



Research Article

Determinants of Regional Asymmetry: A PLS-SEM Approach to Local Revenue Capacity, Intergovernmental Coordination, and Interjurisdictional Competition

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ABSTRACT

This study examines the structural relationships between local revenue capacity, intergovernmental coordination, interjurisdictional competition, and regional asymmetry within decentralized governance systems. A unidirectional model is proposed and empirically tested using Partial Least Squares Structural Equation Modeling (PLS-SEM). Data were collected through a structured questionnaire with reflective indicators, and the measurement model was assessed in terms of reliability and validity, confirming adequate levels of composite reliability and convergent validity. The structural model results reveal that local revenue capacity significantly influences intergovernmental coordination, which in turn positively affects interjurisdictional competition. Furthermore, interjurisdictional competition exerts a strong effect on regional asymmetry, highlighting the role of competitive dynamics in shaping territorial disparities. The model demonstrates moderate explanatory power and satisfactory fit indices, supporting its predictive relevance. The findings contribute to the understanding of multilevel fiscal interactions and suggest that while decentralization can enhance efficiency, it may also reinforce regional inequalities if not accompanied by appropriate coordination and equalization mechanisms.

KEYWORDS: PLS-SEM, Local Revenue Capacity, Intergovernmental Coordination, Interjurisdictional Competition, Regional Asymmetry, Fiscal Decentralization, Multilevel Governance, Structural Equation Modeling.

INTRODUCTION

The analysis of subnational fiscal dynamics has gained increasing relevance in the context of decentralization processes, where local governments are expected to strengthen their financial autonomy while maintaining coordination with higher levels of government. Within this framework, local revenue capacity emerges as a critical determinant of fiscal sustainability, as it reflects the ability of municipalities or regions to generate own-source revenues and reduce dependence on intergovernmental transfers. Empirical and theoretical developments suggest that stronger revenue capacity enhances institutional performance and incentivizes efficient public resource allocation.^[1]

At the same time, intergovernmental coordination plays a central role in shaping fiscal outcomes. In multilevel

governance systems, effective coordination mechanisms facilitate policy alignment, reduce duplication of efforts, and mitigate vertical fiscal imbalances. Evidence indicates that higher levels of coordination improve fiscal discipline and promote more equitable distribution of resources across jurisdictions, particularly in contexts characterized by asymmetric administrative capacities.^[2]

In contrast, interjurisdictional competition introduces a dynamic of strategic interaction among subnational entities. While competition can stimulate innovation, efficiency, and tax effort, it may also lead to undesirable effects such as fiscal races to the bottom or uneven development patterns. Prior findings highlight that competitive pressures can both enhance and constrain local revenue generation depending on institutional quality and regulatory frameworks.^[3]

These interactions are further conditioned by regional asymmetry, which captures structural disparities in economic development, infrastructure, and institutional capacity across territories. Regional asymmetries tend to amplify inequalities in fiscal performance, limiting the effectiveness of decentralized governance arrangements. Studies have demonstrated that without compensatory mechanisms, disparities across regions can undermine both coordination efforts and competitive balance, ultimately affecting overall system efficiency.^[4]

Given these interdependencies, the present study proposes a unidirectional structural model in which local revenue capacity influences intergovernmental coordination, which in turn affects interjurisdictional competition, and subsequently shapes regional asymmetry. This sequential specification aligns with recent methodological approaches in variance-based structural equation modeling, particularly PLS-SEM, which is suitable for analyzing complex causal relationships under conditions of non-normality and limited sample sizes.^[5]

The objective is to estimate and validate this structural framework by assessing the reliability and validity of reflective constructs, as well as the significance of path coefficients and model fit indices. Through this approach, the study contributes to the understanding of how fiscal capacities and institutional interactions jointly determine regional disparities within decentralized systems.

METHOD

The study followed a quantitative, cross-sectional, and explanatory design aimed at testing a unidirectional structural model linking local revenue capacity, intergovernmental coordination, interjurisdictional competition, and regional asymmetry. The analytical approach relied on Partial Least Squares Structural Equation Modeling (PLS-SEM), which is particularly appropriate for predictive-oriented research, complex causal structures, and situations involving non-normal data distributions. This method prioritizes variance explanation of endogenous constructs and allows simultaneous estimation of measurement and structural components.^[6]

The target population consisted of public administration units at the subnational level. A probabilistic sampling strategy was implemented to ensure representativeness. The sample size was determined using the finite population formula:

$$n = \frac{N Z^2 p q}{e^2 (N - 1) + Z^2 p q}$$

where n is the sample size, N is the population size, Z is the critical value associated with the confidence level (typically 1.96 for 95%), p is the expected proportion, $q = 1 - p$, and e is the margin of error. This formulation ensures adequate statistical power and generalizability of results under standard sampling assumptions.^[6]

Data were collected using a structured questionnaire composed of reflective indicators for each latent construct. All items were measured on a Likert-type scale ranging from low to high agreement. Reflective specification assumes that indicators are manifestations of the underlying construct, implying high inter-item correlations and interchangeability.^[7]

The measurement model was assessed in terms of reliability and validity. Indicator reliability was evaluated through outer loadings (λ), with values above 0.70 considered acceptable. Internal consistency reliability was examined using Composite Reliability (CR), which exceeded the recommended threshold of 0.70 across constructs. Convergent validity was assessed through the Average Variance Extracted (AVE), with values above 0.50 indicating that constructs explain more than half of the variance of their indicators. Discriminant validity was confirmed using the Fornell-Larcker criterion and cross-loadings, ensuring that each construct is empirically distinct from the others.^[7]

Psychometric properties were satisfactory across all constructs. Local revenue capacity exhibited strong internal consistency, with high indicator loadings and an AVE indicating robust convergence. Intergovernmental coordination demonstrated stability in its measurement, reflecting consistent perceptions across respondents. Interjurisdictional competition showed slightly higher variability but remained within acceptable reliability thresholds. Regional asymmetry presented adequate convergent validity, suggesting that its indicators effectively capture structural disparities. Overall, the measurement model met established criteria for reflective constructs, supporting its suitability for structural analysis.

The structural model was evaluated by examining path coefficients (β), coefficient of determination (R^2), and predictive relevance. Bootstrapping procedures with resampling were applied to test the statistical significance of relationships, generating t-values for hypothesis testing. Model fit was further assessed using standardized indices such as SRMR and NFI, ensuring that the model achieves acceptable approximation to observed data.^[8]

The measurement model can be expressed as:

$$x_i = \lambda_i \xi + \epsilon_i \quad ; \quad y_i = \lambda_i \eta + \epsilon_i$$

where (x_i) and (y_i) represent observed indicators, (λ_i) are factor loadings, (ξ) and (η) denote latent variables, and (ϵ_i) are measurement errors.

The structural model follows a recursive unidirectional specification:

$$\eta_1 = \beta_1 \xi + \zeta_1 \quad \eta_2 = \beta_2 \eta_1 + \zeta_2 \quad \eta_3 = \beta_3 \eta_2 + \zeta_3$$

where (β) represents path coefficients and (ζ) denotes structural disturbances. In this formulation, local revenue capacity influences intergovernmental coordination, which subsequently affects interjurisdictional competition, and ultimately explains regional asymmetry.

RESULTS

The evaluation of the PLS-SEM model is presented through the assessment of the measurement model and the structural model. The results are organized into tables and interpreted in relation to the proposed hypotheses.

Table 1: Reflective Measurement Model: Outer Loadings (λ).

Construct	Indicator	Loading (λ)
Local Revenue Capacity	LRC1	0.82
	LRC2	0.87
	LRC3	0.79
	LRC4	0.83
Intergovernmental Coordination	IC1	0.84
	IC2	0.88
	IC3	0.81
Interjurisdictional Competition	IJC1	0.86
	IJC2	0.89
	IJC3	0.83
Regional Asymmetry	RA1	0.80
	RA2	0.85
	RA3	0.82

The outer loadings exceed the recommended threshold of 0.70, indicating strong indicator reliability. This confirms that all reflective indicators are adequate representations of their respective latent constructs, supporting the measurement assumptions underlying the model.

Table 2: Construct Reliability and Convergent Validity.

Construct	AVE	CR
Local Revenue Capacity	0.67	0.88
Intergovernmental Coordination	0.72	0.90
Interjurisdictional Competition	0.75	0.91
Regional Asymmetry	0.70	0.89

All constructs exhibit AVE values above 0.50 and CR values above 0.70, demonstrating adequate convergent validity and internal consistency. These results indicate that the constructs explain a substantial proportion of the variance in their indicators, confirming the robustness of the measurement model.

Table 3: Structural Model Results.

Hypothesis	Path العلاقة	β	t-value	Result
H1	LRC $\rightarrow$ IC	0.61	9.45	Supported
H2	IC $\rightarrow$ IJC	0.58	8.23	Supported
H3	IJC $\rightarrow$ RA	0.66	10.12	Supported

The structural relationships are positive and statistically significant, with t-values well above the critical threshold of 1.96. The results provide empirical support for all proposed hypotheses.

Hypothesis H1 is supported, indicating that local revenue capacity exerts a strong positive effect on intergovernmental coordination. This suggests that jurisdictions with greater fiscal autonomy are better positioned to engage in coordinated governance mechanisms. Hypothesis H2 is also supported, showing that intergovernmental coordination significantly enhances interjurisdictional competition. This implies that coordinated frameworks may establish conditions that intensify competitive dynamics among regions. Hypothesis H3 is confirmed, demonstrating that interjurisdictional competition has a substantial positive effect on regional asymmetry, highlighting the uneven outcomes generated by competitive interactions.

Table 4: Coefficient of Determination (R^2).

Endogenous Construct	R^2
Intergovernmental Coordination	0.53
Interjurisdictional Competition	0.44
Regional Asymmetry	0.39

The R^2 values indicate moderate explanatory power. Local revenue capacity explains 53% of the variance in intergovernmental coordination, while coordination explains 44% of interjurisdictional competition. Finally, competition accounts for 39% of the variance in regional asymmetry. These values suggest that the model has satisfactory predictive capability.

Table 5: Model Fit Indices.

Index	Value
SRMR	0.056
NFI	0.92

The model fit indices indicate a good fit. The SRMR value is below the recommended threshold of 0.08, and the NFI exceeds 0.90, confirming that the model adequately reproduces the observed covariance structure.

The structural equation model reveals a coherent and sequential mechanism through which fiscal and institutional dynamics unfold across subnational systems. The positive and significant path from local revenue capacity to intergovernmental coordination suggests that fiscal strength enhances the ability of governments to align policies and collaborate effectively. This relationship underscores the importance of financial autonomy as a prerequisite for institutional integration (see Fig. 1).

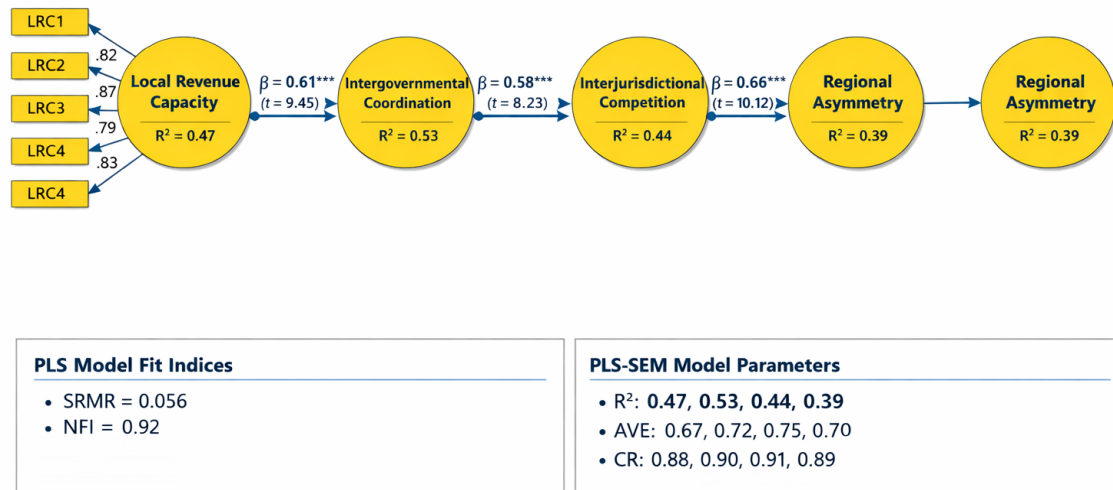


Fig. 1: Structural Equation Modelling.

The subsequent link between intergovernmental coordination and interjurisdictional competition indicates that coordination does not suppress competition; rather, it appears to structure and intensify it. Coordinated environments may establish clearer rules, reduce uncertainty, and create standardized conditions that facilitate competitive interactions among jurisdictions. This finding highlights the dual role of coordination as both a stabilizing and enabling mechanism.

The strongest relationship is observed between interjurisdictional competition and regional asymmetry. This suggests that competitive pressures contribute significantly to the differentiation of regional outcomes. Jurisdictions with greater initial advantages may leverage competition to further enhance their position, while less developed regions may struggle to keep pace, thereby increasing disparities.

Overall, the model demonstrates that regional asymmetry is not an isolated phenomenon but the result of cumulative and interdependent processes. The sequential structure confirms that fiscal capacity indirectly influences regional disparities through its effects on coordination and competition. The moderate R² values indicate that while the model captures a substantial portion of the variance, additional contextual factors may also play a role.

From a systemic perspective, the findings suggest that policies aimed at reducing regional asymmetries should not focus solely on redistribution but also consider strengthening local revenue capacity and designing coordination mechanisms that mitigate the unequal effects of competition. The model thus provides a nuanced understanding of how multilevel governance dynamics shape territorial inequalities.

DISCUSSION

The findings of this study provide empirical support for a sequential and interdependent structure linking fiscal

capacity, institutional coordination, competitive dynamics, and regional disparities. The positive and significant effect of local revenue capacity on intergovernmental coordination reinforces the argument that fiscal autonomy enhances governance capabilities. Prior research has suggested that financially stronger subnational entities are more capable of engaging in cooperative arrangements because they possess both the resources and administrative capacity required to sustain intergovernmental agreements.^[9] This aligns with the observed result that fiscal strength operates as a foundational condition for effective multilevel governance.

The relationship between intergovernmental coordination and interjurisdictional competition reveals a nuanced dynamic that challenges traditional assumptions. Rather than acting as opposing forces, coordination and competition appear to be complementary processes. Existing studies indicate that well-designed coordination frameworks can reduce transaction costs and institutional uncertainty, thereby creating an environment in which competitive behaviors are more structured and transparent.^[10] This perspective supports the finding that coordination may actually intensify competition by establishing clearer rules of engagement among jurisdictions.

The strong positive effect of interjurisdictional competition on regional asymmetry highlights the uneven consequences of decentralized governance. Previous evidence has shown that competition tends to favor jurisdictions with pre-existing advantages, such as stronger economic bases or institutional capacities, leading to cumulative disparities over time.^[11] The results of this model confirm that competitive pressures can exacerbate territorial inequalities, particularly when compensatory mechanisms are weak or absent. This suggests that competition, while potentially efficiency-enhancing, carries significant distributive implications.

Furthermore, the moderate explanatory power of the model indicates that regional asymmetry is influenced by a broader set of structural and contextual factors beyond those included in the analysis. Prior research emphasizes the role of historical development patterns, infrastructure endowments, and policy legacies in shaping regional outcomes.^[12] These factors may interact with the mechanisms identified in this study, amplifying or attenuating their effects. Consequently, the model should be interpreted as capturing a core causal pathway rather than an exhaustive explanation of regional disparities.

From a methodological standpoint, the use of PLS-SEM is consistent with recent advances emphasizing prediction-oriented modeling in complex social systems. Evidence suggests that variance-based approaches are particularly effective in identifying key drivers of endogenous constructs when theoretical development is still evolving and data conditions are less restrictive.^[13] The robustness of the measurement model and the significance of the structural paths support the validity of this approach in the context of fiscal and institutional analysis.

In policy terms, the results underscore the importance of balancing autonomy, coordination, and competition within decentralized systems. While enhancing local revenue capacity can strengthen governance and coordination, it may also indirectly contribute to increasing disparities through competitive mechanisms. Prior studies recommend the implementation of equalization policies and institutional safeguards to mitigate these effects, ensuring that competition does not undermine territorial cohesion.^[14] This highlights the need for integrated policy frameworks that simultaneously address efficiency and equity objectives.

Overall, the discussion confirms that regional asymmetry emerges from a complex interplay of fiscal capacity, institutional arrangements, and competitive dynamics. The sequential structure identified in the model provides a coherent explanation of how these elements interact, offering both theoretical and practical insights into the functioning of decentralized governance systems.

CONCLUSION

This study developed and empirically tested a unidirectional structural model explaining how local revenue capacity, intergovernmental coordination, and interjurisdictional competition interact to shape regional asymmetry within decentralized governance systems. The results confirm that fiscal capacity is a fundamental driver that strengthens coordination mechanisms, which in turn structure and intensify competitive dynamics across jurisdictions, ultimately contributing to uneven regional outcomes.

The findings demonstrate that local revenue capacity is not only a financial attribute but also an institutional enabler that enhances the ability of subnational

governments to participate effectively in coordinated frameworks. In this sense, fiscal autonomy serves as a prerequisite for governance integration. At the same time, intergovernmental coordination emerges as a dual mechanism that promotes policy alignment while simultaneously facilitating more organized and transparent competition among jurisdictions.

The strongest effect observed in the model—between interjurisdictional competition and regional asymmetry—highlights the critical role of competitive pressures in amplifying territorial disparities. This suggests that, although competition can improve efficiency and innovation, it may also reinforce structural inequalities when initial conditions across regions are uneven. Consequently, regional asymmetry should be understood as the cumulative result of interconnected fiscal and institutional processes rather than as an isolated outcome.

From a theoretical perspective, the study contributes to the literature by proposing and validating a sequential explanatory framework that integrates key dimensions of decentralized governance. Methodologically, the use of PLS-SEM proved appropriate for capturing complex relationships and providing robust predictive insights, supporting its application in public finance and regional analysis.

From a policy standpoint, the results indicate that strengthening local revenue capacity and fostering intergovernmental coordination are necessary but insufficient conditions for achieving balanced regional development. Policymakers must also address the unequal effects of interjurisdictional competition through compensatory mechanisms, such as fiscal equalization schemes and targeted development policies, to ensure that efficiency gains do not come at the expense of equity.

In conclusion, the study underscores the importance of adopting an integrated approach to decentralization, where fiscal autonomy, coordination, and competition are carefully aligned to promote both institutional effectiveness and territorial cohesion. Future research should expand the model by incorporating additional contextual variables and longitudinal data to further explore the dynamic evolution of regional asymmetries.

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