ECONOSCITECH INTEGRATION

ISSUE 11

INTERNATIONAL SCIENTIFIC ELECTRONIC JOURNAL

TASHKENT STATE UNIVERSITY OF ECONOMICS

American University of Technology
Powered by Arizona State University®

ISSN: 3060-5075



Acceptance of articles
PUBLISHED MONTHLY

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ISSN INTERNATIONAL STANDARD SERIAL NUMBER DENMARK

CONTACT: +998 94 3540880 https://econoscitech-integration-journal.uz 2026



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In accordance with Resolution No. 384/6 dated April 10, 2026, issued by the Presidium of the Supreme Attestation Commission under the Ministry of Higher Education, Science and Innovation of the Republic of Uzbekistan, this journal is included in the list of recommended international scientific publications for publishing the primary research findings of doctoral dissertations in the field of Economic Sciences.

Partners: Tashkent State University of Economics / American University of Technology in Tashkent (AUT)

Electronic publication. Issue 11.
Approved for publication in Novermber 2026.

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REGIONAL DISPARITIES IN UZBEKISTAN'S ECONOMY: MEASURING INEQUALITY AND CONVERGENCE IN GROSS REGIONAL PRODUCT PER CAPITA IN 2024-2025

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Abstract: Regional disparities are an important consideration within the Uzbekistan-2030 Strategy, yet they are rarely assessed using standard measures of inequality and convergence. This study examines the spatial distribution of gross regional product (GRP) per capita across Uzbekistan's 14 territorial units in 2024-2025, using official data published by the National Statistics Committee. The analysis employs the population-weighted coefficient of variation, Gini and Theil indices, rank correlations with sectoral structure, and a cross-sectional beta-convergence regression. In 2025, GRP per capita ranged from 22.2 million soums in Surkhandarya to 152.2 million soums in Navoi, representing a ratio of 6.85, compared with 6.19 in 2024. Only three territories exceeded the national average of 48.8 million soums. Navoi and Tashkent city accounted for 28.9% of GDP while representing approximately 11.2% of the population. All measures of dispersion increased slightly between 2024 and 2025. However, excluding these two economic centres reveals a relatively compact and stable distribution across the remaining twelve territories, with population-weighted coefficients of variation of 0.291 and 0.298, respectively, and no statistically significant relationship between initial income and real growth ($p = 0.437$). The findings indicate a two-pole spatial structure, driven by industrial activity in Navoi and service-sector agglomeration in Tashkent city, rather than widespread regional divergence. Accordingly, monitoring regional inequality should incorporate indicators calculated both with and without these economically distinctive territories. The analysis is limited to two years of preliminary data.

Key words: regional disparities, gross regional product, spatial inequality, convergence, Theil index, Uzbekistan.

Аннотация: Региональные диспропорции относятся к числу приоритетных вопросов Стратегии «Узбекистан - 2030», однако их оценка с использованием общепринятых показателей неравенства и конвергенции пока не получила широкого распространения. В исследовании анализируется пространственное распределение валового регионального продукта (ВРП) на душу населения в 14 территориальных единицах Узбекистана за 2024-2025 гг. на основе официальных данных Национального комитета по статистике. Применяются коэффициент вариации, взвешенный по численности населения, индексы Джини и Тейла, ранговые корреляции с отраслевой структурой, а также регрессионная модель бета-конвергенции на основе поперечных данных. В 2025 г. ВРП на душу населения варьировался от 22,2 млн сумов в Сурхандарьинской области до 152,2 млн сумов в Навоийской области. Соотношение максимального и минимального значений составило 6,85 против 6,19 в 2024 г., при этом лишь три территории превысили среднереспубликанский уровень, равный 48,8 млн сумов. На Навоийскую область и г. Ташкент приходилось 28,9% ВВП при доле в общей численности населения около 11,2%. Все показатели межрегиональной дифференциации в 2024–2025 гг. незначительно увеличились. Вместе с тем при исключении этих двух экономических центров остальные двенадцать территорий демонстрируют относительно компактное и устойчивое распределение показателей (взвешенный по численности населения коэффициент вариации составил соответственно 0,291 и 0,298), а статистически значимая связь между исходным уровнем дохода и реальными темпами экономического роста не выявлена ($p = 0,437$). Результаты свидетельствуют о наличии двухполюсной пространственной структуры экономики, обусловленной развитием промышленности в Навоийской области и агломерацией сферы услуг в г. Ташкенте, а не повсеместным усилением межрегиональной дивергенции. В связи с этим мониторинг регионального неравенства целесообразно осуществлять на основе показателей, рассчитанных как с учётом, так и без учёта территорий, обладающих выраженной экономической спецификой. Анализ ограничивается предварительными данными за два года.

Ключевые слова: региональные диспропорции, валовой региональный продукт, пространственное неравенство, конвергенция, индекс Тейла, Узбекистан.

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INTRODUCTION

Anyone comparing Uzbekistan's regions soon notices how uneven the map is. Tashkent city and Navoi sit far above everyone else, while much of the rest of the country is clustered well below the national average. This matters for policy. The Uzbekistan-2030 Strategy, adopted by Presidential Decree PD-158 on 11 September 2023, aims to move the country into the upper-middle-income group through sustained growth [1], and a rising national average says little about whether every territory is part of that story. According to the preliminary release of the National Statistics Committee, GDP per capita at current prices reached 48,816.4 thousand soums in 2025, yet individual territories ranged from 22,223.4 to 152,238.2 thousand soums [8].

Official releases report GRP and GRP per capita by territory but stop short of showing how widely the values are spread. Public discussion, therefore, tends to fall back on the gap between the best and the worst performer, which is a fragile yardstick: it is driven by enclave territories and says little about the other regions. Computing standard inequality measures from a single official source, in a way that any reader can repeat, is a modest but useful step for researchers and for those who monitor regional policy.

This paper asks how large and how concentrated regional inequality in GRP per capita is, whether it changed between 2024 and 2025, whether poorer territories grew faster than richer ones, and how the level of GRP per capita relates to the sectoral structure of each territory.

LITERATURE REVIEW

The classic starting point is Kuznets, who proposed that income inequality first rises and then falls as an economy develops [6]. Williamson extended this argument to regions, suggesting that spatial inequality widens in the early stages of national development and narrows later. He also proposed the population-weighted coefficient of variation to measure it [12]. The new economic geography explains persistent concentration differently: under conditions of increasing returns and transport costs, firms tend to cluster in a core region, while peripheral regions may experience slower economic growth [5]. For developing countries, the cases examined by Kanbur and Venables show that spatial inequality is often substantial and that its underlying causes vary from one country to another [4].

Empirical research distinguishes between beta-convergence, in which poorer territories grow faster, and sigma-convergence, in which the dispersion of incomes narrows over time [3, 10]. Barro and Sala-i-Martin found evidence of regional convergence in the United States, Japan, and Europe at approximately 2 per cent per year [3]. Resource-rich territories warrant separate consideration because cross-country evidence suggests a relationship between resource abundance and slower economic growth [9]. Where regional statistical data are limited, satellite night-time light data can serve as an additional means of validating official GRP figures [7].

RESEARCH METHODOLOGY

Two practical points follow for Uzbekistan. The distribution includes enclave territories, so the results are presented both with and without them. Moreover, one year of growth cannot conclusively establish whether convergence is occurring: the regressions presented below are exploratory, and the two years of data are best treated as a baseline for future monitoring.

The data come from the National Statistics Committee's press release, "Gross Regional Product of the Republic of Uzbekistan for January–December 2025", published on 26 January 2026 [8]. The release covers 14 territorial units (the Republic of Karakalpakstan, 12 regions, and Tashkent city). GRP is estimated using the production method at current prices and includes estimates of the non-observed economy; the figures are preliminary. National GDP includes an undistributed component, so the 14 territorial units together account for 86.4% of GDP (author's calculation). The variables used are GRP and GRP per capita for 2024 and 2025, real growth indices, GRP by sector, and the share of small businesses in gross value added. GRP per capita is calculated by dividing GRP at current prices by the average population.

Average population figures are not published in the release and were derived by dividing GRP (billion soums) by GRP per capita (thousand soums), yielding population estimates in millions of people. The resulting total of 37.89 million matches the national figure. Let y_i denote GRP per capita and p_i the population share of territory i. Dispersion is measured using the max/min ratio, the unweighted coefficient of variation, the population-weighted coefficient of variation [12], the Gini index (unweighted and population-weighted), and the Theil index [11]:

$$CV_w = \sqrt{\left(\Sigma\, p_i (y_i - \mu)^2 \right)} / \mu, \quad \mu = \Sigma\, p_i y_i, \qquad (1)$$

$$T = \Sigma\, s_i \ln(y_i / \mu), \quad s_i = p_i y_i / \Sigma\, p_j y_j. \qquad (2)$$

Sigma-convergence is assessed by examining changes in these indicators between 2024 and 2025. Beta-convergence is assessed using a cross-sectional regression of real GRP per capita growth in 2025 on the logarithm of initial (2024) GRP per capita:

$$\ln(1 + g_i) = \alpha + \beta \ln y_{i,2024} + \varepsilon_i, \quad (3)$$

where g_i represents the real growth rate of GRP per capita in 2025; a negative β indicates convergence. The regression is estimated using ordinary least squares (OLS) for three samples: all 14 territorial units, excluding Navoi, and excluding both Navoi and Tashkent city. The relationship between GRP per capita and sectoral structure is measured using Spearman's rank correlations, based on the shares of industry and services in gross value added (author's calculations from sectoral GRP values; rounding differences from the published shares do not exceed 0.2 percentage points) and the published share of small businesses. All calculations are reproducible using the cited release.

Artificial intelligence tools were used as supplementary support in approximately 10% of the research process, primarily for organizing scientific literature on regional economic disparities and convergence, structuring data on gross regional product (GRP) per capita, and assisting with the technical editing of the manuscript.

ANALYSIS AND RESULTS

Level and Distribution of GRP per Capita. In 2025, GRP per capita in Uzbekistan averaged 48,816.4 thousand soums at current prices (Table 1). Only three territories exceeded this level: Navoi (152,238.2 thousand soums, 3.12 times the national average), Tashkent city (116,747.3 thousand soums, 2.39 times the national average), and Tashkent region (57,480.2 thousand soums, 1.18 times the national average). The lowest value was recorded in Surkhandarya (22,223.4 thousand soums), equivalent to 0.46 times the national average. Namangan, Kashkadarya, Fergana, and Karakalpakstan were also positioned at the lower end of the distribution, with GRP per capita ranging from 0.54 to 0.55 times the national average.

Economic output was more geographically concentrated than the population: Navoi and Tashkent city together accounted for 28.9% of national GDP while representing approximately 11.2% of the population (based on the implied average population; author's calculation) (figure 1, table 1).

Table 1. GRP per capita by territory, 2024–2025[1]

Territory	2024, thous. soums	2025, thous. soums	Nominal growth, %	Real growth, %	2025, national = 1
Navoi	120,222.2	152,238.2	26.6	5.9	3.12
Tashkent city	98,440.5	116,747.3	18.6	8.9	2.39
Tashkent region	49,105.4	57,480.2	17.1	5.4	1.18
Bukhara	35,638.4	41,399.1	16.2	5.6	0.85
Syrdarya	31,065.1	38,137.2	22.8	7.9	0.78
Jizzakh	28,602.0	34,116.8	19.3	6.1	0.70
Andijan	27,139.6	30,852.1	13.7	4.8	0.63
Khorezm	26,633.7	30,713.5	15.3	5.9	0.63
Samarkand	24,425.8	28,001.8	14.6	5.9	0.57
Namangan	23,191.8	27,020.6	16.5	6.0	0.55
Kashkadarya	23,319.6	26,856.9	15.2	4.5	0.55
Fergana	22,813.5	26,603.6	16.6	6.0	0.54
Karakalpakstan	22,963.9	26,489.5	15.4	5.9	0.54
Surkhandarya	19,425.6	22,223.4	14.4	4.2	0.46
Republic of Uzbekistan	41,306.7	48,816.4	18.2	5.7	1.00

1 National Statistics Committee [8]; nominal growth and ratio to national average calculated by the author. Real growth is the published growth index minus 100.

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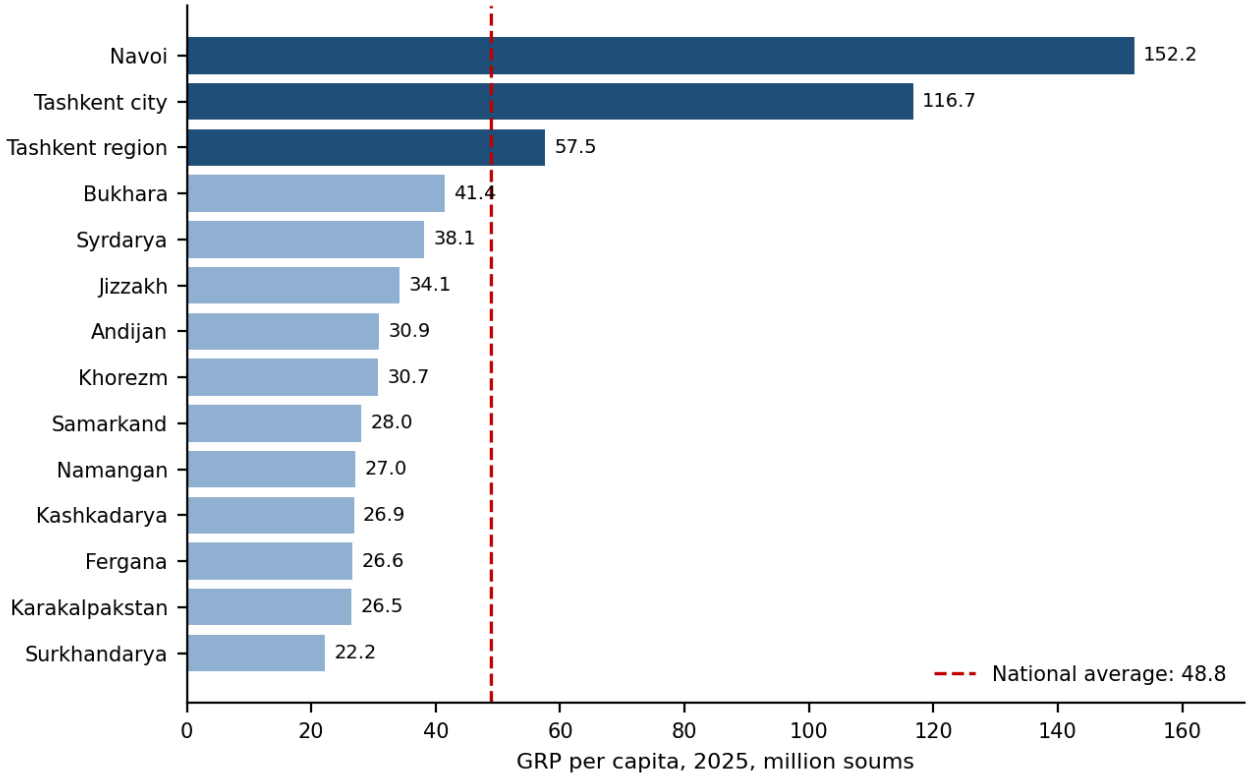


Figure 1. GRP per capita by territory, 2025 (author's chart based on [2])

Inequality indices and their change. All dispersion measures rose slightly in 2025 (Table 2). The max/min ratio increased from 6.19 to 6.85, the population-weighted coefficient of variation from 0.713 to 0.746, the Gini index from 0.295 to 0.306 and the Theil index from 0.187 to 0.202. Sigma-convergence is therefore not observed for the full set of territories. The result is sensitive to the two poles: without Navoi and Tashkent city the distribution is much more compact (population-weighted coefficient of variation 0.298, Gini index 0.137 in 2025), and its dispersion changed only marginally from 0.291 in 2024 (table 2).

Table 2. Indicators of regional inequality in GRP per capita[2]

Indicator	All 14 units		Without Navoi		Without Navoi and Tashkent city	
	2024	2025	2024	2025	2024	2025
Max/min ratio	6.19	6.85	5.07	5.25	2.53	2.59
Coefficient of variation (unweighted)	0.751	0.792	0.606	0.619	0.274	0.281
Coefficient of variation (population-weighted)	0.713	0.746	0.638	0.654	0.291	0.298
Gini index (population-weighted)	0.295	0.306	0.258	0.264	0.134	0.137
Theil index	0.187	0.202	0.150	0.157	0.037	0.039

Convergence. Real growth of GRP per capita was 5.7% nationally in 2025. Nine territories grew faster, including seven with below-average income: Syrdarya, Jizzakh, Namangan, Fergana, Karakalpakstan, Samarkand and Khorezm. At the same time, the three slowest-growing territories all had below-average income: Surkhandarya (4.2%), Kashkadarya (4.5%) and Andijan (4.8%). Tashkent city had the highest real growth (8.9%) from an already high base.

2 Author's calculations based on [8].

The regression estimates are positive in all samples (Table 3), that is, they do not indicate convergence. In the full sample the coefficient is 0.0103 (p = 0.068); it becomes larger and significant without Navoi (0.0189, p = 0.011), which reflects the fast growth of Tashkent city. Without both poles the coefficient is small and statistically insignificant (0.0090, p = 0.437; R^2 = 0.06). Thus the apparent divergence is produced by two territories and no systematic relation between initial income and growth is found in the remaining twelve (figure 2, table 3).

Table 3. Beta-convergence regression, dependent variable ln(1 + real GRP per capita growth, 2025)[3]

Sample	N	β	Std. error	p-value	R^2
All 14 units	14	0.0103	0.0052	0.068	0.25
Without Navoi	13	0.0189	0.0061	0.011	0.46
Without Navoi and Tashkent city	12	0.0090	0.0111	0.437	0.06

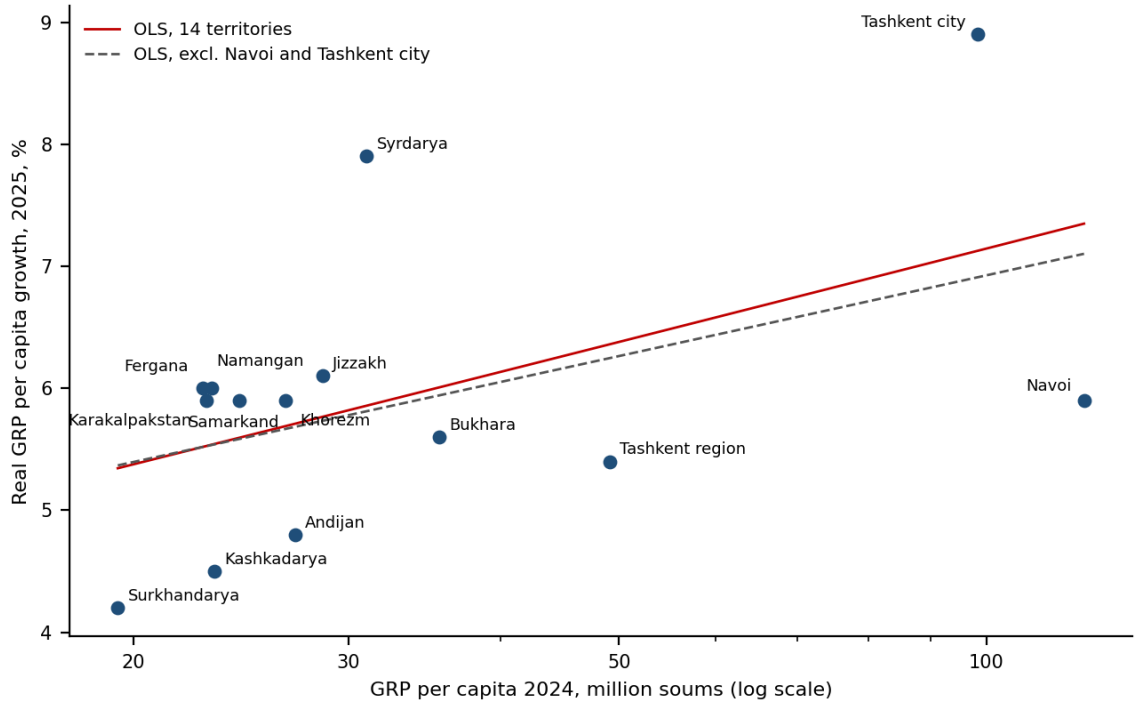


Figure 2. Initial GRP per capita (2024) and real growth of GRP per capita in 2025 (author's chart based on [2])

Sectoral structure. The structure of GRP differs sharply between the territories (Table 4). Industry accounts for 76.0% of gross value added in Navoi and 44.2% in Tashkent region, whereas services dominate in Tashkent city (about 63%) and Karakalpakstan (about 50%). Agriculture is the largest sector in Jizzakh (39.5%) and Surkhandarya (37.4%), the latter being the territory with the lowest GRP per capita [2]. The share of small business in gross value added is lowest in Navoi (21.1%) and Tashkent city (51.7%) and highest in Surkhandarya (76.4%), Namangan (73.6%) and Fergana (73.0%).

GRP per capita is positively associated with the share of industry (Spearman ρ = 0.72, p = 0.003) and negatively with the share of small business (ρ = -0.59, p = 0.026); the association with the share of services is negative and borderline (ρ = -0.53, p = 0.049). After excluding Navoi, only the link with industry remains significant at the 5% level (ρ = 0.65, p = 0.015); the correlations with small business (ρ = -0.49, p = 0.089) and services (ρ = -0.42, p = 0.156) weaken. With N = 14 these are descriptive associations rather than causal estimates (table 4).

3 Note: OLS with conventional standard errors; exploratory, one growth period, no control variables. Source: author's calculations based on [8].

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Table 4. Sectoral structure and small-business share by territory, 2025, %[4]

Territory	Industry (share of GVA)	Services (share of GVA)	Small business (share of GVA)
Navoi	76.0	11.5	21.1
Tashkent city	26.2	63.2	51.7
Tashkent region	44.2	30.6	55.0
Bukhara	21.7	36.4	71.0
Syrdarya	29.1	32.3	69.5
Jizzakh	18.2	36.0	71.2
Andijan	29.2	35.8	70.1
Khorezm	15.3	42.5	71.6
Samarkand	17.4	47.7	69.5
Namangan	16.8	47.5	73.6
Kashkadarya	17.7	43.1	69.2
Fergana	19.5	47.2	73.0
Karakalpakstan	19.6	49.6	65.5
Surkhandarya	9.9	43.4	76.4

Taken together, the numbers describe two poles rather than a gradual slope. Navoi, where industry produces three quarters of value added and small business only about a fifth, and Tashkent city, where services contribute about 63%, reach 3.1 and 2.4 times the national average. Most other territories sit in a fairly narrow band between 0.46 and 0.85 of that average. This is consistent with the idea that increasing returns and agglomeration build a core [5], and with the warning that resource-based specialisation does not automatically spread growth widely [9]. The data used here cannot test either mechanism, however.

The positive beta coefficients should not be read as a sign of general divergence. They come from Tashkent city, which combines the fastest real growth with an already high starting level. Among the remaining twelve territories there is no significant relationship, and several lagging territories actually grew faster than the national average. What does deserve attention is the slow growth of Surkhandarya, Kashkadarya and Andijan, especially since Surkhandarya also has the lowest GRP per capita.

GRP measures production, so it can exaggerate welfare gaps in capital-intensive enclaves. For comparison, per capita income in 2023 was highest in Tashkent (44.4 million soums) and lowest in Karakalpakstan (14.5 million soums), a ratio of about 3.1 [2], while the ratio of extreme GRP values in 2025 is 6.85. The two figures refer to different years and definitions, so they are only indicative, but they suggest that income indicators should accompany GRP in regional monitoring.

The study has clear limits. The 2025 figures are preliminary and in current prices, and there are no regional price deflators. Only two annual observations exist, so sigma-convergence is a one-year comparison, and the beta regression rests on 14 observations, a single growth period and no controls. In addition, about 14% of GDP is not allocated to any territory, which means the regional totals are incomplete.

CONCLUSION AND RECOMMENDATIONS

Regional inequality in Uzbekistan is concentrated in two territories. In 2025 the highest GRP per capita was 6.85 times the lowest, only three of the 14 territories stood above the national average, and Navoi and Tashkent city produced 28.9% of GDP with about 11.2% of the population. All dispersion indicators edged up in 2025, but without these two poles the rest of the country looks compact and shows no significant link between initial income and growth. Economic structure matters too: GRP per capita is positively associated with the share of industry and negatively with the share of small business.

Several recommendations follow. Official monitoring of the Uzbekistan–2030 Strategy should report population-weighted dispersion indicators with and without enclave territories. Statistical agencies could publish longer, revised regional series together with real GRP and regional price indices, so that convergence can be tested over several years. Policy attention should go to territories that combine low GRP per capita with slow real growth, above all Surkhandarya, Kashkadarya and Andijan, with a focus on productivity and on

4 Source: sectoral shares calculated by the author from [8]; small-business share as published in [8]. GVA = gross value added (GRP minus net taxes on products).

diversification beyond agriculture. Since industry makes up 76.0% of Navoi's value added, ways of diversifying its economy deserve assessment. Finally, income-based indicators should sit alongside GRP in regional comparisons. Further research should extend the panel, add controls such as investment, infrastructure and human capital, and use satellite data as an independent check.

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Layout and Designer: Oloviddin Sobir o‘g‘li

2026. № 11

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