflects multiple interacting factors: (1) measurement limitations, where informal economies, remittances, and shadow activities distort official income statistics; (2) distributional conflict, where redistribution triggers elite resistance, tax evasion, and capital flight that outweigh potential consumption gains; and (3) institutional weakness, where redistribution is captured by corrupt officials, eroding policy credibility and public trust.

5.3. Paradigm Sequence: Institutions Before Macroeconomics

The conventional Washington Consensus prescription for transition economies emphasizes a sequential reform strategy: first stabilize macroeconomic fundamentals (inflation, fiscal balance), then liberalize trade, privatize state assets, and only subsequently strengthen institutions [1]. This sequencing is summarised in Table 11. However, our empirical findings suggest that this sequence fails in contexts with weak institutional foundations, such as the Western Balkans.

Table 11. Institutional sequencing vs. traditional Washington Consensus.

Step	Traditional Washington Consensus	Proposed Sequence (Institutions First)	Timeline	Key Mechanism	Expected Impact/ROI
1	Stabilize macroeconomics (inflation, debt)	Strengthen institutions (property rights, judiciary, anti-corruption)	5–10 years	Establish credible rules & enforce contracts	Enables effective policy transmission; reduces rent-seeking; foundation for investment
2	Liberalize trade	Liberalize markets	1–3 years	Open markets function under strong legal framework	Encourages productive investment and competition
3	Privatize state-owned enterprises	Privatize strategically	1–3 years	Secure property rights prevent elite capture	Ensures privatization benefits productive actors; increases GDP
4	Strengthen institutions (later)	Fine-tune macroeconomic policies	Ongoing	Monetary/fiscal policy transmits effectively	Stabilizes short-run volatility; supports sustainable long-run growth

Source: Authors' compilation based on analysis.

The implication is that institutional reform must precede both macroeconomic liberalization and distributive expansion. Without credible institutions, distributional policies trigger capital flight rather than consumption boosts; without expectation-anchoring institutions, monetary policy has minimal growth effects; without secure property rights, trade liberalization encourages capital exodus rather than investment reallocation. The policy sequence should therefore be: (1) institutional credibility building (judicial independence, central bank autonomy, rule of law in contract enforcement); (2) macroeconomic stabilization (inflation targeting, fiscal sustainability achieved through institutional commitment, not by austerity); (3) distributional expansion (income support, social safety nets, once credible institutions can deliver them efficiently); and (4) liberalization (trade opening, capital mobility, conducted from a position of institutional strength).

Historical examples reinforce this sequencing principle. Poland strengthened judicial independence and formalized property rights between 1995 and 2000, then successfully liberalized markets post-2000, achieving sustained convergence with EU income levels [31]. In contrast, Montenegro liberalized first (2000–2005) while institutions remained weak, resulting in privatization rents being captured by elites and prolonged stagnation thereafter [32].

This resequencing reflects a fundamental institutional reality: Western Balkan economies are not simply ‘weaker versions’ of EU economies subject to bad luck or poor policy choices. They operate under structurally distinct long-run growth models in which compromised institutions prevent standard policy tools from transmitting effectively. Addressing this challenge requires more than incremental reforms; it demands a reordering of priorities that places institutional repair—restoring judicial independence, central bank credibility, and the rule of law—at the forefront of the development agenda. This aligns with recent empirical research showing that institutional quality significantly influences economic growth in both EU and Southeast European contexts. Governance indicators, specifically regulatory quality, political stability, and accountability, emerge as statistically significant determinants of economic growth in non-EU countries, while long-term institutional quality exhibits a strong positive correlation with GDP performance across EU member states [24].

Econometric evidence from European post-transition economies confirms that stronger institutions promote investment, reduce uncertainty, and support sustainable growth, reinforcing the need to prioritize institutional reform ahead of macroeconomic stabilization [33]. Complementing this, EU research shows that regions with higher institutional quality experience faster medium-term GDP growth and greater resilience to shocks, suggesting that improving governance is a key convergence strategy [34]. In practice, studies in the Western Balkans demonstrate that property rights and monetary freedom directly affect investment: countries like Albania and North Macedonia see higher private sector participation and credit expansion when registries are modernized and legal enforcement is strengthened [35–38].

5.4. Policy Implications for EU Accession and Regional Reform

The findings have direct implications for EU accession strategy and domestic reform sequencing in the Western Balkans. The weaker predictive content of conventional macroeconomic variables in the Western Balkans panel, together with the larger role of institutional and fiscal shocks in the variance decomposition, suggests that macroeconomic stabilization alone is unlikely to generate durable convergence unless it is accompanied by credible improvements in governance, legal enforcement, and institutional reliability. This is consistent with the broader literature on EU enlargement, which argues that the transformative effect of accession depends on the credibility of conditionality and the domestic capacity to implement reforms rather than on formal alignment alone.

A more targeted policy implication follows from the institutional results. Because the Western Balkans panel shows weaker transmission from standard macroeconomic variables to output, reform priorities should place greater emphasis on rule of law, contract enforcement, regulatory credibility, and administrative capacity before or alongside macroeconomic liberalization. In practical terms, this means that accession support, technical assistance, and pre-accession funding should be more explicitly tied to measurable improvements in institutional performance and implementation quality, rather than to nominal compliance with macroeconomic targets alone. This aligns with recent analyses of EU–Western Balkans relations, which stress that integration works best when institutional approximation and credible enforcement advance together.

For the EU panel, the stronger macroeconomic transmission mechanisms suggest a different emphasis: policy instruments appear to operate more effectively where institutional foundations are already stable, so maintaining credibility in monetary, fiscal, and labour-market coordination remains important. The EU results therefore do not imply that institutions replace macroeconomic policy, but rather that policy effectiveness is conditional on the institutional environment. The comparative evidence supports a sequencing logic in which institutional credibility is treated as an enabling condition for effective convergence, especially in economies where formal reforms have outpaced implementation capacity.

The policy implications differ across the two panels. In the EU, the results suggest that stable institutions allow macroeconomic policy, investment, and labour-market dynamics to transmit more effectively into growth, so policy attention should remain focused on preserving institutional credibility, fiscal discipline, and predictable regulation. In the Western Balkans, by contrast, the weaker macroeconomic transmission and the larger role of institutional shocks imply that reforms should prioritize rule of law, governance quality, and enforcement capacity before expecting stabilization and liberalization to produce durable convergence. This sequencing logic is consistent with the broader institutional-growth literature and with the evidence that formal policy alignment alone is insufficient where implementation capacity is weak.

6. Limitations

The main limitation of the analysis is that the Western Balkan panel combines a relatively small number of countries with a high-dimensional specification. Accordingly, the findings for that group should be interpreted as comparative evidence on the dominant long-run and short-run transmission patterns, rather than as fully exhaustive structural estimates.

In addition, the Western Balkans error-correction coefficient (-1.4889) exceeds unity in absolute value, which may reflect genuine overshooting dynamics but could equally indicate estimation sensitivity given the small cross-sectional dimension of that panel; robustness checks with alternative lag specifications are recommended in future work.

Besides that, the study period (2002–2022) spans multiple economic phases: pre-crisis (2002–2007), the global financial crisis (2008–2009), the eurozone crisis (2010–2015), post-crisis recovery (2016–2019), and the COVID-19 pandemic (2020–2022). Sub-sample analyses were conducted to examine potential structural breaks. Cointegration relationships remain stable across all sub-periods, although the error correction term (ECT) indicates faster adjustment in the Western Balkans after 2015 and in the EU after 2010. These structural shifts reflect evolving macroeconomic and institutional conditions, including pandemic shocks, but do not alter the overall conclusions regarding the role of institutional constraints in shaping growth dynamics.

Finally, the Western Balkans panel is constrained by a relatively limited effective sample (92 observations after first-differencing and accounting for the VECM lag structure across six countries, compared to 126 raw country-year observations reported in Table 2),

which reduces the statistical power of Granger causality tests. The reduction from 126 to 92 observations reflects the loss of one observation per country due to first-differencing and one additional lag used in the VECM specification. To mitigate this limitation, future studies could strengthen the analysis by triangulating quantitative findings with qualitative evidence, such as country-specific case studies or evaluations of EU Instrument for Pre-Accession Assistance (IPA) interventions, to corroborate statistical results and provide additional context on institutional dynamics.

7. Conclusions

For the past thirty years, transition economies have adhered to a common policy framework: controlling inflation, reducing fiscal deficits, liberalizing trade, and privatizing state assets. Despite diligent implementation, the Western Balkans have repeatedly fallen short of the expected outcomes. This underscores a key premise of macroeconomic theory: policy instruments produce real economic effects only through stable and credible channels, which are provided by mature, institutionally robust economies such as the EU. In contexts with weak institutions, this premise breaks down.

Recent research reinforces this view. Beirne and Panthi show that strong institutions enhance macro-financial resilience, enabling economies to absorb shocks and sustain growth, particularly through rule of law and regulatory quality [38]. Similarly, Chowdhury et al. demonstrate that institutions must cross a certain threshold before macroeconomic policies, such as managing sovereign debt, can function effectively [23]. These findings align with classical institutional economics: institutions do more than correlate with growth—they shape the very channels through which policy affects outcomes [5].

Institutions define the rules that govern property rights, contract enforcement, and political constraints. Inclusive institutions support growth; extractive institutions block it. In the Western Balkans, formal democratic structures often mask extractive practices: courts can be captured, enforcement selective, and privatization processes elite-dominated. As a result, standard macroeconomic prescriptions fail to produce sustained growth.

The VECM evidence highlights how institutional quality shapes economic outcomes. These results have important implications for policy sequencing. The conventional order—first stabilize, then liberalize, then strengthen institutions—proves ineffective in contexts like the Western Balkans. Strong institutions must come first. Secure property rights allow firms to plan and invest, independent courts enforce contracts, and constraints on government reduce expropriation risk. These foundations are also essential for meaningful integration into the EU common market: without credible institutions, liberalization and market access fail to generate productive investment or enhance competitiveness. Although institution-building takes time, it lays the groundwork for durable growth, demonstrating that the effectiveness of macroeconomic policy depends fundamentally on institutional quality.

In practice, this approach has clear applications. EU accession efforts should emphasize institutional chapters—judiciary, rule of law, and anti-corruption—over purely macroeconomic criteria. Central bank independence should be reinforced through statutory protections and, where possible, supranational oversight. Fiscal rules should be backed by mechanisms beyond domestic capacity, including EU frameworks and international enforcement mechanisms. Finally, reforms such as judicial independence, anti-corruption measures, and transparent regulatory frameworks require sustained investment and external technical support.

Overall, the empirical findings are broadly consistent with the central hypothesis examined in this study, suggesting that differences in institutional quality are associated with differences in macroeconomic transmission between the EU and the Western Balkans.

Convergence toward EU living standards in the Western Balkans depends on building institutions before applying standard macroeconomic policies. This reflects pragmatic sequencing rather than deterministic institutionalism: because institutions take time to develop, prioritizing them lays the groundwork for faster and more sustainable convergence. Contemporary evidence supports this view, emphasizing that strong institutions are a necessary foundation for effective economic governance. The message is clear: institutions must come first.

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Abbreviations

The following abbreviations are used in this manuscript:

VECM	Vector Error Correction Model
EU	European Union
WB	Western Balkans
GDP	Gross Domestic Product
LOGEF	Heritage Foundation Economic Freedom Index (log)
GFCF	Gross Fixed Capital Formation
ECT	Error Correction Term
IPA	Instrument for Pre-Accession Assistance
CEFTA	Central European Free Trade Agreement
IMF	International Monetary Fund
EBRD	European Bank for Reconstruction and Development
OECD	Organization for Economic Co-operation and Development
PPP	Purchasing Power Parity

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