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Property-tax performance in Kosovo and selected Western Balkan economies: A comparison with Croatia

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Abstract

Aim/purpose – This study examines property-tax performance – measured as property--tax revenue as a percentage of gross domestic product (GDP) – in Kosovo, four selected Western Balkan economies, and Croatia as a comparative benchmark during 2007-2023, focusing on the economic, fiscal, administrative, and institutional factors associated with performance.

Design/methodology/approach – The study employs a balanced dataset of 102 country--year observations. It combines descriptive analysis and comparisons with a country- and year-fixed effects model. Because the panel contains only six country clusters, inference uses CR2 variance estimation with Satterthwaite degrees-of-freedom corrections and wild cluster bootstrap t-tests with Webb weights. The econometric analysis is complemented by a comparative institutional assessment of cadastral modernization, fiscal decentralization, administrative capacity, and institutional quality.

Findings – Regional differences in property-tax performance remain evident. Fiscal decentralization shows a positive conditional association under both small-cluster procedures. GDP per capita, administrative capacity, and institutional quality do not meet the 5% significance threshold under either procedure. Cadastral evidence is examined separately and is not included in the baseline model.

Research implications/limitations – The study provides evidence that may help policy-makers, tax administrations, municipal authorities, and cadastral agencies assess institutional arrangements relevant to local revenue mobilization. Nevertheless, the findings should be interpreted in light of limitations related to data comparability across countries and the use of country-level rather than municipal-level observations. Additional limitations arise from only six country clusters and a dependent variable that does not directly measure collection efficiency, compliance, or tax potential.
Originality/value/contribution – The study contributes to the literature on property taxation and local public finance by combining a harmonized comparative panel with small-cluster inference and explicitly separating baseline econometric associations from contextual institutional interpretations and supplementary cadastral evidence. This distinction clarifies which conclusions the model supports and which remain context-dependent across heterogeneous fiscal and administrative systems.

Keywords: Property-tax performance; fiscal decentralization; cadastral systems; institutional quality; Western Balkans.
JEL Classification: H71; H72; C33; O23.
Article type: Original article.

1. Introduction

Taxes on land and property are often an important source of finance for local governments (Bird & Slack, 2002). Nevertheless, outdated property values and shortcomings in reporting and enforcement often weaken the revenue potential of recurrent taxes on immovable property, underscoring the importance of sound valuation and administration (OECD, 2022).

Kosovo and four selected Western Balkan economies, with Croatia serving as a regional benchmark, provide a suitable setting for examining property-tax performance. Country-specific studies document differences in their property-tax systems, local-finance arrangements, valuation approaches, and administrative frameworks (Asllani & Grima, 2019; Gaber & Gruevski, 2020; Klemenčić, 2023; Lazović-Pita & Močević, 2018; Puleri & Kripa, 2016; Rapajić et al., 2019). They also exhibit differences in governance indicators (World Bank, 2024) and recorded property-registration indicators (World Bank, 2026). Current reform agendas emphasize modernizing property valuation (OECD, 2022) and digitalization within broader public-administration reform (OECD, 2025). Kosovo represents a particularly important case because studies document outdated cadastral information, an insufficient number of property-tax assessors, and broader institutional-capacity constraints in property-tax administration and collection

(Asllani & Grima, 2019; Jashari, 2020). The coexistence of shared regional characteristics and differing reform outcomes provides a suitable setting for comparative analysis of the factors associated with property-tax performance.

Although the literature links property-tax performance to fiscal decentralization, administrative capacity, cadastral systems, and institutional quality, researchers often examine these dimensions separately or within individual countries (Bahl & Bird, 2018; OECD, 2022). Comparative evidence integrating these dimensions within a common empirical framework remains relatively limited for the Western Balkans. A remaining conceptual question is whether fiscal decentralization and broader institutional capacity should be treated as interchangeable explanations or as related but analytically distinct dimensions of property-tax performance. The study addresses this question in Kosovo, four selected Western Balkan economies, and Croatia, serving as a regional benchmark, from 2007 to 2023.

The study evaluates fiscal and institutional associations within a common country- and year-fixed effects model while using a separate comparative institutional assessment to interpret administrative and cadastral developments. This design distinguishes the evidence from the baseline model from the contextual institutional evidence and does not treat institutional modernization as a single econometrically confirmed mechanism.

Empirically, the study provides comparable evidence across the six countries using a common model specification and inference procedures appropriate for the panel structure. Conceptually, the findings suggest that fiscal decentralization and broader institutional capacity are related but analytically distinct dimensions. Fiscal decentralization is the only consistently statistically supported baseline correlate; the remaining baseline estimates are not statistically significant, and the cadastral evidence is supplementary and contextual.

2. Literature review

The academic literature on property taxation provides a solid foundation for understanding how institutional, valuation, and administrative factors relate to local revenue performance. Classical public-finance theory emphasizes the stability and visibility of real property as a tax base, supporting both the benefit principle and the ability-to-pay principle, which link tax burdens to services received and long-term household wealth (Bahl & Bird, 2018; Bird & Slack, 2002; Youngman, 2016).

The literature highlights cadastral information, valuation practices, and administrative capacity as important dimensions of property-tax performance (Bahl & Bird, 2018; OECD, 2022). Modern ad valorem property-tax systems base taxation on property values determined through cadastral registers (Mazurek-Chwiejczak, 2015). Transparent and regular valuation cycles are associated with fairness (McCluskey, 1999; OECD, 2022). Administrative capacity in property-tax assessment, collection, and enforcement is associated with revenue performance (Bahl & Bird, 2018).

Recent literature has also emphasized the institutional design of sustainable property-tax reform. Renigier-Biłozor et al. (2024) proposed a consensual, transparent property-tax framework that incorporates stakeholder participation and adaptability to economic shocks. Their conceptual analysis suggested that these features can reduce resistance to reform and strengthen community resilience.

The six countries also differ substantially in the institutional arrangements and maturity of their property-tax systems. Within the study sample, Croatia recorded comparatively high and stable property-tax revenue. Croatian scholarship has examined proposals for real-estate-tax reform, expert and public attitudes toward such reform, its potential long-term household consequences, and the role of local taxation in financial autonomy (Blažić et al., 2016; Klemenčić, 2023; Vidaković et al., 2016). In Serbia, property-tax reforms transferred responsibility for administering this locally generated revenue to local tax authorities, strengthening the fiscal role of local governments (Rapajić et al., 2019). In Albania, the system remained area-based during much of the study period, while the literature highlighted registration weaknesses and recommended a transition toward value-based property taxation (Gjika, 2016; Puleri & Kripa, 2016). North Macedonia has shown progress in fiscal decentralization but remains constrained by weaknesses in property valuation and tax administration (Elezi, 2016; Gaber & Gruevski, 2020). Bosnia and Herzegovina continues to have a fragmented property-tax framework across its two entities, while property-tax revenues remain limited (Lazović-Pita & Močević, 2018).

The literature on Kosovo has reflected similar challenges. Research identified outdated cadastral information, an insufficient number of property-tax assessors, and limited institutional capacity as challenges to property-tax collection (Asllani & Grima, 2019; Jashari, 2020). Collectively, these insights establish a coherent analytical framework centered on cadastral completeness, valuation accuracy, and administrative capacity – elements that guide this study's empirical strategy.

3. Research methods

This study used panel data analysis, complemented by a comparative institutional assessment, to examine property-tax performance in Kosovo, four selected Western Balkan economies, and Croatia as a regional benchmark. The analysis used annual data for 2007-2023 and a balanced panel dataset covering six countries: Kosovo, Albania, North Macedonia, Serbia, Bosnia and Herzegovina, and Croatia. These countries share transitional and fiscal characteristics yet differ significantly in cadastral completeness, administrative modernization, and institutional capacity, making them an appropriate sample for comparative analysis. Montenegro was excluded because credible institutional sources could not provide a complete and comparable 2007-2023 panel.

Croatia was retained because it provided complete and consistent data coverage for the entire study period, preserving the balanced panel structure. In addition, Croatia served as a useful regional benchmark for property taxation and local public finance, and has shared important historical, institutional, and fiscal characteristics with the Western Balkan economies included in the analysis.

The study had four main research objectives: first, to measure the level and trends of property-tax performance across the six countries during the period of analysis; second, to identify the key economic, fiscal, administrative, and institutional factors associated with property-tax performance; third, to estimate the conditional associations of gross domestic product (GDP) per capita, fiscal decentralization, administrative capacity, and institutional quality with property-tax performance using a country- and year-fixed effects model; and fourth, to relate the quantitative findings to comparative institutional evidence, including cadastral reform.

The research followed several methodological steps. First, the authors collected economic, fiscal, administrative, and institutional data from the audited IMF-derived property-tax revenue performance (PTRP) series and its documented supplementary national reconstructions, the World Bank's WDI and WGI datasets, NALAS reports on fiscal decentralization, and other documented national sources. We reconstructed the institutional variables used in the baseline model from documented numerical source components. While we reserved cadastral evidence for the comparative institutional assessment, we reported supplementary limited-period specifications separately. Second, we harmonized the dataset and structured it as a balanced panel suitable for econometric modeling. Third, we performed descriptive and comparative analyses to identify cross-

country patterns. Finally, we ran econometric estimations, diagnostic tests, and small-cluster inference procedures in R using the final audited panel dataset. The analysis follows established panel-data methods (Baltagi, 2008; Wooldridge, 2010).

The following research questions guided this study:

- RQ1: What are the main trends of property tax performance in Kosovo during 2007–2023?
- RQ2: Which economic, administrative, and institutional factors are associated with property-tax performance across the six-country sample?
- RQ3: How does Kosovo's property-tax performance compare with that of the four selected Western Balkan economies and Croatia as a regional benchmark?

Prior evidence indicated that recurrent property-tax revenues tend to increase with the level of economic development, supporting the expectation of a positive association between GDP per capita and property-tax performance (Norregaard, 2013). Fiscal decentralization can strengthen local fiscal responsibility and incentives for own-source revenue mobilization, suggesting a positive association with property-tax performance (Bahl & Bird, 2018). Effective governance and institutional capacity also matter for consistent property-tax administration and revenue mobilization, supporting the expectation of a positive association between institutional quality and property-tax performance (Akitoby et al., 2019; OECD, 2022).

Based on the theoretical framework and the empirical literature, the following hypotheses and separately assessed H4 were specified.

H1: Higher GDP per capita is associated with higher property-tax performance.

H2: Greater fiscal decentralization is positively associated with local property-tax performance.

H3: Stronger administrative capacity is positively associated with property-tax performance.

H4: Higher cadastral completeness and more regular valuation cycles are positively associated with property-tax performance.

H5: Better institutional quality is associated with higher property-tax performance.

We formally assessed H1, H2, H3, and H5 within the baseline econometric model. H4 was assessed separately through the comparative institutional assessment and restricted-period supplementary specifications and was therefore not subject to the same hypothesis-testing procedure as the baseline hypotheses.

To assess these hypotheses and the separately examined H4, the analysis used a set of variables later incorporated into the econometric model. The dependent variable, PTRP, measured property-tax revenue as a percentage of GDP. As a revenue-to-GDP ratio, PTRP does not directly measure collection efficiency, taxpayer compliance, tax potential, valuation accuracy, or the revenue gap. The baseline explanatory variables were GDP per capita (GDPpc), fiscal decentralization (DEC), administrative capacity (ADMIN), and institutional quality (INST_QUAL). We assessed cadastral completeness through the comparative institutional assessment and a separate restricted-period supplementary analysis. Table 1 presents the operationalized variables of the econometric model.

Table 1. Definition, measurement, and sources of variables

Variable	Definition	Unit/scale	Data source	Construction method	Expected sign
PTRP	property-tax revenue performance	% of GDP	IMF GFS/WoRLD-derived PTRP series (96 observations); documented official reconstructions for Kosovo 2007–2010, North Macedonia 2012, and Serbia 2023	property-tax revenues divided by GDP × 100	Dependent variable
GDPpc	gross domestic product per capita	constant 2015 EUR per capita	World Bank WDI NY.GDP.PCAP.KD, October 2025 archive; Kosovo 2007 DERIVED–SPLICED	annual GDP per capita series: constant 2015 USD × 0.90	+
DEC	fiscal decentralization	ratio (0–1)	NALAS fiscal-decentralization reports, 9th ed. (2024) and 10th ed. (2025)	(local-government revenue / total public revenue) × (own-source revenue / total local-government revenue); percentage inputs divided by 100 before multiplication	+

Table 1 cont.

Variable	Definition	Unit/scale	Data source	Construction method	Expected sign
ADMIN	administrative capacity	index (0–1)	World Bank WGI, 2024 vintage: Government Effectiveness estimate (GE.EST)	(government effectiveness estimate + 2.5) / 5	+
INST_QUAL	institutional quality	index (0–1)	World Bank WGI, 2024 vintage: Rule of Law (RL.EST) and Control of Corruption (CC.EST)	{[(rule of law + 2.5) / 5] + [(control of corruption + 2.5) / 5]} / 2; equal weights	+

Source: Authors' own compilation based on: European Central Bank (n.d.); Federal Reserve Bank of St. Louis (n.d.); Garvanlieva Andonova et al. (2020); International Monetary Fund (2025a, 2025b); Ministria e Financave (2024); National Bank of Serbia (2024); National Bank of the Republic of Macedonia (2013); Network of Associations of Local Authorities of South-East Europe (2025); Prorok et al. (2024); State Statistical Office of the Republic of Macedonia (2014); Statistical Office of the Republic of Serbia (2024); World Bank (2024, 2025a, 2025b).

In Table 1, GDPpc corresponds to the World Bank WDI indicator NY.GDP.PCAP.KD, and is expressed in constant 2015 euros. We obtained the data from the October 2025 WDI archive (World Bank, 2025b), where GDP per capita is reported in constant 2015 US dollars, and converted it to euros using an exchange rate of EUR 0.90 per US dollar. This rounded coefficient was derived from the 2015 annual average ECB reference rate of EUR 1 = USD 1.1095, equivalent to USD 1 = EUR 0.9013 (European Central Bank, n.d.). Kosovo 2007, which was missing from that archive, was retained as a DERIVED–SPLICED observation obtained by linking the historical WDI constant-2010 series, accessed through FRED (Federal Reserve Bank of St. Louis, n.d.), to the constant-2015 series at their first common year, 2008.

PTRP has been documented for all 102 country-year observations. For 96 observations, we obtained PTRP directly from the harmonized IMF GFS/WoRLD--derived series. We reconstructed six observations from documented official sources where the corresponding IMF PTRP observation was unavailable: Kosovo 2007-2010, North Macedonia 2012, and Serbia 2023. For Kosovo 2007-2010, we divided property-tax revenue from the Ministry of Finance, Labour and Transfers of the Republic of Kosovo (Ministria e Financave, 2024) by the corresponding IMF nominal GDP and multiplied by 100. The reconstructed observations are not attributed directly to the IMF PTRP series.

For the Kosovo-specific descriptive analysis in Table 3 and Figure 1 (subsection 4.1), we obtained nominal property-tax revenue from the Ministry of Finance, Labour and Transfers of the Republic of Kosovo's (2024) final time-series file. For the cross-country comparisons and econometric analysis, PTRP was drawn from the harmonized IMF-derived series, with documented national sources used only where the corresponding IMF PTRP observation was unavailable. The Ministry--based nominal descriptive series and the IMF-based PTRP panel therefore serve different analytical purposes and are not numerically interchangeable.

DEC was calculated as (local-government revenue / total public revenue) × (own-source revenue / total local-government revenue), after converting percentage inputs to proportions, using the NALAS ninth edition (Prorok et al., 2024; 2006-2021 coverage) and tenth edition (Network of Associations of Local Authorities of South-East Europe, 2025; 2014-2023 coverage). ADMIN was normalized from WGI Government Effectiveness (GE.EST) as (GE + 2.5) / 5. INST_QUAL was the equally weighted mean of normalized Rule of Law (RL.EST) and Control of Corruption (CC.EST) estimates. The frozen WGI vintage was 2024 (World Bank, 2024). ADMIN, DEC, and INST_QUAL contained 102/102 source-based country--year observations and were not interpolated or coded from qualitative reports. This multiplicative specification captures the share of total public revenue represented by local governments' own-source revenue.

We used two World Bank Doing Business indicators only in restricted-period supplementary specifications (World Bank, 2026). The cadastral efficiency indicator (CADASTRE_EFF) was used for 2010–2020 (N = 66), and the Quality of Land Administration indicator (CADASTRE_QLA) was used for 2016-2020 (N = 30). Values were assigned to the applicable observation year; no interpolation, extrapolation, carry-forward, or qualitative author coding was used. Because these indicators were standardized representations rather than national measures of cadastral completeness, we did not include them in the baseline model.

The empirical model estimated in this study was specified as follows:

$$PTRP_{it} = \beta_0 + \beta_1 GDPpc_{it} + \beta_2 DEC_{it} + \beta_3 ADMIN_{it} + \beta_4 INST_QUAL_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

where: $PTRP_{it}$ denotes property-tax revenue performance in country *i* and year *t*, $GDPpc_{it}$ captures economic development, DEC_{it} represents fiscal decentralization, $ADMIN_{it}$ is the normalized WGI Government Effectiveness indicator (0 – 1), $INST_QUAL_{it}$ captures institutional quality, β_0 is the intercept, $\beta_1 \ldots \beta_4$ are the coefficients, μ_i denotes time-invariant country characteristics, λ_t denotes common year

effects, and ε_{it} is the idiosyncratic error term. The coefficients are interpreted as conditional associations within the observed panel, not as causal effects.

The baseline model has been a country- and year-fixed effects model. Because the panel contained only six country clusters, conventional asymptotic cluster-robust inference may overstate the precision of the coefficient estimates. Statistical inference, therefore, relies on two complementary small-sample procedures: CR2 variance estimation with coefficient-specific Satterthwaite degrees-of-freedom corrections and wild cluster bootstrap-t inference with Webb weights based on 9,999 replications at the country level. We reported conventional standard errors and p-values for comparison, but assessed statistical support based on the small-cluster procedures. We reported two-way clustered results for comparison.

The comparative institutional assessment complemented the econometric analysis by reviewing evidence on administrative modernization, governance effectiveness, cadastral reforms, and fiscal-administration developments across the six countries. This assessment placed the econometric findings and observed cross-country differences in their institutional context. Cadastral evidence contextualized the quantitative findings and was assessed separately from the baseline model.

The analysis acknowledged several methodological limitations. Variations in data availability and measurement across countries may influence institutional indicators, and decentralization metrics may vary across national classifications. In addition, the panel contained only six country clusters, which limits the precision of statistical inference and requires cautious interpretation of significance. The estimates described conditional associations within the observed panel rather than causal effects. The cadastral proxies covered substantially shorter periods than the baseline panel and should not have been interpreted as national measures of cadastral completeness.

4. Research findings

This section presents the study's empirical results through descriptive statistics, cross-country and gap comparisons, and panel-data econometric modeling. The findings are organized across the main analytical components and supported by tables, figures, and robustness checks. The final subsection assesses the baseline hypotheses and the separately examined H4.

Table 2 includes Croatia as a regional benchmark; the remaining sample comprises Kosovo and four selected Western Balkan economies. The entries summarize period-specific systems and should not be read as implying a uniform, recurring market-value tax across all six countries.

Table 2. Institutional characteristics of property-tax systems in the six-country study sample

Country	Property-tax base	Administration level	Property valuation approach	Revenue assignment
Kosovo	buildings; land included from 2019	municipal governments	administrative assessment based on property characteristics and market-value principles	municipal own-source revenue
Albania	buildings and land	municipal governments	area-based assessment during much of the period, transitioning toward value-based building taxation	municipal own-source revenue
Bosnia and Herzegovina	property and land (changes across entities and cantons)	municipal and entity-level authorities	administrative valuation procedures	local government revenue
North Macedonia	residential, commercial, and other taxable properties	municipal governments	administrative valuation based on assessed property value	municipal own-source revenue
Serbia	buildings, land, and property rights	municipal governments	market-value-based assessment using valuation zones	municipal own-source revenue
Croatia	holiday homes and other locally taxable real-estate categories	local governments	area-based annual holiday-home tax; market value as the tax base for real estate transfer tax	local government revenue

Source: Kosovo: Asllani & Grima (2019); Ministria e Financave (2024); Republic of Kosovo (2018); Albania: Puleri & Kripa (2016); Bosnia and Herzegovina: Center of Excellence in Finance (2016); Lazović-Pita & Močević (2018); North Macedonia: Ministry of Finance of the Republic of North Macedonia (n.d.); Gaber & Gruevski (2020); Serbia: Rapajić et al. (2019); Croatia: Government of Croatia (n.d.); Tax Administration (n.d.).

To better understand cross-country differences in property-tax performance, it was important to consider the institutional context within which property tax systems operate. Table 2 presents the principal characteristics of property-tax systems across the six countries in the study sample, including the property-tax base, administrative level, valuation approach, and revenue assignment. These institutional differences provided important context for interpreting the descriptive, comparative, and econometric results presented in the following sections.

4.1. Descriptive trends in Kosovo (2007-2023)

This subsection summarizes the evolution of property-tax revenues in Kosovo from 2007 to 2023, highlighting key structural changes and long-term trends (Table 3 and Figure 1). The goal was to provide a factual baseline for interpreting the regional comparison and econometric results in the following subsections.

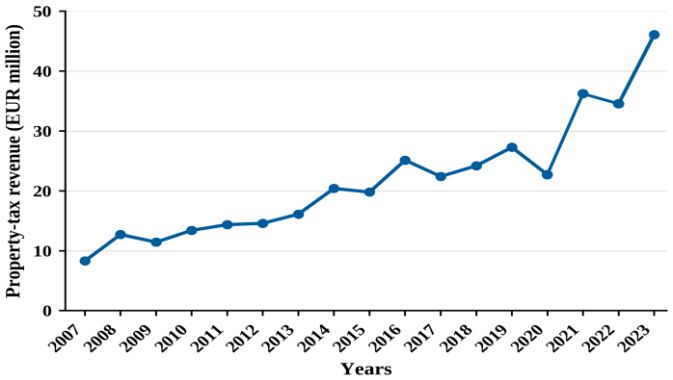
Table 3. Property-tax revenue in Kosovo (EUR thousands, 2007-2023)

Year	Property-tax revenue (EUR thousands)
2007	8,300.48
2008	12,717.00
2009	11,436.23
2010	13,411.47
2011	14,363.92
2012	14,584.17
2013	16,119.34
2014	20,411.15
2015	19,796.81
2016	25,127.91
2017	22,408.00
2018	24,195.65
2019	27,276.71
2020	22,707.49
2021	36,258.13
2022	34,554.04
2023	46,085.20

Source: Authors' own calculations based on the data from the Ministria e Financave (2024).

As shown in Table 3 and Figure 1, property-tax revenues increased from €8.3 million in 2007 to €46.1 million in 2023, a more than five-fold increase. Collections remained relatively modest from 2007 to 2011, ranging from €8.3 million to €14.4 million. Despite year-to-year fluctuations, revenues rose from €20.4 million in 2014 to €36.3 million in 2021, then to €46.1 million in 2023. The series declined to €22.7 million in 2020 before increasing again in 2021.

Figure 1. Visual presentation of the trend of property-tax revenues in Kosovo (EUR million, 2007-2023)



Source: Authors' own calculations based on data from the Ministria e Financave (2024).

4.2. Regional comparative analysis

This subsection compares Kosovo's property-tax performance with that of four selected Western Balkan economies and Croatia, using the property-tax-to-GDP ratio as a regional benchmark (Table 4 and Figure 2).

Table 4. Property-tax revenue in the six-country study sample and five-country comparison average (% of GDP, 2007-2023)

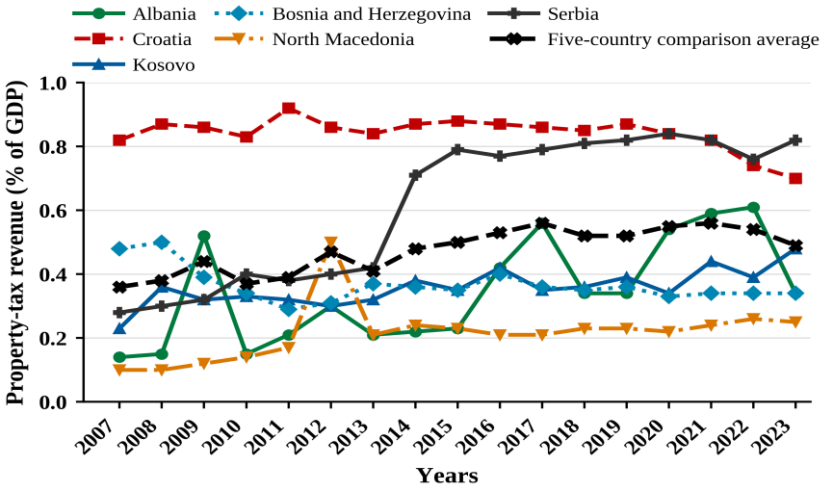
Year	Albania	Croatia	Kosovo	Bosnia and Herzegovina	North Macedonia	Serbia	5-country average*
2007	0.14	0.82	0.23	0.48	0.10	0.28	0.36
2008	0.15	0.87	0.36	0.50	0.10	0.30	0.38
2009	0.52	0.86	0.32	0.39	0.12	0.32	0.44
2010	0.15	0.83	0.33	0.34	0.14	0.40	0.37
2011	0.21	0.92	0.32	0.29	0.17	0.38	0.39
2012	0.30	0.86	0.30	0.31	0.50	0.40	0.47
2013	0.21	0.84	0.32	0.37	0.21	0.42	0.41

Table 4 cont.

Year	Albania	Croatia	Kosovo	Bosnia and Herzegovina	North Macedonia	Serbia	5-country average*
2014	0.22	0.87	0.38	0.36	0.24	0.71	0.48
2015	0.23	0.88	0.35	0.35	0.23	0.79	0.50
2016	0.42	0.87	0.42	0.40	0.21	0.77	0.53
2017	0.56	0.86	0.35	0.36	0.21	0.79	0.56
2018	0.34	0.85	0.36	0.35	0.23	0.81	0.52
2019	0.34	0.87	0.39	0.36	0.23	0.82	0.52
2020	0.54	0.84	0.34	0.33	0.22	0.84	0.55
2021	0.59	0.82	0.44	0.34	0.24	0.82	0.56
2022	0.61	0.74	0.39	0.34	0.26	0.76	0.54
2023	0.34	0.70	0.48	0.34	0.25	0.82	0.49

Source: Authors' own calculations from Garvanlieva Andonova et al. (2020); International Monetary Fund (2025a, 2025b); Ministria e Financave (2024); National Bank of Serbia (2024); State Statistical Office of the Republic of Macedonia (2014); Statistical Office of the Republic of Serbia (2024); World Bank (2025a).

Figure 2. Visual presentation of the property-tax revenue in the six-country study sample and five-country comparison average (% of GDP, 2007-2023)



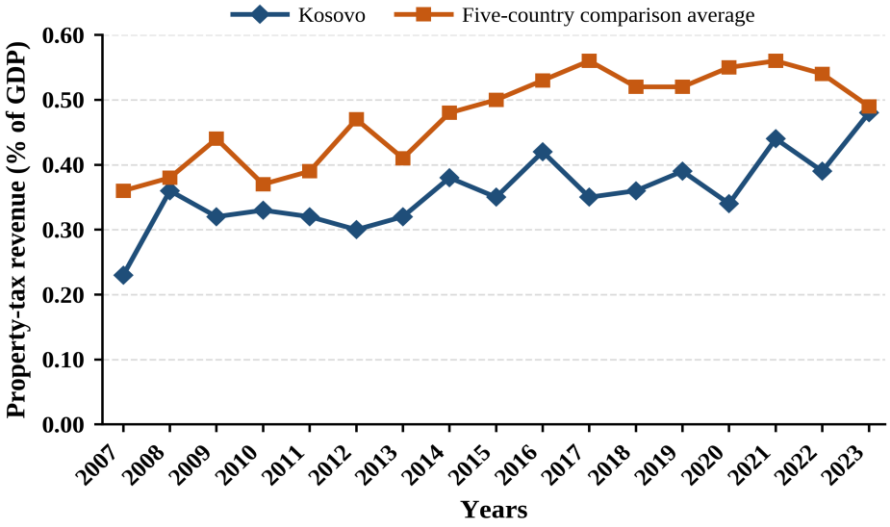
Source: Authors' own calculations from Garvanlieva Andonova et al. (2020); International Monetary Fund (2025a, 2025b); Ministria e Financave (2024); National Bank of Serbia (2024); State Statistical Office of the Republic of Macedonia (2014); Statistical Office of the Republic of Serbia (2024); World Bank (2025a).

Table 4 and Figure 2 show that substantial cross-country variation remained evident throughout the study period. Croatia and Serbia generally recorded the highest property-tax-to-GDP ratios. Albania, North Macedonia, and Bosnia and Herzegovina generally recorded lower ratios, although their positions relative to the five-country comparison average varied by year. Kosovo ranged from 0.23% to 0.48% of GDP. The difference between Kosovo and the five-country comparison average was smaller at the end of the period but fluctuated considerably across years.

4.3. Kosovo versus the five-country comparison average

This subsection compares Kosovo with the five-country comparison average, which excludes Kosovo and includes Croatia (Figure 3).

Figure 3. Visual presentation of Kosovo and the five-country comparison average (% of GDP, 2007-2023**)**



Source: Authors' own calculations from Garvanlieva Andonova et al. (2020); International Monetary Fund (2025a, 2025b); Ministria e Financave (2024); National Bank of Serbia (2024); State Statistical Office of the Republic of Macedonia (2014); Statistical Office of the Republic of Serbia (2024); World Bank (2025a).

As shown in Figure 3, Kosovo's property-tax-to-GDP ratio increased from 0.23% in 2007 to 0.48% in 2023. The comparative average of the five countries, excluding Kosovo (including Croatia), ranged from approximately 0.36% to 0.56% during this period. The difference fluctuated rather than narrowing steadily: it was about 0.13 percentage points in 2007 and 0.01 percentage points in 2023, but wider in several intervening years. Therefore, the results indicated a smaller gap at the endpoint, not formal convergence.

4.4. Econometric results

This subsection presents the final country- and year-fixed effects results, the two small-cluster inference procedures, the supplementary cadastral specifications, and the diagnostic evidence. Table 5 presents the final country- and year-fixed effects estimates, together with conventional results for comparison and the two small-cluster inference procedures used for the final assessment.

Table 5. Final country- and year-fixed effects estimates and small-cluster inference

Variable	Coefficient	Conv. SE	Conv. P
Panel A. Coefficients and conventional inference			
GDP per capita (EUR)	−0.000074	0.000028	0.0115
Fiscal decentralization	6.873120	1.792987	<0.001
Administrative capacity	0.671367	0.438993	0.1303
Institutional quality	0.908041	0.722043	0.2124
Variable	**CR2 SE (df)**	**CR2 p**	**Webb p**
Panel B. Small-cluster inference			
GDP per capita (EUR)	0.000027 (1.565)	0.1438	0.2417
Fiscal decentralization	1.563437 (2.953)	0.0225	0.0211
Administrative capacity	0.434567 (4.041)	0.1965	0.1199
Institutional quality	0.892735 (3.526)	0.3737	0.4223

Source: Authors' own calculations from the final audited R analysis.

In Table 5, the dependent variable is PTRP (% of GDP), and the country- and year-fixed effects model used 102 country-year observations from six countries over 2007-2023. CR2 denotes the bias-reduced cluster-robust variance estimator; df denotes coefficient-specific Satterthwaite degrees of freedom; and WCB denotes the wild cluster bootstrap with Webb weights, fnw11, 9,999 replications, clustered by country. We reported conventional results for comparison, while assessing statistical support using CR2/Satterthwaite and Webb WCB inference.

Under the two small-cluster procedures, fiscal decentralization remained statistically supported at the 5% level, whereas GDP per capita, administrative capacity, and institutional quality did not meet the 5% significance threshold. The supplementary cadastral results are reported in Table 6.

Table 6. Cadastral indicators: robustness of country- and year-fixed effects estimates

Inference method	Estimate	SE	Statistic	p-value [df] / WCB 95% CI
Panel A. CADASTRE_EFF (2010–2020; N = 66)				
Conventional	0.191856	0.186827	1.0269	0.3099
HC1 heteroskedasticity--robust	0.191856	0.181204	1.0588	0.2953
Clustered by country	0.191856	0.164688	1.1650	0.2966
Clustered by year	0.191856	0.217466	0.8822	0.3984
Two-way clustered: country and year	0.191856	0.201965	0.9499	0.3858
Driscoll–Kraay	0.191856	0.297492	0.6449	0.5335
CR2 with Satterthwaite correction	0.191856	0.547551	0.3504	0.7854 [1.000]
Wild cluster bootstrap: Webb weights, fnw11	0.191856	–	1.1052	0.4500; −0.3468, 0.9661
Panel B. CADASTRE_QLA (2016–2020; N = 30)				
Conventional	−0.155965	1.199173	−0.1301	0.8982
HC1 heteroskedasticity--robust	−0.155965	1.087591	−0.1434	0.8879
Clustered by country	−0.155965	1.495750	−0.1043	0.9210
Clustered by year	−0.155965	1.146446	−0.1360	0.8984
Two-way clustered: country and year	−0.155965	1.450817	−0.1075	0.9196
Driscoll–Kraay	−0.155965	1.190246	−0.1310	0.9021
CR2 with Satterthwaite correction	−0.155965	4.322242	−0.0361	0.9770 [1.000]
Wild cluster bootstrap: Webb weights, fnw11	−0.155965	–	−0.0903	0.9197; −8.0644, 4.3751

Source: Authors' own calculations from the final audited R analysis.

In Table 6, the dependent variable is PTRP. All specifications used a country- and year-fixed effects model. Conventional and alternative covariance estimators used the same country- and year-fixed effects point estimate. CR2 used the Satterthwaite small-sample correction. WCB denotes the wild cluster bootstrap with Webb weights, fnw11, 9,999 replications, clustered by country. In this calculation, no cadastral coefficient was significant at the 5% level.

For the 2010-2020 CADASTRE_EFF specification (N = 66), the estimated cadastral coefficient was 0.191856. The CR2/Satterthwaite p-value was 0.7854, and the Webb-Wild bootstrap p-value was 0.4500. For the 2016–2020 CADASTRE_QLA specification (N = 30), the estimated cadastral coefficient was −0.155965. The corresponding CR2/Satterthwaite and Webb-Wild bootstrap p-values were 0.9770 and 0.9197, respectively. Table 7 presents the results of model selection and diagnostic tests for the final R-based analysis.

Table 7. Model-selection and diagnostic tests

Diagnostic test	Statistic	df	p-value
Panel A. Model selection			
Hausman: country FE versus country RE	1.710	4	0.7888
Hausman: two-way FE versus two-way RE	15.917	4	0.0031
F test: country FE versus pooled OLS	F(5, 92) = 23.936	–	<0.001
F test: two-way FE versus pooled OLS	F(21, 76) = 7.468	–	<0.001
BP LM: country RE versus pooled OLS	137.365	1	<0.001
BP LM: two-way RE versus pooled OLS	140.674	2	<0.001
Panel B. Fixed-effects diagnostics			
Breusch–Pagan heteroskedasticity test	26.216	4	<0.001
Wooldridge serial-correlation test	F(1, 94) = 5.037	–	0.0272
Panel Breusch–Godfrey serial-correlation test	13.287	1	<0.001
Pesaran CD cross-sectional-dependence test	−1.845	–	0.0651
Scaled LM cross-sectional-dependence test	3.552	–	<0.001

Source: Authors' own calculations from the final audited R analysis.

In Table 7, FE – fixed effects; RE – random effects; OLS – ordinary least squares; BP LM – Breusch–Pagan Lagrange multiplier; df – degrees of freedom. For F-distributed tests, numerator and denominator degrees of freedom are reported directly in F(df1, df2) notation. The diagnostic tests informed model selection and the need for cluster-aware inference; they did not replace the final small-cluster procedures in Table 5. As a supplementary comparison, the two--way country- and year-clustered p-values were 0.000116356 for GDP per capita, 0.000000237 for fiscal decentralization, 0.151968134 for administrative capacity, and 0.163492908 for institutional quality. The corresponding coefficient estimates are reported in Table 5, and the full two-way clustered results are reported in Appendix (Table A1).

4.5. Synthesis of findings and hypothesis assessment

We assessed the baseline hypotheses using the final small-cluster results reported in Table 5, while we considered the separately examined H4 using the supplementary cadastral results reported in Table 6. H1 was not supported because GDP per capita was not statistically supported under the final procedures. H2 was supported because fiscal decentralization (DEC) was statistically supported under both CR2/Satterthwaite and Webb-Wild bootstrap inference. H3 and H5 were not supported under the final small-cluster procedures. The supplementary cadastral specifications did not support the expected positive cadastral association; we did not assess H4 in the baseline model. Statistical non-support was not interpreted as evidence that an underlying association was absent.

5. Discussion

The descriptive and econometric results cover property-tax performance in Kosovo, four selected Western Balkan economies, and Croatia as a regional benchmark. Despite year-to-year fluctuations, descriptive evidence indicates an overall increase in property-tax revenues in Kosovo, especially after 2015. Within the regional comparison, Croatia and Serbia generally record higher property-tax-to-GDP ratios. In the discussion below, we distinguish model-based associations from descriptive comparisons and interpretations drawn from institutional reports.

The findings indicate that fiscal decentralization is the only baseline variable with a statistically supported positive conditional association with property-tax performance under both small-cluster procedures. GDP per capita, administrative capacity, and institutional quality are not statistically supported; registration, assessment, and enforcement remain contextual elements rather than model-identified mechanisms. Prior research discusses possible relationships between institutional capacity and revenue performance (Akitoby et al., 2019; McCluskey, 1999; OECD, 2022); however, the present model does not identify causal effects or confirm underlying mechanisms.

The regional comparison shows that Kosovo remains below the highest-performing countries in the sample. The difference between Kosovo and the five-country comparison average fluctuates across the study period but is smaller in

2023 than in 2007. This descriptive comparison does not constitute a formal convergence analysis. Institutional differences – including cadastral coverage, valuation practices, and administrative integration – remain relevant contextual factors. The smaller gap may also reflect valuation cycles, tax-policy changes, collection practices, or macroeconomic conditions whose separate contributions are not identified here.

Within the study sample, Croatia and Serbia tend to record higher and more stable levels of property-tax performance. In contrast, Bosnia and Herzegovina and, to a lesser extent, North Macedonia continue to face institutional and administrative constraints associated with lower revenue performance (Elezi, 2016; Gaber & Gruevski, 2020; Lazović-Pita & Močević, 2018). Throughout the period, Kosovo's property-tax performance is similar to that of Albania and Bosnia and Herzegovina. In 2023, it was higher than that of Albania and Bosnia and Herzegovina but remained lower than that of Serbia and Croatia. These differences suggest that similar levels of economic development do not necessarily coincide with similar property-tax performance. Institutional and administrative conditions provide relevant context for interpreting this cross-country variation, but the present analysis does not establish their causal effects or confirm underlying mechanisms.

The econometric results provide consistent statistical support for a positive conditional association between fiscal decentralization and property-tax performance. GDP per capita has a negative estimated coefficient, but is not statistically supported under the final small-cluster procedures. Administrative capacity and institutional quality exhibit positive estimated coefficients, although neither association is statistically significant under the applied estimation procedures. The two cadastral indicators are examined only in supplementary specifications and are not statistically supported. These results do not establish that the remaining associations are absent; limited within-country variation and the small number of country clusters may affect the estimates. The supported finding of fiscal decentralization is consistent with the literature linking local fiscal autonomy to revenue performance (Bahl & Bird, 2018).

In this study, however, the statistically supported conditional association for fiscal decentralization should not be treated as evidence of a causal impact or as evidence that broader institutional capacity, administrative capacity, or cadastral development has the same empirically established relationship with property-

-tax performance. The latter measures were not statistically supported under the final small-cluster procedures. Greater local revenue authority may be associated with stronger incentives for tax collection, although the model does not directly test or confirm this mechanism. The findings therefore distinguish the supported conditional association for fiscal decentralization from the statistically unsupported estimates for the broader institutional conditions relevant to property-tax administration.

Overall, the descriptive and institutional evidence identify cadastral modernization, valuation practices, municipal administrative capacity, and local fiscal autonomy as relevant areas for policy attention in Kosovo. The econometric evidence provides direct statistical support only for fiscal decentralization under the final small-cluster procedures. The remaining areas should therefore be understood as institutional considerations rather than as policy effects established by the baseline model.

6. Conclusions

This study examined property-tax performance in Kosovo, four selected Western Balkan economies, and Croatia as a regional benchmark from 2007 to 2023. In the country- and year-fixed effects model, fiscal decentralization (DEC) is the only statistically supported variable according to both final small-cluster procedures. GDP per capita has a negative estimated coefficient and is not statistically supported, while administrative capacity and institutional quality have positive coefficients but are also not statistically supported. The cadastral indicators are examined separately in supplementary specifications and are not statistically supported.

The study's contribution extends beyond wider geographical coverage. Its common specification and small-cluster inference distinguish the consistently supported association with fiscal decentralization from statistically unsupported evidence for the other baseline measures. This distinction also treats fiscal decentralization and institutional capacity as related but analytically separate dimensions of property-tax performance. The study treats cadastral evidence as institutional and supplementary rather than as evidence of a causal relationship.

The study also has practical implications for municipal authorities, ministries of finance, property-tax administrations, cadastral agencies, institutions responsible for fiscal decentralization, and international organizations supporting public finance reform. The supported conditional association with fiscal decentralization suggests that the design of local fiscal autonomy merits attention. This association should not be interpreted as an estimated causal policy effect. Municipal authorities may use the findings to review local revenue responsibilities and performance monitoring, while property-tax administrations may identify areas that require more detailed administrative diagnostics. Ministries of finance may use these findings when balancing local autonomy and oversight, while institutions responsible for fiscal decentralization may assess whether revenue authority aligns with administrative responsibilities and capacity. Cadastral agencies may assess data quality, valuation regularity, and interoperability; international organizations may use cross-country differences to tailor technical assistance and data harmonization. Administrative capacity, institutional quality, valuation practices, and cadastral modernization remain important areas of institutional assessment, although the baseline model does not establish their causal effectiveness.

Several limitations warrant acknowledgment when interpreting the findings. First, differences in data availability, reporting practices, and institutional classifications across countries may affect the comparability of some indicators despite efforts to harmonize the dataset. Second, the analysis relies on country--level panel data and therefore cannot capture potentially important variations in property-tax performance across municipalities within individual countries. Third, property-tax performance is measured as property-tax revenue as a percentage of GDP; it does not directly measure collection efficiency, taxpayer compliance, tax potential, valuation accuracy, or the revenue gap. The constructed institutional measures simplify multidimensional concepts: ADMIN is a normalized WGI Government Effectiveness estimate, while INST_QUAL averages normalized Rule of Law and Control of Corruption estimates. The cadastral indicators are available only as restricted-period standardized proxies and do not measure national cadastral completeness; they are therefore excluded from the baseline specification. Finally, inference is based on only six country clusters, requiring small-cluster corrections; the estimates should therefore be interpreted

as conditional associations within the observed panel. Because the sample comprises six selected countries, the findings do not support broad statistical generalization. Any potential transferability of the observed institutional relationships to other transition or decentralizing economies remains conditional on differences in legal, fiscal, and administrative systems.

The study period includes the COVID-19 shock in 2020. Year fixed effects account for common time shocks, but the pandemic's country-specific effects are not separately estimated.

Future research could extend the analysis in four directions. First, municipal-level data could examine local variation not captured by country-level analysis. Second, dynamic panel data methods, including the Generalized Method of Moments (GMM) or other designs that address endogeneity, can examine temporal relationships more rigorously. Third, alternative measures, including collection rates, assessment ratios, tax arrears, and valuation accuracy, could complement the revenue-to-GDP measure used here. Finally, future studies could test valuation reforms, exemption and tax-relief measures, digitalization, governance, taxpayer compliance, and enforcement using measures that allow institutional and behavioral mechanisms to be assessed more directly.

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Conflict of interest

The authors declare that there is no conflict of interest.

Author contributions

Teki Shala – 60% (research concept and design, collection and/or assembly of data, data analysis and interpretation).
Astrit Hulaj – 40% (writing the article, critical revision of the article).

Ethics statement

This study did not involve human participants, and did not use personal, sensitive, or identifiable data; therefore, ethical approval was not required.

Data availability statement

The data used in this study were obtained from publicly available IMF, World Bank, NALAS, national ministry, statistical office, and legal sources. The quantitative variables, supplementary reconstructions, and country-level institutional statements are linked to the corresponding sources in the manuscript and reference list.

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Appendix. Supplementary econometric results

Table A1. Country- and year-clustered inference for the baseline fixed-effects model

Baseline explanatory variable	Coefficient	Two-way clustered SE	t-statistic	Two-way clustered p-values
GDP per capita	−0.000074	0.000018	−4.0643	0.000116356
Fiscal decentralization	6.873120	1.210353	5.6786	0.000000237
Administrative capacity	0.671367	0.463925	1.4471	0.151968134
Institutional quality	0.908041	0.645357	1.4070	0.163492908

Source: Authors' own calculations from the final audited R analysis.

Table A1 reports supplementary two-way country- and year-clustered inference for the baseline country- and year-fixed effects model. The standard errors use the HC1 two-way clustered covariance estimator, and the reported t-statistics and two-way clustered p-values correspond to the coefficient estimates in Table 5. Because the panel contains only six country clusters, these results are presented for supplementary comparison and are not used as the primary basis for hypothesis assessment. The study's statistical conclusions remain based on the CR2/Satterthwaite and Webb-Wild cluster bootstrap inference reported in Table 5.