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INSTITUTIONAL MECHANISMS FOR DEVELOPING REGIONAL ECONOMIC POTENTIAL: PANEL DATA EVIDENCE FROM UZBEKISTAN'S SUBNATIONAL ECONOMIES



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Abstract. *This study investigates the role of institutional mechanisms in shaping regional economic potential across Uzbekistan's fourteen administrative regions over the period 2015–2023. The research addresses a critical gap in the empirical literature concerning how institutional quality, governance structures, and regulatory frameworks influence subnational economic performance in transition economies. Employing a panel data methodology encompassing fixed effects, random effects, and system generalized method of moments (GMM) estimators, the analysis draws upon a comprehensive dataset compiled from official statistical records, World Bank governance indicators, and institutional capacity assessments. The findings reveal that institutional quality, measured through composite indices of regulatory efficiency, property rights enforcement, and administrative transparency, exerts a statistically significant and economically meaningful effect on regional economic potential. Specifically, a one-standard-deviation improvement in institutional quality is associated with a 12.4 percent increase in regional gross product per capita. The system GMM results confirm the persistence of regional economic disparities and underscore the endogeneity of institutional arrangements. Furthermore, the analysis identifies heterogeneous effects across regions, with lagging territories demonstrating greater sensitivity to institutional reforms. The study contributes to the growing body of literature on institutions and subnational development by providing granular evidence from Central Asia and offers targeted policy recommendations for institutional capacity building at the regional level.*

Keywords: *institutional mechanisms; regional economic potential; panel data analysis; GMM estimation; governance quality; subnational development; Uzbekistan; transition economy; regulatory efficiency; Central Asia.*

INTRODUCTION

The relationship between institutional quality and economic development has occupied a central position in the scholarly discourse since the seminal contributions of North [1] and Acemoglu et al. [2]. While the macro-level evidence linking national institutions to cross-country income differences is well established, comparatively less attention has been devoted to understanding how institutional mechanisms operate at the subnational level to shape regional economic trajectories. This gap is particularly pronounced for transition economies in Central Asia, where rapid structural transformations have created considerable institutional heterogeneity across administrative territories [3],[4].

Uzbekistan presents a compelling case for investigating institutional determinants of regional economic potential. As the most populous nation in Central Asia, with approximately 36 million inhabitants distributed across fourteen regions (viloyats) and the Republic of Karakalpakstan, the country exhibits substantial spatial variation in economic performance. The ratio of per capita gross regional product (GRP) between the wealthiest and poorest regions exceeded 4.8:1 in 2023, indicating persistent and economically consequential disparities [5]. These differences cannot be attributed solely to factor endowments or geographic advantages; rather, they reflect underlying institutional arrangements that condition the allocation of resources, the enforcement of contracts, and the facilitation of entrepreneurial activity [6],[7].

Since the adoption of the Development Strategy for 2017–2021 and its successor framework through 2030, the Government of Uzbekistan has pursued an ambitious program of institutional reform aimed at decentralizing governance, streamlining regulatory procedures, and enhancing transparency in public administration [8]. These reforms have generated considerable variation in institutional performance across regions, creating a natural laboratory for examining the economic consequences of institutional change at the subnational level. Nevertheless, rigorous empirical assessments of the institutional drivers of regional economic potential in Uzbekistan remain scarce, with existing studies largely confined to descriptive analyses or case studies of individual sectors [9],[10].

The present study seeks to address this lacuna by posing the following research questions: (1) To what extent do institutional mechanisms explain variation in regional economic potential across Uzbekistan? (2) Which specific dimensions of institutional quality—regulatory efficiency, property rights protection, administrative transparency, or anti-corruption measures—exert the strongest influence on subnational economic performance? (3) Are the effects of institutional mechanisms heterogeneous across regions with different initial levels of development?

To answer these questions, the study employs a panel data framework covering fourteen regions over the period 2015–2023. The econometric strategy utilizes fixed effects, random effects, and system generalized method of moments (GMM) estimators to address potential endogeneity arising from reverse causality and omitted variable bias [11]. The institutional quality measures are constructed from multiple data sources, including the State Statistics Committee of the Republic of Uzbekistan (Stat.uz), the World Bank's Doing Business and Worldwide Governance Indicators, and administrative records on regulatory compliance and judicial efficiency.

The study contributes to the literature in three principal ways. First, it provides the first comprehensive panel data analysis of institutional determinants of regional economic potential in Uzbekistan, addressing a significant empirical gap. Second, it employs system GMM estimation to account for the dynamic and endogenous nature of institutional-economic interactions, thereby strengthening the causal interpretation of the findings. Third, it disaggregates institutional quality into constituent dimensions, enabling policymakers to identify the most impactful reform levers for promoting balanced regional development.

The remainder of this article is organized as follows. Section 2 reviews the relevant theoretical and empirical literature on institutions and regional development. Section 3 describes the data sources, variable construction, and econometric methodology. Section 4 presents the empirical results, including robustness checks. Section 5 discusses the findings in the context of the existing literature and their policy implications. Section 6 concludes with a summary of key insights and directions for future research.

LITERATURE REVIEW

Theoretical Foundations of Institutional Economics

The intellectual foundations for studying institutional mechanisms and economic performance can be traced to the new institutional economics (NIE) tradition. North [1] defined institutions as the “rules of the game” that structure human interaction, encompassing formal rules (constitutions, laws, regulations), informal constraints (norms, conventions, codes of conduct), and their enforcement characteristics. According to this framework, institutions reduce transaction costs, mitigate information asymmetries, and create incentive structures that either promote or hinder productive economic activity [12]. Williamson [13] further distinguished among four levels of institutional analysis—embeddedness, institutional environment, governance structures, and resource allocation—each operating at different temporal scales and exerting distinct influences on economic outcomes.

Acemoglu et al. [2] advanced the empirical agenda by demonstrating that historical institutional origins, proxied by settler mortality rates, explain a substantial share of contemporary cross-country income variation. Their instrumental variable approach established a causal link running from institutions to economic prosperity, a finding that has stimulated an extensive body of subsequent research [14]. Rodrik et al. [15] reinforced this conclusion by showing that institutional quality dominates geography and trade openness in explaining cross-national income differences once the endogeneity of institutions is properly addressed.

While the cross-country evidence is compelling, several scholars have emphasized the importance of examining institutional effects at the subnational level. Tabellini [16] demonstrated that regional cultural norms—trust, respect for others, and confidence in individual effort—significantly predict regional economic development across European regions, even after controlling for country fixed effects. Charron et al. [17] constructed the European Quality of Government Index and found substantial within-country variation in institutional quality that correlates with regional economic performance. These contributions underscore the principle that institutions are not monolithic national characteristics but rather exhibit meaningful spatial heterogeneity within countries.

Institutional Mechanisms and Regional Development

The theoretical literature has identified several channels through which institutional mechanisms influence regional economic potential. First, regulatory efficiency affects the cost and speed of starting and operating businesses, thereby shaping the business environment and entrepreneurial activity [18]. Second, the security of property rights and contract enforcement mechanisms determine the willingness of agents to invest in physical and human capital [19]. Third, administrative transparency and accountability in local governance reduce rent-seeking behavior and improve the allocation of public resources

to productive uses [20]. Fourth, anti-corruption institutions protect market competition and ensure that economic opportunities are distributed on the basis of merit rather than political connections [21].

Empirical studies of institutional effects on regional development have produced broadly consistent findings across diverse geographical contexts. Ketterer and Rodriguez-Pose [22] analyzed the determinants of economic growth across European regions and found that institutional quality, proxied by government effectiveness and control of corruption, significantly enhances regional growth rates after controlling for traditional growth determinants. Farole et al. [23] extended this analysis to developing countries and demonstrated that institutional filters—the quality of governance, human capital, and market access—condition the extent to which regions can translate locational advantages into sustainable economic growth.

In the context of post-Soviet transition economies, the relationship between institutions and regional economic outcomes has attracted growing scholarly attention. Berkowitz and DeJong [24] showed that regions in Russia with more market-friendly initial conditions and stronger institutional endowments experienced faster subsequent growth. Ahrend [25] confirmed these findings and additionally demonstrated the role of institutional quality in attracting foreign direct investment to Russian regions. For Central Asia, however, the empirical evidence remains thin, with most studies focusing on country-level institutional analyses rather than subnational variation [26,27].

Research Gap and Contribution

The preceding review reveals several notable gaps in the literature that the present study aims to address. First, there is a scarcity of rigorous quantitative assessments of institutional effects on regional development in Central Asian transition economies, particularly at the subnational level. Second, existing studies often rely on cross-sectional methods that cannot adequately address the endogeneity of institutional arrangements. Third, few studies decompose institutional quality into its constituent dimensions to identify which specific mechanisms matter most for regional economic potential. The present research contributes to filling these gaps by providing comprehensive panel data evidence from Uzbekistan, employing appropriate econometric techniques to address endogeneity, and disaggregating institutional quality into actionable policy-relevant dimensions.

MATERIALS AND METHODS

Data Sources and Variable Construction

The empirical analysis draws upon a balanced panel dataset encompassing Uzbekistan's fourteen administrative regions (including the Republic of Karakalpakstan and the city of Tashkent) observed annually over the period 2015–2023 ($N = 14$, $T = 9$, yielding 126 region-year observations). Data were compiled from multiple authoritative sources: the State Statistics Committee of the Republic of Uzbekistan (Stat.uz), the Ministry of Economy and Finance, the World Bank's Worldwide Governance Indicators (WGI), and the Doing Business database.

The dependent variable, regional economic potential (REP), is operationalized as the natural logarithm of real gross regional product (GRP) per capita, deflated to constant 2015 prices using regional consumer price indices. This measure captures the overall

productive capacity of each region while controlling for population size and inflationary effects.

The principal explanatory variable is an institutional quality index (IQI), constructed as a weighted composite of four sub-indices: (i) regulatory efficiency (RE), measured by the average time and cost required to register a business and obtain construction permits; (ii) property rights protection (PRP), assessed through indicators of land registration completeness and contract enforcement effectiveness; (iii) administrative transparency (AT), captured by indices of public information disclosure and citizen participation in local governance; and (iv) anti-corruption measures (ACM), quantified using reported corruption cases per capita and compliance with anti-corruption legislation. Each sub-index is normalized to a 0–100 scale using min-max normalization, and the composite IQI is computed as the equally weighted arithmetic mean of the four sub-indices.

The control variables include: human capital (HC), proxied by the share of the working-age population with higher education; physical infrastructure (INF), measured by the density of paved roads per square kilometer; financial depth (FD), represented by the ratio of bank loans to GRP; trade openness (TRADE), calculated as the ratio of regional exports to GRP; urbanization (URB), defined as the share of the population residing in urban areas; and fixed capital investment (FCI), expressed as the ratio of gross fixed capital formation to GRP.

Econometric Model Specification

The baseline econometric model is specified as follows:

$$\ln(REP_{it}) = \alpha_i + \beta_1 IQI_{it} + \beta_2 HC_{it} + \beta_3 INF_{it} + \beta_4 FD_{it} + \beta_5 TRADE_{it} + \beta_6 URB_{it} + \beta_7 FCI_{it} + \lambda_t + \varepsilon_{it} \quad (1)$$

where i indexes regions ($i = 1, \dots, 14$), t indexes years ($t = 2015, \dots, 2023$), α_i denotes region-specific fixed effects capturing time-invariant unobserved heterogeneity, λ_t represents year fixed effects controlling for common temporal shocks, and ε_{it} is the idiosyncratic error term. The coefficient β_1 is the parameter of primary interest, measuring the elasticity of regional economic potential with respect to institutional quality.

To address potential endogeneity arising from reverse causality (economic development may influence institutional quality) and omitted variable bias, the study additionally estimates a dynamic panel model using the system GMM estimator proposed by Arellano and Bover [28] and Blundell and Bond [29]:

$$\ln(REP_{it}) = \gamma \ln(REP_{i,t-1}) + \delta_1 IQI_{it} + \delta_2 X_{it} + \alpha_i + \lambda_t + v_{it} \quad (2)$$

where $\ln(REP_{i,t-1})$ is the one-period lagged dependent variable capturing persistence in regional economic performance, X_{it} is a vector of control variables, and v_{it} is the composite error term. The system GMM estimator instruments endogenous variables with their lagged levels and differences, providing consistent estimates under the assumptions of no second-order serial correlation (AR(2) test) and valid instruments (Hansen J test of overidentifying restrictions) [30].

Disaggregated Institutional Analysis

To identify which dimensions of institutional quality matter most, the study replaces the composite IQI with its four sub-indices in an augmented specification:

$$\ln(REP_{it}) = \alpha_i + \varphi_1 RE_{it} + \varphi_2 PRP_{it} + \varphi_3 AT_{it} + \varphi_4 ACM_{it} + \varphi_5 X_{it} + \lambda_t + \varepsilon_{it} \quad (3)$$

This decomposition enables policymakers to prioritize reform efforts on the institutional dimensions that yield the largest returns in terms of regional economic development.

3.4. Heterogeneity Analysis

Finally, to examine whether institutional effects vary with initial development levels, the study introduces an interaction term between IQI and a binary indicator for lagging regions (those with initial GRP per capita below the national median):

$$\ln(REP_{it}) = \alpha_i + \theta_1 IQI_{it} + \theta_2 (IQI_{it} \times LAG_i) + \theta_3 X_{it} + \lambda_t + \varepsilon_{it} \quad (4)$$

A statistically significant coefficient on the interaction term (θ_2) would indicate heterogeneous institutional effects across regions at different development stages.

4. Results

This section presents the empirical findings in four stages: descriptive statistics, baseline panel regression results, system GMM estimates, and disaggregated and heterogeneity analyses.

Table 1. Descriptive Statistics of Principal Variables.

Variable	Mean	Std. Dev.	Min	Max	N
ln(GRP per capita)	8.42	0.61	7.14	10.23	126
IQI (0–100)	54.32	10.24	31.70	82.40	126
RE (0–100)	57.18	11.83	28.50	85.20	126
PRP (0–100)	52.46	9.67	30.10	79.80	126
AT (0–100)	51.89	10.51	26.40	81.60	126
ACM (0–100)	55.74	12.03	32.20	83.90	126
HC (%)	18.64	5.32	9.80	34.70	126
INF (km/km ²)	0.87	0.41	0.22	2.14	126
FD (%)	24.31	8.76	8.40	52.60	126
TRADE (%)	16.85	9.43	3.20	48.70	126
URB (%)	42.67	14.28	21.30	100.0	126
FCI (%)	28.43	7.61	14.20	49.80	126

Notes: $N = 126$ region-year observations (14 regions \times 9 years). IQI = Institutional Quality Index; RE = Regulatory Efficiency; PRP = Property Rights Protection; AT = Administrative Transparency; ACM = Anti-Corruption Measures; HC = Human Capital; INF = Infrastructure; FD = Financial Depth.

Table 1 reports the descriptive statistics for the principal variables employed in the analysis. The mean logged GRP per capita across all region-year observations is 8.42, with a standard deviation of 0.61, reflecting considerable cross-regional dispersion in economic performance. The institutional quality index (IQI) exhibits a mean of 54.32 on the 0–100 scale, with a minimum of 31.7 (Karakalpakstan in 2015) and a maximum of 82.4 (Tashkent city in 2023), underscoring substantial institutional heterogeneity. The within-region

standard deviation (6.18) indicates meaningful temporal variation in institutional quality, which is essential for the identification strategy employed in the fixed effects estimation.

Table 2. Baseline Panel Regression Results: Dependent Variable $\ln(\text{GRP per capita})$.

Variable	Pooled OLS (1)	RE (2)	FE (3)
IQI	0.0156*** (0.0028)	0.0138*** (0.0031)	0.0124*** (0.0035)
HC	0.0243*** (0.0052)	0.0218*** (0.0058)	0.0197*** (0.0064)
INF	0.1847** (0.0821)	0.1524* (0.0894)	0.1236* (0.0712)
FD	0.0086** (0.0034)	0.0074** (0.0037)	0.0068** (0.0031)
TRADE	0.0064** (0.0027)	0.0058** (0.0025)	0.0051** (0.0023)
URB	0.0032* (0.0018)	0.0028 (0.0019)	0.0021 (0.0016)
FCI	0.0114*** (0.0031)	0.0098*** (0.0034)	0.0087*** (0.0028)
Year FE	Yes	Yes	Yes
Region FE	No	No	Yes
R ²	0.724	0.698	0.846
Hausman test (p)	—	—	0.000
Observations	126	126	126

Notes: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Year fixed effects included in all specifications.

Table 2 presents the baseline panel regression results. Columns (1) and (2) report the pooled OLS and random effects estimates, respectively, while Column (3) reports the preferred fixed effects specification. The Hausman test (chi-squared = 38.72, $p < 0.001$) decisively rejects the null hypothesis that the random effects estimator is consistent, confirming the appropriateness of the fixed effects approach. In the fixed effects specification, the coefficient on IQI is 0.0124 ($p < 0.01$), indicating that a one-unit increase in the institutional quality index is associated with a 1.24 percent increase in real GRP per capita, holding other factors constant. Given that the standard deviation of IQI is approximately 10.24, a one-standard-deviation improvement in institutional quality corresponds to approximately a 12.7 percent increase in regional economic potential.

Among the control variables, human capital (HC) and fixed capital investment (FCI) display positive and statistically significant coefficients at the 1 percent level, consistent with standard growth theory predictions. Financial depth (FD) and trade openness (TRADE) are positively associated with GRP per capita at the 5 percent level. Infrastructure density (INF) is marginally significant ($p < 0.10$), while urbanization (URB) does not attain conventional significance levels in the fixed effects specification, likely because much of the cross-regional variation in urbanization is absorbed by the region-specific intercepts.

Table 3. System GMM Estimates: Dynamic Panel Model.

Variable	Sys-GMM (1)	Sys-GMM (2)
ln(REP) _{t-1}	0.714*** (0.087)	0.698*** (0.092)
IQI	0.0098*** (0.0032)	0.0084** (0.0038)
HC	0.0142**	—
FD	0.0054*	—
Controls	Full set	Reduced
Year FE	Yes	Yes
AR(1) p-value	0.003	0.004
AR(2) p-value	0.284	0.316
Hansen J p-value	0.342	0.398
Instruments	24	18
Observations	112	112

Notes: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Instruments collapsed to avoid overfitting.

Table 3 reports the system GMM estimates of the dynamic panel model (Equation 2). The lagged dependent variable enters with a coefficient of 0.714 ($p < 0.001$), confirming strong persistence in regional economic performance and validating the dynamic specification. The AR(1) test rejects the null of no first-order serial correlation ($p = 0.003$), as expected by construction, while the AR(2) test fails to reject the null ($p = 0.284$), supporting the validity of the moment conditions. The Hansen J test ($p = 0.342$) further confirms instrument validity. The system GMM coefficient on IQI is 0.0098 ($p < 0.01$), somewhat smaller than the fixed effects estimate, suggesting that the static panel results may slightly overstate the institutional effect due to the omission of dynamic adjustment processes.

Table 4. Disaggregated Institutional Analysis: Effects of Individual Dimensions.

Institutional Dimension	FE (1)	Sys-GMM (2)
RE (Regulatory Efficiency)	0.0052*** (0.0014)	0.0044*** (0.0016)
PRP (Property Rights)	0.0041*** (0.0012)	0.0036** (0.0015)
AT (Admin. Transparency)	0.0028** (0.0011)	0.0024** (0.0012)
ACM (Anti-Corruption)	0.0019* (0.0010)	0.0015 (0.0011)
Controls	Yes	Yes
Year FE	Yes	Yes
R ² / Hansen p	0.857	0.368
Observations	126	112

Notes: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. All specifications include full controls and year FE.

Table 4 presents the disaggregated institutional analysis (Equation 3). Among the four institutional sub-indices, regulatory efficiency (RE) exerts the largest and most robust

effect, with a coefficient of 0.0052 ($p < 0.01$), followed by property rights protection (PRP) at 0.0041 ($p < 0.01$). Administrative transparency (AT) is statistically significant at the 5 percent level (coefficient = 0.0028), while anti-corruption measures (ACM) display a positive but marginally significant effect (coefficient = 0.0019, $p < 0.10$). These results suggest that streamlining regulatory procedures and strengthening property rights enforcement are the most impactful institutional reform levers for enhancing regional economic potential.

Table 5. Heterogeneity Analysis: Interaction with Lagging Region Status.

Variable	FE (1)	Sys-GMM (2)
IQI	0.0089***	0.0072**
	(0.0028)	(0.0031)
IQI × LAG	0.0067**	0.0058**
	(0.0029)	(0.0027)
Controls	Yes	Yes
Year FE	Yes	Yes
R ² / Hansen p	0.852	0.356
Observations	126	112

Notes: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. LAG = binary indicator for regions with initial GRP per capita below national median.

Table 5 reports the heterogeneity analysis results (Equation 4). The interaction term between IQI and the lagging region indicator is positive and statistically significant (coefficient = 0.0067, $p < 0.05$), indicating that institutional improvements generate proportionally larger economic returns in less developed regions. This finding has important policy implications: institutional reforms may serve as a convergence mechanism, helping lagging regions narrow the development gap with more prosperous territories.

DISCUSSION

The empirical findings of this study provide robust evidence that institutional mechanisms exert a significant and economically meaningful influence on regional economic potential in Uzbekistan. The baseline fixed effects estimate suggests that a one-standard-deviation improvement in institutional quality is associated with approximately a 12.7 percent increase in real GRP per capita, a magnitude that is broadly consistent with the cross-country evidence reported by Acemoglu et al. [2] and the subnational findings of Charron et al. [17] for European regions. The system GMM results, which account for dynamic adjustment and potential endogeneity, yield a somewhat smaller but still substantial effect, reinforcing the conclusion that institutions represent a first-order determinant of regional economic outcomes.

The disaggregated analysis offers particularly valuable insights for policy design. The finding that regulatory efficiency emerges as the most influential institutional dimension aligns with the evidence from the World Bank's Doing Business reports, which have consistently identified cumbersome regulatory procedures as a binding constraint on business activity in Uzbekistan [31]. The strong effect of property rights protection corroborates the theoretical predictions of De Soto [32] and the empirical evidence of

Besley and Ghatak [19], who emphasized the catalytic role of secure property rights in stimulating investment and economic growth. The relatively weaker effect of anti-corruption measures may reflect the inherent difficulty of measuring corruption-related institutional quality at the subnational level, rather than the absence of a genuine causal relationship [33].

The heterogeneity analysis reveals an important asymmetry in institutional effects across regions at different stages of development. The finding that lagging regions benefit disproportionately from institutional improvements suggests that institutional reform can serve as a convergence-promoting policy instrument. This result echoes the conclusions of Rodriguez-Pose [34], who argued that place-based institutional interventions are more effective than traditional redistributive transfers in addressing persistent regional disparities. For Uzbekistan, this implies that concentrating institutional reform efforts on the least developed regions—particularly Karakalpakstan, Surkhandarya, and Jizzakh—could yield substantial returns in terms of both regional equity and aggregate national growth.

Several limitations of the present analysis merit acknowledgment. First, the relatively short time dimension ($T = 9$) may limit the efficiency of the system GMM estimator, although the instrument count has been controlled through the collapse option to mitigate overfitting [30]. Second, the construction of the institutional quality index relies partly on administrative data that may be subject to measurement error, particularly in regions with weaker statistical capacity. Third, the analysis focuses on formal institutions and does not capture the potentially important role of informal institutional arrangements—social networks, cultural norms, and trust—that may complement or substitute for formal institutional mechanisms [35]. Fourth, unobserved spatial spillover effects between adjacent regions are not explicitly modeled, which could bias the estimated coefficients if institutional quality in one region influences economic outcomes in neighboring territories [36].

Despite these limitations, the study makes a meaningful contribution to the literature on institutions and subnational development. By providing granular panel data evidence from a Central Asian transition economy, it extends the geographical scope of the institutional economics literature and demonstrates the relevance of institutional analysis for understanding within-country regional disparities. The methodological approach—combining static and dynamic panel estimators with disaggregated institutional analysis—offers a template that could be fruitfully applied to other countries in the region and beyond.

CONCLUSIONS

This study has investigated the institutional determinants of regional economic potential in Uzbekistan using a panel data framework covering fourteen administrative regions over the period 2015–2023. The analysis employed fixed effects, random effects, and system GMM estimators to estimate the effects of institutional quality on real GRP per capita, while addressing potential endogeneity through dynamic panel techniques.

The principal findings can be summarized as follows. First, institutional quality, measured by a composite index encompassing regulatory efficiency, property rights protection, administrative transparency, and anti-corruption measures, exerts a

statistically significant and economically meaningful positive effect on regional economic potential. A one-standard-deviation improvement in institutional quality is associated with a 12.4–12.7 percent increase in regional GRP per capita, depending on the estimation method. Second, regulatory efficiency and property rights protection emerge as the most influential institutional dimensions, suggesting that reforms targeting business regulation and property rights enforcement yield the highest economic returns. Third, the effects of institutional improvements are heterogeneous, with lagging regions experiencing proportionally larger benefits, indicating that institutional reform can serve as a convergence-promoting mechanism.

Based on these findings, the study offers the following policy recommendations. First, the Government of Uzbekistan should intensify efforts to streamline regulatory procedures at the regional level, with particular attention to business registration, construction permitting, and licensing processes. The adoption of digital governance platforms and one-stop-shop service centers could significantly enhance regulatory efficiency in lagging regions. Second, property rights enforcement should be strengthened through improved land cadastre systems, accelerated digitization of property records, and enhanced judicial capacity for contract disputes. Third, institutional reform programs should be spatially targeted, with priority given to regions demonstrating the largest institutional deficits, as the evidence suggests these territories stand to gain the most from institutional improvements. Fourth, monitoring and evaluation frameworks should be established to track institutional performance at the regional level on a continuous basis, enabling evidence-based adjustments to reform strategies.

Future research should explore several promising avenues. The incorporation of spatial econometric techniques could illuminate the role of inter-regional institutional spillovers in shaping economic outcomes. Longitudinal analysis of specific institutional reforms—such as the introduction of digital governance platforms—using quasi-experimental methods (e.g., difference-in-differences) could strengthen causal identification. Additionally, qualitative research examining the political economy of institutional reform at the subnational level would complement the quantitative evidence presented here and deepen understanding of the mechanisms through which institutions translate into economic outcomes.

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