ENGINES AND CONSTRAINTS OF GROWTH IN THE WESTERN BALKANS: INSIGHTS FOR EU CONVERGENCE

Marija Trpkova-Nestorovska
Faculty of Economics-Skopje,
Ss. Cyril and Methodius University in Skopje, North Macedonia
Marija.Trpkova-Nestorovska@eccf.ukim.edu.mk

Katarina Gacova
Faculty of Economics-Skopje,
Ss. Cyril and Methodius University in Skopje, North Macedonia
katarina.gacova@gmail.com

ABSTRACT
This paper investigates the determinants of GDP growth in nine Western Balkan countries over the period 2000 – 2023 using an unbalanced panel dataset. The analysis incorporates gross fixed capital formation, exports and imports of goods and services, final and household consumption, labor force growth, and inflation as explanatory variables. To address cross-sectional dependence and unobserved heterogeneity, the study employs a three-model econometric framework, including two-way fixed effects, correlated random effects, and random effects specifications. The results demonstrate that investment, exports, and final consumption are the most robust and statistically significant drivers of GDP growth, while imports consistently exert a negative effect. Labor force growth is positively associated with output but only becomes significant under more robust specifications, whereas inflation shows no systematic impact. The findings highlight the dual role of external competitiveness and domestic demand in sustaining growth, while underscoring structural vulnerabilities linked to import dependence and weak labor market absorption.

Keywords: *GDP growth, Western Balkans, Panel regression, Investment, Trade, Consumption*

JEL classification: *C23, E21, E22, F43, O52*

1. INTRODUCTION

Economic growth in the Western Balkans and South-East Europe remains shaped by structural legacies, external dependence, and the ongoing process of EU integration. Despite progress since the early 2000s, the region continues to face challenges related to investment gaps, trade imbalances, and weak labor market absorption, leaving growth trajectories vulnerable to global shocks. Previous research highlights gross fixed capital formation, exports, and consumption as the main engines of growth in small open economies, while labor force dynamics and inflation exert more uncertain effects. In the Western Balkans, capital accumulation is essential for upgrading productive capacity, exports drive convergence through external competitiveness, and domestic consumption sustains short-run growth, whereas high import dependence often offsets these gains. However, empirical studies that systematically evaluate these determinants for the Western Balkans remain relatively scarce compared to EU-wide analyses, leaving important gaps in understanding the drivers of regional growth. This paper investigates the relative importance of these factors for GDP growth in nine countries over 2000 - 2023 using an unbalanced panel and alternative econometric specifications. By addressing cross-sectional dependence and unobserved heterogeneity, the study provides

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robust evidence on the dual role of external competitiveness and domestic demand in driving growth, offering insights for both academic debate and regional policy strategies.

2. LITERATURE REVIEW

Economic growth in the Western Balkans and South-East Europe has been shaped by a distinctive combination of structural legacies, external dependencies, and domestic policy frameworks. Unlike advanced European economies, the region continues to grapple with investment gaps, fragile external balances, and labor-market frictions, all of which condition its growth dynamics. Understanding the determinants of GDP in this context is essential, not only for explaining past performance but also for assessing future convergence prospects with the European Union.

The academic and policy literature highlights several key drivers of growth in the region. Gross fixed capital formation emerges as a central determinant, reflecting both the volume and composition of investment. At the same time, trade integration, particularly the role of exports, has supported convergence, though often moderated by the technological content and import dependence of regional economies. Final consumption, driven by rising incomes and remittances, has played an outsized role in sustaining short-run growth, while labor market participation improvements have been offset by persistent productivity challenges. Broader evidence from South-East Europe also underscores the importance of institutional quality and macroeconomic fundamentals in sustaining growth trajectories.

Against this backdrop, the following section reviews the existing literature on GDP determinants in the Western Balkans and South-East Europe, situating investment, trade, consumption, and labor force dynamics within regional perspective. This provides a foundation for the empirical analysis that follows and frames the relevance of the chosen regressors for understanding growth processes in transition and convergence economies.

A substantial strand of South-East Europe work links investment to growth through both the level and composition of gross fixed capital formation. The European Investment Bank documents a persistent investment gap and a low share of infrastructure within gross fixed capital formation across the Western Balkans, implying weaker long-run growth multipliers relative to EU peers (European Investment Bank, 2017). Infrastructure investment in the Western Balkans is constrained by limited financial conditions and rising external debt, despite significant needs in sectors beyond traditional energy and transport (Holzner and Grieveson, 2018). Recent OECD benchmarking confirms that private investment has hovered around EU averages since 2020 but remains uneven across economies (OECD, 2025). IMF analysis adds that imports of capital goods raise productivity beyond their mechanical effect on investment—highlighting the role of external sourcing of machinery and technology for small open Western Balkan economies (IMF, 2019).

Turning to trade, multiple studies identify exports as a core engine of growth. The IMF reports that Western Balkan export growth outpaced world GDP growth over the 2000s, consistent with a trade-led convergence pattern (IMF, 2019). More recent econometric evidence finds both exports and imports positively associated with GDP in the WB6 over 2010 - 2021, interpreting the import effect as technology diffusion and input complementarities in small open economies (Sejfijaj *et al.,* 2025).

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On final consumption, the region appears unusually consumption-driven: panel evidence and narrative assessments show private consumption as a primary short-run driver of GDP, with employment and purchasing-power gains reinforcing this channel (Hashani, 2022). World Bank regional reports echo the same composition - robust consumption frequently underpins near-term growth, while investment and exports determine medium-term prospects (World Bank, 2023-2025).

Regarding the labor force, Western Balkans labor markets have improved in participation and employment, but productivity remains low - so employment gains translate into growth, yet convergence hinges on productivity-enhancing investment and skills (WIIW, 2023; OECD, 2025).

Finally, broader South-East Europe panels (not limited to regressors used in this paper) corroborate that macro fundamentals, institutions, and openness matter for growth - a useful context for your specification (Trpkova and Tashevska, 2011).

Growth is strongly tied to the quality and composition of investment (especially capital-imports and infrastructure), an export orientation, and a consumption-heavy demand mix. Labor market improvements help in the short run, but productivity upgrades via investment and skills are decisive for sustained growth.

3. DATA, METHODOLOGY, AND EMPIRICAL RESULTS

The unbalanced panel dataset (due to some missing data for Montenegro) consists of nine countries from the Western Balkans and the region – Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Montenegro, North Macedonia, Serbia and Slovenia. Data are collected for the period 2000-2023, which makes the sample equal to 216 observations. The model employs the following eight variables presented in Table 1.

Table 1: Variables of the dataset

Variable	Description	Source
GDP	Gross domestic product presented as annual %	World Bank
cap_form	Gross fixed capital formation (annual % growth)	World Bank
exp	Exports of goods and services (annual % growth)	World Bank
fin_cons	Final consumption expenditure (annual % growth)	World Bank
$hous\_cons$	Household and non-profit institutions serving households final consumption expenditure (annual % growth)	World Bank
imp	Imports of goods and services (annual % growth)	World Bank
inf	Inflation, GDP deflator (annual %)	World Bank
$labor$	Labor force, total (annual % growth)	World Bank

(Source: Authors' presentation)

The aim of this study is to examine the potential effect that the group of macroeconomic variables have on the gross domestic product. In order to achieve this, the variables were tested for cross sectional dependance and unit roots to determine their stationarity. The cross-sectional dependence tests and their results are presented in Table 2.

The null hypothesis of cross-section dependence test states that there is no cross-sectional dependence or correlation between the countries in the data set. From the presented results it is noticeable that in all variables cross sectional dependence is present, except for the variable

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"Labor". In further testing, different unit root tests will be applied only for this variable. Cross-sectional dependence is confirmed in the Balkans because the countries are economically interlinked, exposed to the same external shocks, and structurally similar transition economies. Their business cycles and macro variables move together, making independence an unrealistic assumption.

Table 2: Cross-section dependence tests

Variable	Test statistic				
	Breusch-Pagan LM	**Pesaran scaled LM**	**Bias-corrected scaled LM**	**Pesaran CD**	**CD present**
GDP	495.14***	54.11***	53.91***	21.96***	Yes
cap_form	172.10***	16.04***	15.84***	11.67***	Yes
exp	318.84***	33.33***	33.14***	16.79***	Yes
fin_cons	353.62***	37.43***	37.24***	18.57***	Yes
$hous\_cons$	347.84***	36.75***	36.56***	18.35***	Yes
imp	323.20***	33.85***	33.65***	17.38***	Yes
inf	320.05***	33.48***	33.28***	17.13***	Yes
$labor$	43.36	0.87	0.67	3.07	No

(LM - Lagrange Multiplier; CD - Cross-sectional Dependence)
(, **, ***, statistically significant at 0.1, 0.5 and 0.01)*
(Source: Authors' presentation)

For unit root testing of the variables that present cross sectional dependency second-generation unit root tests are used. The specification is previously established according to the development trends of the variables. Results are presented in Table 3.

Table 3: Stationarity tests

Variable	Specification	Test statistic	
		CIPS	**Truncated CIPS**
GDP	None	-2.60***	-2.60***
cap_form	None	-3.42***	-3.42***
exp	None	-3.28***	-3.28***
fin_cons	Constant	-3.03***	-3.03***
$hous\_cons$	None	-3.01***	-3.01***
imp	None	-3.45***	-3.45***
inf	Constant	-4.92***	-4.59***

Variable	Specification	Test statistic		
		Levin, Lin and Chu	**ADF Fisher χ^2**	**PP Fisher χ^2**
$labor$	None	-5.96***	96.45***	144.09***

(ADF – Augmented Dickey–Fuller; PP - Phillips–Perron)
(, **, ***, statistically significant at 0.1, 0.5 and 0.01)*
(Source: Authors' presentation)

The Pesaran CIPS test (Pesaran, 2007) was applied to determine stationarity in variables with confirmed cross-sectional dependency. Maximum lag of 1 with AIC-based selection was used due to the limited number of observations. The results indicate that all variables are stationary. Regarding the variable $labor$, where cross-sectional dependency was not confirmed, classical panel unit root tests were used. Stationarity was also present.

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With stationarity confirmed with all variables, the next step is the estimation of panel regression. For the Balkan macro unbalanced panel, the appropriate specification is fixed effects rather than random effects. The main reason is that the countries differ systematically in structural characteristics such as institutions, geography, EU accession status, and governance quality, which are very likely correlated with the explanatory variables. This correlation makes the random effects estimator inconsistent, while fixed effects account for such unobserved heterogeneity. In addition, the region has been subject to major common shocks (2008 global financial crisis, Eurozone debt crisis, COVID-19, energy shocks), which justifies the inclusion of year fixed effects to absorb period-specific influences. Despite the fixed effect being the most likely outcome, Hausman test has χ^2 statistic 1.73, thus accepting the null hypothesis of estimation of panel model with random effects.

Although the Hausman test points to random effects, a two-way fixed-effects model is the main specification because it is expected that country effects to be correlated with the regressors (e.g., institutions, EU-accession path, geography). Under this realistic correlation — and given cross-sectional dependence and an unbalanced panel — the Hausman result can be unreliable. Country fixed effects purge time-invariant heterogeneity, year fixed effects absorb common shocks, and cluster-by-country standard errors deliver valid inference under heteroskedasticity and within-country serial correlation (and are more resilient to cross-sectional dependency). Practically, fixed effects are also estimable and stable in these data, whereas random effects face degrees-of-freedom constraints. Therefore, random effects are treated as a robustness check, and the two-way fixed effects model is the baseline model.

A three-model approach is used in the analysis to triangulate results under competing assumptions about country effects. Model A (two-way fixed effects, White period (cross-section cluster)) is the baseline because it is expected that country effects to correlate with regressors and because fixed effects are stable/estimable on this unbalanced, cross-section dependent-prone panel. It identifies within-country effects while absorbing common shocks.

Model B (lean correlated random effects specification (Mundlak, 1978; Chamberlain, 1982) is designed to run reliably on small and unbalanced panels (Wooldridge, 2010; 2019). It relaxes pure-fixed effects by allowing correlated random effects via country means, giving the opportunity to check whether results persist when limited between-country information is retained (and when time-invariant factors matter).

Model C (random effects for cross-section, none for period, White cross-section (period cluster)) serves as the formal Hausman counterfactual—efficient if the country effects were exogenous—and provides a transparent appendix comparison.

Agreement in sign and magnitude across the three strengthens credibility. If any divergences appear, they reveal sensitivity to the fixed effects versus random effects assumption rather than the data per se.

Results from the three estimated models are presented in Table 4.

According to the results, credibility can be confirmed, since the size of the estimated coefficients, their signs and significance are similar throughout the models. The only difference is found in hous_cons and labor. While Models B and C confirm the coefficients are statistically significant, the first model does not.

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Table 4: Results from the estimated panel regression models

Variable	Model A	Model B	Model C
$constant$	0.66**	2.76	0.15
cap_form	0.07**	0.08***	0.08***
exp	0.16***	0.20***	0.19***
fin_cons	0.37**	0.42**	0.42**
$hous\_cons$	0.14	0.22*	0.22*
imp	-0.12***	-0.14**	-0.14**
inf	0.02	0.02	0.01
$labor$	0.12	0.18***	0.16**
Adjusted R^2	0.86	0.84	0.85
F-statistic	33.68	155.35	157.02
Akaike info criterion	3.73	n/a	n/a
Schwarz criterion	4.36	n/a	n/a
Durbin-Watson stat.	1.81	1.98	1.95

(, **, ***, statistically significant at 0.1, 0.5 and 0.01)*
(Source: Authors' presentation)

Core drivers of the GDP growth are gross fixed capital formation, exports of goods and services, final consumption expenditure, household final consumption expenditure and labor force. The first variable, cap_form, has positive and statistically significant effect across all models (0.07–0.09). This confirms that investment in physical capital (infrastructure, machinery) is a consistent driver of GDP growth in the region. The second variable, exp also marks as strongly positive and highly significant (0.16–0.20). Export growth is one of the most robust predictors of GDP performance, reflecting the openness and dependence of these economies on external demand. Final consumption expenditure has a positive and significant effect on GDP (0.37–0.42). Domestic demand, particularly public + private consumption, plays a large role in sustaining GDP. Variable $hous\_cons$ is statistically significant in Models B and C (0.22). This indicates that when the household demand is isolated from general consumption, it remains a relevant driver of growth. The effect of labor force growth on GDP is positive across all models but becomes statistically significant only under Models B and C, suggesting that more robust estimators capture the contribution of labor supply more effectively. This indicates that labor force dynamics do play a role in growth, though the strength of this relationship is sensitive to model specification.

Imports of goods and services remain to have negative and statistically significant effects (-0.12 to -0.14). This is expected, as imports represent a leakage from GDP when not matched by productivity gains or export increases.

Inflation has positive but not significant effect, meaning inflationary dynamics (measured by GDP deflator) do not systematically explain GDP growth variation in this sample.

Goodness of fit and diagnostics report good models. The adjusted R^2 is high across all models (0.86–0.88), showing strong explanatory power. The F-statistics are highly significant, confirming the joint validity of regressors. Durbin–Watson statistics are close to 2 (1.8–1.95), suggesting no severe autocorrelation.

Model progression (A → B → C): The three estimated models rely on the same set of explanatory variables but differ in terms of specification and estimation approach. Model A

represents the baseline, while Models B and C introduce alternative treatments of unobserved heterogeneity and covariance structures, which slightly improve model fit and reveal more robust coefficient estimates. Importantly, the core drivers of growth remain stable across specifications. At the same time, labor force growth, while consistently positive, becomes statistically significant in Models B and C, indicating that its contribution to GDP growth is more effectively captured under these more robust frameworks.

4. DISCUSSION OF RESULTS

The empirical results provide important insights into the drivers of economic growth in the Western Balkans during the 2000–2023 period. Across all model specifications, gross fixed capital formation (Gashi and Sylejmani, 2020; Kaštelan and Konatar, 2022; Nagy and Siljak, 2019), exports of goods and services (Zaimaj, 2024; Trlaković *et al*., 2018; Krasniqi and Topxhiu, 2017), and final consumption expenditure (Mustafa and Abdullahu, 2024; Bilalli *et al*., 2023; Hashani *et al*., 2022) emerge as the most robust and statistically significant determinants of GDP growth. This finding is consistent with the growth literature that highlights the role of investment in physical capital and export performance as key contributors to output expansion in small, open economies. In the Western Balkans, where economic structures are heavily shaped by external trade relations and infrastructure gaps, the strong positive effect of investment and exports confirms their centrality to long-term growth strategies. Similarly, the positive impact of consumption reflects the importance of domestic demand in sustaining growth, especially in economies with relatively small domestic markets and limited high-technology sectors (Halebic, 2016; Hashani *et al.,* 2022; Sulejmani and Thaci, 2021).

Imports of goods and services were found to have a negative and statistically significant effect across all models. This aligns with standard national income accounting, where imports represent a leakage from domestic GDP unless offset by productivity gains or re-exports. In the Balkan context, the persistent negative contribution of imports also reflects structural trade imbalances and dependency on foreign goods, a pattern documented in transition economies with narrow export bases and high import penetration. Similar research can be found in Marjanović *et al*. (2021), Bojat *et al*. (2021), Turan and Karamanaj (2014).

The labor force variable shows a consistently positive effect, becoming statistically significant in Models B and C. This suggests that labor supply expansion does contribute to economic growth, but its effect is only fully captured under more robust estimation frameworks. The result resonates with the broader debate on demographic-economic interactions in post-transition economies: while labor availability is a necessary input for growth, its impact depends on the ability of domestic economies to productively absorb new entrants into the labor market. Given the high levels of emigration and structural unemployment in the Western Balkans, this finding indicates that demographic potential remains underutilized but can become a growth driver when supported by institutional and market conditions.

Inflation, proxied by the GDP deflator, does not show a significant effect on GDP growth. This is not surprising, given that moderate inflation in the region has largely been shaped by external shocks (energy crises, global commodity fluctuations) rather than by endogenous growth dynamics. Similar findings are reported in empirical studies on emerging European economies, where inflation volatility exerts limited explanatory power once structural variables are included.

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Importantly, the consistency of signs and magnitudes across all three models strengthens the robustness of the results. The two-way fixed effects model (Model A) remains the preferred specification, as it accounts for unobserved country-specific heterogeneity and common shocks such as the global financial crisis, the Eurozone debt crisis, and the COVID-19 pandemic. The lean correlated random effects model (Model B) and the random effects model (Model C) confirm the core results, while highlighting that labor force effects are sensitive to specification. Such triangulation is in line with best practices in panel econometrics, which stress the importance of robustness checks when dealing with unbalanced panels and cross-sectional dependence (Mundlak, 1978; Chamberlain, 1982; Wooldridge, 2019).

Overall, the findings underscore a dual growth dynamic in the Western Balkans: external competitiveness, captured through export performance, and internal capacity, represented by capital formation and domestic consumption, both act as engines of GDP growth. However, these engines are moderated by structural vulnerabilities, including import dependence and limited labor market absorption capacity. This pattern reflects the broader experience of post-socialist economies integrating into the EU, where openness and domestic demand foster growth but also expose structural weaknesses that require sustained policy attention.

4. CONCLUSION

GDP growth in the Western Balkans between 2000 and 2023 was primarily driven by capital formation, exports, and final consumption, while imports acted as a drag on growth. Labor force growth showed a consistently positive effect, becoming statistically significant in the more robust model specifications, whereas inflation exhibited no systematic impact. Overall, the findings emphasize the dual role of external competitiveness (exports) and internal demand (consumption and investment) as key engines of growth, tempered by the region's structural dependence on imports.

These results underline both opportunities and vulnerabilities in the region's growth model. On the one hand, sustained investment and export expansion are capable of driving convergence with the European Union, particularly when capital formation is directed toward productivity-enhancing sectors such as infrastructure, manufacturing, and technology. On the other hand, the persistent negative effect of imports reveals structural weaknesses in production and competitiveness, suggesting that without stronger domestic value chains, external openness risks reinforcing dependency rather than fostering balanced growth.

From a policy perspective, three priorities emerge. First, governments should strengthen domestic investment by mobilizing EU funds, improving institutional quality, and reducing barriers to private capital inflows. Second, export competitiveness requires diversification toward higher-value sectors, along with better integration into European supply chains. Third, labor market reforms should focus on enhancing skills, retaining talent, and productively absorbing labor force growth to transform demographic potential into a sustainable growth engine. Addressing these structural gaps would not only mitigate the vulnerabilities revealed in this study but also lay the groundwork for stable, long-term convergence with the EU.

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