

Article

Intra-Regional Disparities in Service Sector Development: District-Level Evidence from Samarkand Region, Uzbekistan (2010–2024)

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Abstract: The service sector has become the largest part of the economy of Samarkand Region, Uzbekistan, rising from 39.3% of gross value added in 2021 to 46.8% in January–September 2025. Whether this shift is spreading evenly across the region's territories has not been examined. Using official data on per capita service output for two cities and fourteen rural districts over 2010–2024, corrected for a territorial reallocation in 2019 and an informal-economy revision in 2024, this paper applies σ -convergence, β -convergence, a two-group Theil decomposition and a Lerman–Yitzhaki decomposition of the Gini index by service type. Rural districts converged during 2010–2018, with a half-life of 14–20 years. After 2019 the pattern reversed. The coefficient of variation rose from 0.64 to 0.76, the Theil index from 0.223 to 0.285, and the cross-sectional β coefficient turned positive (+0.023, $p < 0.001$). Almost all of the increase came from the widening gap between the two cities and the rural districts; among rural districts there was no significant β -convergence and dispersion rose only slightly. Samarkand city, with 13.9% of the population, produced 43.7% of territorially allocated service output in 2024 and 84.5% of education, 70.4% of health and 52.9% of financial services. Education, accommodation and food, finance and health services widen the per capita gap at the margin, while transport, trade, information and communication, and personal services narrow it. The results support spatially targeted policies for higher-order services and reveal gaps in district-level service statistics.

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1. Introduction

The economy of Uzbekistan has been moving away from agriculture and towards services for more than a decade, and Samarkand Region illustrates this shift clearly. Official estimates show that services accounted for 39.3% of the region's gross value added in 2021, 44.9% in 2024 and 46.8% in January–September 2025, while the share of agriculture, forestry and fisheries fell from 39.0% to 29.1% over the same period [1]. The national development agenda supports this movement. The "Uzbekistan – 2030" strategy, adopted by Presidential Decree PF-158 in 2023 and updated in February 2026, sets targets for the expansion of tourism and the information technology sector (President of the Republic of Uzbekistan, 2023, 2026).

Services are not footloose, however. A large part of service output is consumed where it is produced, and many higher-order services, such as specialised medical care, higher education, banking or engineering consultancy, require a minimum market size before a provider can operate profitably. Central place theory [3] and the later literature on the geography of services [4][5] predict that these activities concentrate in the largest settlement of a region, while everyday services spread more evenly. New economic geography adds that agglomeration economies can make such concentration self-reinforcing [6][7]. A service-led growth path can therefore widen spatial gaps even when it raises average incomes, which is consistent with Williamson's [34] observation that regional inequality often rises in the early stages of development before it declines.

Evidence on this question for Uzbekistan is thin. National studies discuss the contribution of services to growth, employment and the environment [8][9], and a small number of papers compare the country's fourteen first-level territories [10][11]. Below the oblast level, where many public services are delivered and where households experience disparities most directly, the service economy has not been studied systematically. Samarkand Region is a useful case. With about 4.25 million residents in 2024, it is one of the most populous regions of the country. Its capital is a major historical and tourist centre, while several of its fourteen rural districts remain predominantly agricultural.

This paper addresses three questions. First, have disparities in per capita service output among the region's sixteen territories narrowed or widened since 2010? Second, is the observed pattern driven by the gap between the cities and the countryside or by differences among rural districts? Third, which service industries account for the remaining inequality?

The paper makes three contributions. It builds a district-level panel of service output from official regional statistics for 2010–2024 and identifies two statistical breaks that would otherwise distort the analysis: a reallocation of output between Samarkand city and the districts in 2019, and the inclusion of informal-economy estimates in the 2024 regional total. It combines several complementary tools (σ - and β -convergence, a group decomposition of the Theil index and a source decomposition of the Gini index) rather than relying on a single statistic. Finally, by decomposing inequality by service type, it links the convergence debate to the location of specific services, which is the level at which policy can act.

The remainder of the paper follows the AJEBM article structure: the literature review completes the Introduction, Section 2 presents the Materials and Methods, Section 3 reports the Results, Section 4 discusses the findings, and Section 5 provides the Conclusion.

1.1 Literature Review

1.1.1 Services, structural change and regional growth

The modern literature on structural transformation treats the rise of services as a regular feature of development. Herrendorf et al. [12] document that the share of services in employment and value added increases with income across countries, and Eichengreen and Gupta [13] distinguish an early wave of traditional services from a later wave of modern, knowledge-based services that begins at higher income levels. Baumol's [36] cost-disease argument implies that services with slow productivity growth absorb a growing share of nominal expenditure. Rodrik [14] warns that many developing economies are moving into services before they have built a large manufacturing base, and Ghani and O'Connell [37] argue that services can still act as an escalator for growth in low-income countries. For Uzbekistan, the World Bank [8] finds that services already account for more than half of all jobs and that social services drove much of the recent growth in services employment. These studies focus on national aggregates and say little about where within a country the new service jobs and output are located.

1.1.2 The spatial concentration of services

The geography of services has its roots in central place theory. Christaller [3] showed that goods and services with high demand thresholds and wide market ranges are

supplied only from higher-order centres, which produces a hierarchy of settlements. Daniels [4] and Illeris [5] extended this view to modern service economies and stressed the role of business and public services in shaping urban hierarchies. Kolko [15] shows that service industries are more urbanised, though less agglomerated, than manufacturing industries, and that their co-location depends largely on direct trading relationships between firms. Knowledge-intensive business services are especially urban, and they also act as carriers of innovation within regional systems [16]. This line of work suggests that the composition of service growth matters: growth in education, health, finance and professional services may favour the main city, while growth in retail, transport and personal services may be more evenly spread.

1.1.3 Measuring convergence and inequality

Two concepts of convergence are standard. β -convergence holds when poorer units grow faster than richer ones, and σ -convergence holds when the dispersion of a variable across units declines over time [17][18]. β -convergence is necessary but not sufficient for σ -convergence, and Quah [19] shows that regression-based tests can mislead when the cross-sectional distribution is polarising. Panel versions of the β -regression allow for unit-specific steady states [20], although fixed-effects estimates in short panels are biased towards finding convergence [21]. Applied regional studies therefore tend to combine several indicators [22]. Among inequality measures, the Theil index is additively decomposable into between-group and within-group components [23], which has made it popular for analysing urban–rural and inter-provincial gaps [24]; Kanbur and Zhang [25], for example, use decomposable indices to separate the rural–urban and inland–coastal components of regional inequality in China. The Gini index cannot be decomposed by population subgroups in the same way, but it can be decomposed by income source [26], which allows the contribution of each component to overall inequality to be measured. Cross-country work suggests that spatial inequality first rises and then falls with development [27], although the turning point varies widely.

1.1.4 Evidence for Uzbekistan

Research on spatial disparities in Uzbekistan is recent and mostly conducted at the level of the fourteen first-level territories. Turaxanov [11] finds no absolute β -convergence in regional output over 2018–2025 but some conditional convergence once differences in digital infrastructure are controlled for. Abraev [10] describes regional differences in service output per capita, and Nasirov et al. [28] discuss how regional differences in infrastructure and human capital shape innovation in services. Astanakulov and Goyipnazarov [29] relate tourism to regional development, with reference to Samarkand and Bukhara. None of these studies works with district-level data or decomposes inequality by service type. The present paper fills this gap for one of the country's largest regions.

2. Materials and Methods

2.1. Data

The analysis uses official data published by the Samarkand Regional Department of Statistics, part of the National Statistics Committee of Uzbekistan. The core panel contains the annual volume of market services (billion soum, current prices, excluding VAT) and per capita service output (thousand soum) for sixteen territories, namely Samarkand city, Kattakurgan city and fourteen rural districts, for 2010–2024 [30]. The same source reports annual growth rates of service output at constant prices for each territory, which are used to build real indices. The 2024 statistical bulletin on services by type of economic activity provides a breakdown of service output into thirteen categories for each territory [31]. Preliminary 2025 territorial totals are taken from the most recent release [32].

Territorial population is not published in the same tables. It is obtained by dividing the volume of services by per capita output. The derived figures are internally consistent: in 2024 the sixteen territories sum to 4,253.0 thousand persons, exactly matching the regional total implied by the same tables, with Samarkand city (590.5 thousand) and Urgut

district (565.9 thousand) as the two largest units. The derived regional population for 2023 (4,163.4 thousand, an annual average) is also close to the official count of 4,137.8 thousand on 1 April 2023 [33].

2.2. Two statistical breaks

Two features of the data require careful treatment. The first is a break in 2019. In that year the per capita service output of Samarkand city fell by 20% in nominal terms, although the official real growth rate for the city was 115.4%. At the same time, per capita output in the rural districts rose by factors of between 1.24 (Nurabad) and 3.19 (Urgut), well above their reported real growth rates of 100.5–117.9%. The only consistent explanation is a change in how output was attributed to territories, most likely a shift from the place of registration of service providers towards the place where services are delivered. Levels before and after 2019 are therefore not comparable. The analysis is carried out separately for 2010–2018 and 2019–2024, and the main conclusions rest on the second, methodologically consistent period. The constant-price growth rates are not affected by the break, so real indices are used as a robustness check across the whole period.

The second feature concerns 2024. The regional total for that year (59.6 trillion soum) includes the results of statistical surveys of the informal and hidden economy, but only 37.1 trillion soum (62.2%) is attributed to territories. Of the unallocated 22.5 trillion soum, 18.0 trillion soum relates to accommodation and food services. The most recent release also revises the regional totals for 2017–2024 upwards while leaving the territorial figures unchanged [32]. To keep the series comparable, all territorial calculations in this paper use the sum of territorially allocated output rather than the revised regional total.

2.3. Inequality and dispersion measures

Let y_{it} denote per capita service output of territory i in year t , p_{it} its population share and $\bar{y}_t$ the population-weighted mean. Four standard measures are calculated. The unweighted coefficient of variation is

$$CV_t = \frac{s_t}{m_t} \quad (1)$$

where s_t and m_t are the standard deviation and the simple mean across the sixteen territories. The population-weighted coefficient of variation [34] is

$$CVW_t = \frac{[\sum_i p_{it}(y_{it} - \bar{y}_t)^2]^{1/2}}{\bar{y}_t} \quad (2)$$

The Gini index is computed with population weights as $G_t = 2 \text{cov}(y_{it}, F_{it}) / \bar{y}_t$, where F_{it} is the cumulative population share of territory i in the ranking by per capita output. The Theil T index and its decomposition into a between-group and a within-group component are

$$T_t = \sum_i s_{it}^Y \ln\left(\frac{s_{it}^Y}{p_{it}}\right) = \sum_g s_{gt}^Y \ln\left(\frac{s_{gt}^Y}{p_{gt}}\right) + \sum_g s_{gt}^Y T_{gt} \quad (3)$$

where s_{it}^Y is the territory's share of total service output, and g indexes two groups: the two cities and the fourteen rural districts [23][24]. The first term on the right-hand side measures the urban–rural gap and the second the inequality within each group.

2.4. β -convergence

Absolute β -convergence is tested with the cross-sectional regression

$$\frac{1}{T} \ln\left(\frac{y_{i,t_0+T}}{y_{i,t_0}}\right) = \alpha + \beta \ln y_{i,t_0} + \varepsilon_i \quad (4)$$

A negative β indicates convergence. The implied speed of convergence is $\lambda = -\ln(1 + \beta T)/T$ and the half-life is $\ln 2/\lambda$ [17]. Equation (4) is estimated for 2010–2018 and 2019–2024, for all sixteen territories and for the fourteen rural districts only, using both nominal per capita output and a real index derived from official constant-price growth rates adjusted for population growth. Heteroskedasticity-robust (HC1) standard errors are reported. Because sixteen observations give limited power, the cross-section is complemented by an annual panel for 2020–2024:

$$\Delta \ln y_{it} = \mu_t + \eta_i + \beta \ln y_{i,t-1} + u_{it} \quad (5)$$

estimated first with year effects μ_t only (pooled) and then with territory effects η_i added. Standard errors are clustered by territory. With five periods, the fixed-effects estimate of β is biased downwards [21], so it is read as evidence of reversion towards territory-specific levels rather than as a precise convergence rate.

2.5. Decomposing the Gini index by service type

The 2024 bulletin allows per capita output in each territory to be written as the sum of K service components, $y_i = \sum_k y_{ik}$. Following Lerman and Yitzhaki [26], the Gini index can be written as

$$G = \sum_k S_k R_k G_k \quad (6)$$

where S_k is the share of component k in total output, G_k is the Gini index of that component and R_k is the Gini correlation between the component and total output. The product $S_k R_k G_k / G$ is the share of overall inequality attributable to component k . The effect of a uniform 1% increase in component k on the Gini index, expressed in per cent, is

$$\frac{\partial G / \partial e_k}{G} = \frac{S_k R_k G_k}{G} - S_k \quad (7)$$

A negative value means that expanding the component reduces inequality. Eleven components are used, combining some of the thirteen categories of the bulletin where they are small or closely related.

3. Results

3.1. The pattern of per capita service output

Table 1 summarises per capita service output by territory in 2019 and 2024. The spread is wide. In 2024 per capita output in Samarkand city reached 27.4 million soum, more than three times the regional average and 6.4 times the level in Urgut and Nurabad districts (4.3 million soum each). Only three territories exceed the regional average: the two cities and Samarkand district, which surrounds the regional capital and has a high concentration of accommodation and food services. The remaining thirteen districts lie between 0.49 and 0.90 of the average.

Table 1. Population and per capita service output by territory, 2019 and 2024

Territory	Population 2024, thous.	Per capita 2019, thous. soum	Per capita 2024, thous. soum	Relative 2019	Relative 2024	Real growth per capita 2019–2024, % p.a.
Samarkand city	590.5	9,497.9	27,432.8	2.85	3.15	12.8
Kattakurgan city	95.4	3,588.2	10,483.9	1.08	1.20	12.9
Samarkand district	275.7	3,466.7	9,780.7	1.04	1.12	12.2
Jambay	191.8	3,397.0	7,841.9	1.02	0.90	7.8
Akdarya	175.2	2,663.1	6,565.6	0.80	0.75	9.1
Tayloq	223.7	2,877.1	6,472.2	0.86	0.74	7.1
Pastdargom	387.7	2,581.1	6,301.8	0.77	0.72	9.0
Payarik	276.6	1,858.1	5,243.3	0.56	0.60	12.2
Koshrabad	143.1	2,100.6	4,942.4	0.63	0.57	8.1
Narpay	229.5	2,150.0	4,926.9	0.65	0.56	7.5
Bulungur	204.4	1,864.3	4,659.2	0.56	0.53	9.5
Pakhtachi	153.4	1,850.8	4,591.6	0.56	0.53	9.3
Ishtikhan	279.1	1,995.1	4,580.9	0.60	0.53	7.6
Kattakurgan	296.8	1,850.3	4,370.5	0.56	0.50	8.3
Urgut	565.9	1,846.9	4,283.0	0.55	0.49	8.0
Nurabad	164.2	1,832.4	4,282.7	0.55	0.49	8.0

Note: Relative values are per capita output divided by the population-weighted regional mean of allocated output. Real growth is based on official constant-price growth rates adjusted for population growth. Source: authors' calculations based on SRSD (2025a).

The ranking of territories is very stable. The Spearman rank correlation between per capita output in 2019 and 2024 is 0.95, and the Kendall coefficient is 0.87. Relative positions, by contrast, moved in a clear direction. The relative level of Samarkand city rose from 2.85 to 3.15, and those of Kattakurgan city and Samarkand district also rose, while twelve of the remaining thirteen districts lost ground (Figure 1). The share of Samarkand city in territorially allocated service output increased from 40.3% in 2019 to 43.7% in 2024, although its share of the population is only 13.9%. Real per capita growth over 2019–2024 averaged 12.2–12.9% a year in the three leading territories and 7.1–9.5% in most of the others, with Payarik the only other district to keep pace.

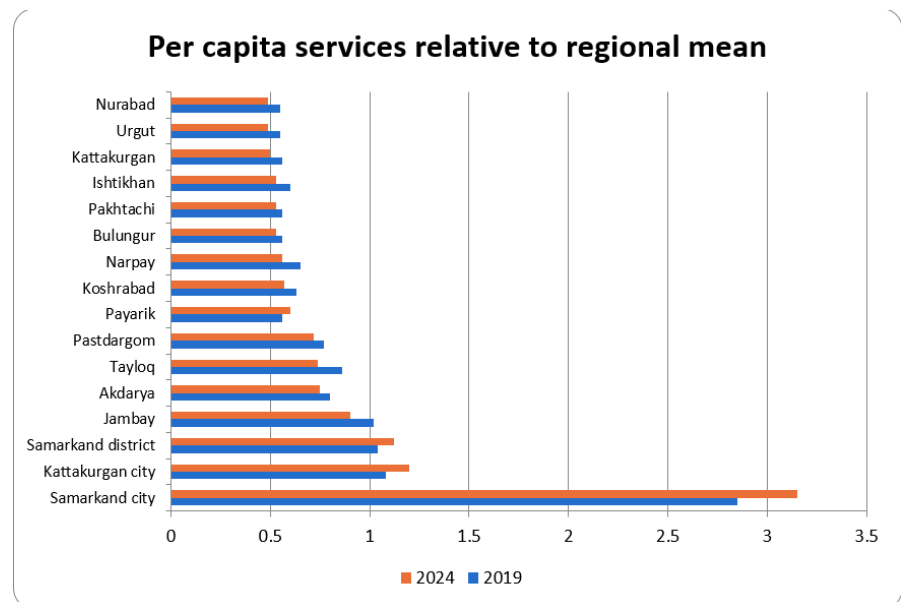


Figure 1. Per capita service output relative to the regional average, 2019 and 2024. Source: authors' calculations based on SRSD (2025a).

3.2. σ -convergence

Table 2 and Figure 2 report the dispersion measures. In 2010–2018 the coefficient of variation for all sixteen territories fluctuated between 1.28 and 1.60 without a significant trend (slope -0.017 a year, $p = 0.31$). Among the fourteen rural districts, however, dispersion fell steadily, from 0.305 in 2010 to 0.242 in 2018 (slope -0.008 a year, $p < 0.001$), and the ratio between the highest and lowest district fell from 3.6 to 2.6. The rural districts were converging, but the gap between them and Samarkand city remained very large under the old attribution method.

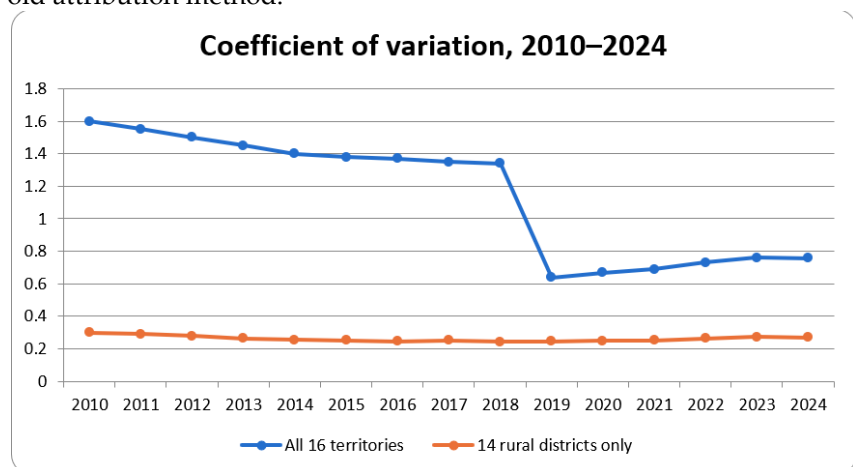


Figure 2. Coefficient of variation of per capita service output, 2010–2024. Source: authors' calculations based on SRSD (2025a).

The 2019 break lowers all dispersion measures sharply, which reflects the reallocation of output rather than an economic event. Within the consistent 2019–2024 period, every indicator points to rising inequality. The coefficient of variation increased from 0.643 to 0.757 (slope $+0.027$ a year, $p = 0.002$), the standard deviation of log per capita output from 0.417 to 0.471 ($p < 0.001$), the population-weighted Gini index from 0.329 to 0.372 and the Theil index from 0.223 to 0.285. Dispersion among the rural districts also increased slightly (from 0.245 to 0.275, $p = 0.003$), so the earlier convergence among districts came to an end.

Table 2. Dispersion and inequality of per capita service output, selected years

Indicator	2010	2014	2018	2019	2021	2023	2024
CV, 16 territories	1.598	1.397	1.338	0.643	0.693	0.761	0.757
SD of log, 16 territories	0.715	0.657	0.638	0.417	0.432	0.464	0.471
Williamson CV ^w	1.639	1.446	1.419	0.768	0.826	0.895	0.881
Gini (population-weighted)	0.601	0.566	0.551	0.329	0.348	0.377	0.372
Theil T	0.816	0.692	0.660	0.223	0.253	0.292	0.285
Between-group share of T, %	90.0	91.1	91.2	86.2	86.4	86.1	87.7
CV, 14 rural districts	0.305	0.257	0.242	0.245	0.249	0.274	0.275
Max/min ratio, 16 territories	29.9	21.7	20.6	5.2	5.9	6.9	6.4
Samarkand city share of allocated output, %	66.9	65.7	63.5	40.3	42.0	44.3	43.7

Note: Values before and after 2019 are not comparable because of the change in the territorial attribution of output (see Section 3.2). Source: authors' calculations based on SRSD (2025a).

3.3. β -convergence

Table 3 reports the β -convergence estimates. In 2010–2018 the coefficient is negative in all four specifications. For the fourteen rural districts it is -0.031 in nominal terms and -0.041 in real terms (both $p < 0.01$), which corresponds to a speed of convergence of 3.6–5.0% a year and a half-life of 14–20 years. For all sixteen territories the coefficient is smaller (-0.016 nominal, -0.010 real) and only marginally significant in real terms.

Table 3. β -convergence estimates

Specification	β	SE	P-value	R ²	λ , % p.a.	Half-life, years
2010–2018, 16 territories, nominal	–0.0155	0.0028	<0.001	0.33	1.7	41.9
2010–2018, 16 territories, real	–0.0101	0.0052	0.051	0.10	1.0	66.1
2010–2018, 14 districts, nominal	–0.0309	0.0118	0.009	0.30	3.6	19.5
2010–2018, 14 districts, real	–0.0411	0.0157	0.009	0.30	5.0	13.9
2019–2024, 16 territories, nominal	0.0230	0.0065	<0.001	0.30	n.a.	n.a.
2019–2024, 16 territories, real	0.0232	0.0065	<0.001	0.30	n.a.	n.a.
2019–2024, 14 districts, nominal	0.0067	0.0229	0.769	0.01	n.a.	n.a.
2019–2024, 14 districts, real	0.0060	0.0231	0.795	0.01	n.a.	n.a.
Panel 2020–2024, year effects (N = 80)	0.0172	0.0069	0.012	0.48	n.a.	n.a.
Panel 2020–2024, year and territory effects (N = 80)	–0.8306	0.2325	<0.001	0.68	n.a.	n.a.

Note: Cross-sectional estimates of Equation (4) with HC1 robust standard errors; panel estimates of Equation (5) with standard errors clustered by territory. Real specifications use indices built from official constant-price growth rates. n.a.: not applicable because β is positive or the estimate reflects reversion to territory-specific levels. Source: authors' calculations.

After 2019 the sign changes. Across all sixteen territories, β is +0.023 in both nominal and real terms ($p < 0.001$), so territories with higher initial output grew faster (Figure 3). The fitted line is driven mainly by the two cities, Samarkand district and Payarik. Among the fourteen rural districts the coefficient is close to zero and insignificant ($p = 0.77$ – 0.80). Excluding 2024, whose regional total was revised, does not change the result ($\beta = +0.025$, $p = 0.002$ for all territories). The pooled panel with year effects confirms absolute divergence ($\beta = +0.017$, $p = 0.012$). Once territory effects are added, the coefficient becomes strongly negative. Allowing for the Nickell bias, this indicates that each territory tends to return to its own growth path, and those paths differ substantially. Put differently, there is no sign of absolute convergence after 2019, only reversion to territory-specific levels that keep the existing gaps in place.

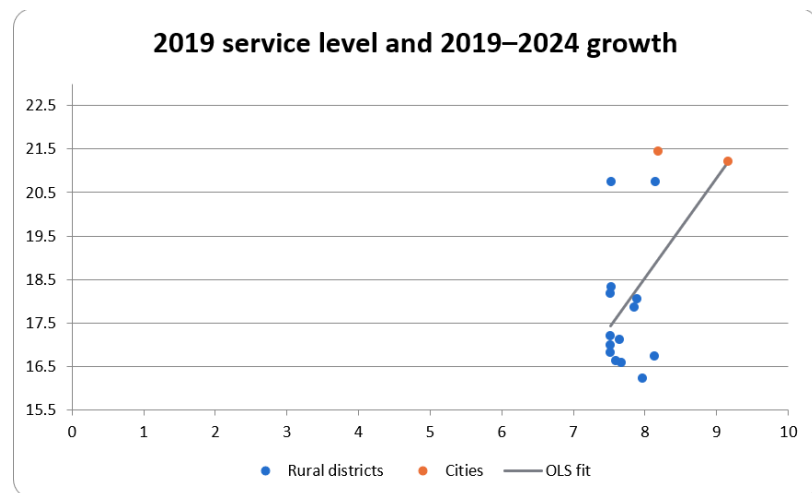


Figure 3. Initial per capita service output (2019) and average annual growth (2019–2024). Source: authors' calculations based on SRSD (2025a).

3.4. Cities versus rural districts

The two-group Theil decomposition shows where the rising inequality comes from (Table 4). The between-group component, which measures the gap between the two cities and the fourteen rural districts, accounts for between 85.6% and 87.7% of total inequality in each year of 2019–2024. Of the increase in the Theil index from 0.223 to 0.285, the between-group component contributes 0.058 points, or about 93%. Inequality within the rural group increased only slightly, from 0.028 to 0.036 as measured by the Theil index for the fourteen districts. The divergence after 2019 is therefore essentially a widening gap between the urban core and its hinterland.

Table 4. Two-group decomposition of the Theil index, 2019–2024

Year	Theil T	Between cities and districts	Within groups	Between-group share, %
2019	0.223	0.192	0.031	86.2
2020	0.232	0.199	0.033	85.6
2021	0.253	0.218	0.035	86.4
2022	0.278	0.240	0.038	86.4
2023	0.292	0.252	0.041	86.1
2024	0.285	0.250	0.035	87.7

Source: authors' calculations based on SRSD (2025a).

3.5. Which services drive the gap?

Table 5 combines the location of each service component with the results of the Gini decomposition for 2024. Transport and trade together account for almost half of allocated service output (24.7% and 24.9%) and contribute 42% of the overall Gini index simply because of their size. Their own Gini indices (0.32) are lower than that of total output (0.37), so a uniform expansion of these components reduces inequality. The same applies to information and communication services, which are the most evenly distributed component (Gini 0.12; Samarkand city share 22.3%), and to repair and personal services.

Table 5. Spatial concentration of service components and decomposition of the Gini index, 2024

Service component	Share of output, %	City share, %	Gini G_k	Gini correlation R_k	Share of total Gini, %	Effect of 1% rise, %
Trade	24.9	35.7	0.322	0.990	21.3	-0.036
Transport	24.7	36.8	0.317	0.994	20.9	-0.038
Finance	14.8	52.9	0.500	0.830	16.5	+0.017
Repair and personal	7.1	25.0	0.202	0.965	3.7	-0.034
Education	5.7	84.5	0.730	0.994	11.0	+0.054
Accommodation and food	5.4	59.0	0.650	0.955	9.0	+0.036
Real estate and rental	5.0	31.6	0.266	0.982	3.5	-0.015
Information and communication	4.9	22.3	0.122	0.954	1.5	-0.034
Other services	4.0	65.7	0.614	0.921	6.1	+0.021
Health	2.2	70.4	0.646	0.894	3.4	+0.012
Architecture and engineering	1.4	94.2	0.834	0.993	3.1	+0.017
Total	100.0	43.7	0.372	1.000	100.0	0.000

Note: Shares refer to territorially allocated output (37.1 trillion soum). City share is the share of Samarkand city in the allocated output of each component. The last column is computed from Equation (7). Source: authors' calculations based on SRSD (2025b).

The disequalising components are the higher-order services. Education services, 84.5% of which are produced in Samarkand city, have the largest marginal effect: a uniform 1% increase raises the Gini index by 0.054%. Accommodation and food services (59.0% in the city, with a location quotient of 2.50 in Samarkand district), finance (52.9%), health (70.4%) and architectural and engineering services (94.2%) also widen the gap (Figure 4). Education alone accounts for 11.0% of overall inequality although it makes up only 5.7% of output. Finance is a partial exception: its Gini correlation (0.83) is the lowest of all components, because per capita financial output is also relatively high in several rural districts such as Payarik, Pastdargom and Urgut, which may reflect the regional branch networks of banks and microfinance organisations.

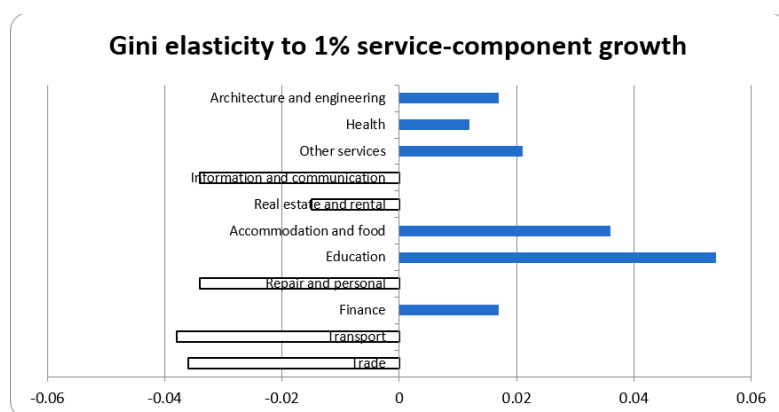


Figure 4. Effect of a uniform 1% increase in each service component on the Gini index of per capita service output, 2024. Source: authors' calculations based on SRSD (2025b).

3.6. Robustness and preliminary 2025 data

Three checks support the main findings. First, the results for 2019–2024 do not depend on the deflation method, since real and nominal estimates are almost identical (Table 3). Second, excluding the revised year 2024 gives the same sign and significance. Third, preliminary data for 2025 point in the same direction. Nominal service output grew by 38.2% in Samarkand city and by 24.9–35.2% in the fourteen rural districts, and the city's share of allocated output rose further to 45.2%. Using populations projected with each territory's 2023–2024 growth rate, the coefficient of variation for 2025 is 0.805, above its 2024 value. These 2025 figures are preliminary and should be read with caution.

4. Discussion

The results describe two distinct periods. Before 2019, rural districts were converging among themselves at 3.6–5.0% a year, faster than the 2% benchmark often reported for regions in advanced economies [17], while the gap with the capital, measured under the old attribution method, remained wide. Since 2019, rural districts have stopped converging and their dispersion has increased slightly, while the regional capital and its immediate surroundings have pulled ahead. This is consistent with the prediction of central place theory and new economic geography that, as incomes rise, demand for higher-order services grows faster than demand for basic services and is met mainly in the largest centre [3][6]. It also matches the first, rising part of the inverted-U relationship between development and spatial inequality [34][27].

The decomposition by service type gives this general argument a concrete form. The services that widen the gap are those with high demand thresholds or strong links to urban amenities: education (including universities and colleges), specialised health care, banking, engineering and the hospitality industry. The services that narrow it are those consumed close to home, such as retail trade, local transport, telecommunications and personal services. This is consistent with the finding that knowledge-intensive services cluster in urban areas [16][15], and it adds a spatial dimension to the World Bank's (2025) classification of services in Uzbekistan by skill intensity and tradability. Information and communication services stand out as the most evenly distributed component. Mobile and internet services reach every district, which suggests that digital delivery could also help other higher-order services, such as banking, consultations with doctors or distance education, to reach rural residents.

The findings also qualify the oblast-level evidence for Uzbekistan. Turaxanov [11] reports a modest narrowing of output dispersion across the country's territories after 2021. The district-level data for Samarkand show that a region can contribute to national convergence while becoming more unequal internally, because its main city grows faster than its rural periphery. Regional policies aimed only at the oblast level may therefore miss a significant part of spatial inequality.

Several policy implications follow. First, because the gap is mainly between the city and the countryside, support should target the location of higher-order services rather than general service growth. Examples include branch campuses and vocational colleges in large districts such as Urgut and Pstdargom (together 0.95 million residents), district-level diagnostic centres and telemedicine links with city hospitals, and incentives for banks to expand agent networks and digital services in districts with low financial output per capita. Second, tourism, which drives accommodation and food services, is now concentrated in Samarkand city and Samarkand district. Developing routes and accommodation linked to heritage and natural sites in other districts, for instance in Urgut and Nurabad, would spread the benefits of visitor spending. Third, the strong equalising role of transport, trade and telecommunications suggests that infrastructure that connects rural districts to the city, including public transport and digital networks, indirectly supports convergence in services.

Finally, the analysis exposes gaps in the statistical base. The 2019 reallocation is not documented in the published tables, and in 2024 some 22.5 trillion soum of regional service output, including 90% of accommodation and food services, was not allocated to territories. Without a consistent and documented territorial attribution, district-level

monitoring of the "Uzbekistan – 2030" targets is difficult. Publishing back-calculated territorial series under the new method and allocating informal-economy estimates to districts would greatly improve the evidence available to local authorities.

The study has limitations. The data measure gross service output rather than value added, so differences in intermediate consumption are not taken into account. Even after 2019 some output of firms registered in Samarkand city but serving other districts may be attributed to the city, which would overstate its share. With sixteen territories, the statistical power of the cross-sectional tests is limited, and spatial econometric models [35] cannot be estimated reliably. Finally, the decomposition by service type is available only for 2024. Future work could use a longer series of service composition by district and combine it with data on household incomes and access to services.

5. Conclusion

This paper has examined the territorial distribution of service sector development in Samarkand Region over 2010–2024 using district-level official data. After correcting for a reallocation of output in 2019 and an informal-economy revision in 2024, three conclusions emerge. First, rural districts converged in per capita service output before 2019, but since then disparities across the region's sixteen territories have widened on every indicator used, with the coefficient of variation rising from 0.64 to 0.76 and the Theil index from 0.223 to 0.285. Second, the widening is almost entirely a gap between Samarkand city, and to a lesser extent Kattakurgan city and Samarkand district, and the rest of the region: about 93% of the increase in the Theil index is due to the between-group component, while rural districts show no significant β -convergence and only a slight rise in dispersion. Third, the gap is driven by higher-order services, in particular education, accommodation and food, finance and health services, while transport, trade, telecommunications and personal services reduce inequality.

These results suggest that service-led growth in Samarkand Region is currently concentrating in its urban core. Policies that bring higher-order services closer to rural residents, spread tourism beyond the city and improve district-level statistics would help ensure that the shift towards services benefits the whole region.

REFERENCES

- [1] SRSD [Samarkand Regional Department of Statistics]., 2025c, Structure of the gross regional product of Samarkand region by type of economic activity, 2021–2025. Samarkand.
- [2] President of the Republic of Uzbekistan., 2023, Decree No. PF-158 "On the Uzbekistan – 2030 Strategy" (11 September 2023). <https://lex.uz/docs/6600413>
- [3] Christaller, W., 1966, Central places in southern Germany (C. W. Baskin, Trans.). Prentice-Hall. (Original work published 1933)
- [4] Daniels, P. W., 1985, Service industries: A geographical appraisal. Methuen.
- [5] Illeris, S., 1996, The service economy: A geographical approach. John Wiley, and Sons.
- [6] Krugman, P., 1991, Increasing returns and economic geography. *Journal of Political Economy*, 99(3), 483–499. <https://doi.org/10.1086/261763>
- [7] Fujita, M., Krugman, P., and Venables, A. J., 1999, The spatial economy: Cities, regions, and international trade. MIT Press.
- [8] World Bank., 2025, At your service? The promise of services-led growth in Uzbekistan. World Bank. <https://doi.org/10.1596/42619>
- [9] Achilova, F., Rizaev, N., Xolmurotov, F., Ibadullaev, E., Rashidova, X., Salaev, D., and Hudayberganov, D., 2026, Economic growth, service sector, and urbanization effects on environmental degradation in Uzbekistan: Evidence from ARDL analysis. *Economies*, 14(8), 303. <https://doi.org/10.3390/economies14080303>

- [10] Abraev, T. E., 2022, Economic analysis of the current situation of services in the socio-economic development of the territories of Uzbekistan. *Partners Universal International Research Journal*, 1(2), 74–79. <https://doi.org/10.5281/zenodo.6727034>
- [11] Turaxanov, O. D., 2026, Regional digital divide and economic convergence: Empirical evidence from Uzbekistan's administrative territories. *Pioneering Studies and Theories*, 2(4), 171–181. <https://doi.org/10.5281/zenodo.22963365>
- [12] Herrendorf, B., Rogerson, R., and Valentinyi, Á., 2014, Growth and structural transformation. In P. Aghion, and S. N. Durlauf (Eds.), *Handbook of economic growth* (Vol. 2, pp. 855–941). Elsevier.
- [13] Eichengreen, B., and Gupta, P., 2013, The two waves of service-sector growth. *Oxford Economic Papers*, 65(1), 96–123.
- [14] Rodrik, D., 2016, Premature deindustrialization. *Journal of Economic Growth*, 21(1), 1–33. <https://doi.org/10.1007/s10887-015-9122-3>
- [15] Kolko, J., 2010, Urbanization, agglomeration, and coagglomeration of service industries. In E. L. Glaeser (Ed.), *Agglomeration economics* (pp. 151–180). University of Chicago Press.
- [16] Muller, E., and Zenker, A., 2001, Business services as actors of knowledge transformation: The role of KIBS in regional and national innovation systems. *Research Policy*, 30(9), 1501–1516. [https://doi.org/10.1016/S0048-7333\(01\)00164-0](https://doi.org/10.1016/S0048-7333(01)00164-0)
- [17] Barro, R. J., and Sala-i-Martin, X., 1992, Convergence. *Journal of Political Economy*, 100(2), 223–251. <https://doi.org/10.1086/261816>
- [18] Sala-i-Martin, X., 1996, The classical approach to convergence analysis. *The Economic Journal*, 106(437), 1019–1036.
- [19] Quah, D. T., 1996, Twin peaks: Growth and convergence in models of distribution dynamics. *The Economic Journal*, 106(437), 1045–1055.
- [20] Islam, N., 1995, Growth empirics: A panel data approach. *The Quarterly Journal of Economics*, 110(4), 1127–1170.
- [21] Nickell, S., 1981, Biases in dynamic models with fixed effects. *Econometrica*, 49(6), 1417–1426. <https://doi.org/10.2307/1911408>
- [22] Monfort, P., 2008, Convergence of EU regions: Measures and evolution (Regional Policy Working Paper No. 01/2008). European Commission.
- [23] Shorrocks, A. F., 1980, The class of additively decomposable inequality measures. *Econometrica*, 48(3), 613–625. <https://doi.org/10.2307/1913126>
- [24] Akita, T., 2003, Decomposing regional income inequality in China and Indonesia using two-stage nested Theil decomposition method. *The Annals of Regional Science*, 37(1), 55–77. <https://doi.org/10.1007/s001680200107>
- [25] Kanbur, R., and Zhang, X., 2005, Fifty years of regional inequality in China: A journey through central planning, reform, and openness. *Review of Development Economics*, 9(1), 87–106. <https://doi.org/10.1111/j.1467-9361.2005.00265.x>
- [26] Lerman, R. I., and Yitzhaki, S., 1985, Income inequality effects by income source: A new approach and applications to the United States. *The Review of Economics and Statistics*, 67(1), 151–156. <https://doi.org/10.2307/1928447>
- [27] Lessmann, C., 2014, Spatial inequality and development: Is there an inverted-U relationship? *Journal of Development Economics*, 106, 35–51. <https://doi.org/10.1016/j.jdeveco.2013.08.011>
- [28] Nasirov, D. F., Abdurakhmanov, J., and Bekpulatov, K., 2026, Regional characteristics of innovation development in the service sector of the Republic of Uzbekistan. *International Journal of Technology and Academic Research*, 6(10), 552–558.
- [29] Astanakulov, O., and Goyipnazarov, S., 2023, Tourism as a catalyst for regional development: Uzbekistan's experience and economic prospects. *Economic Annals-XXI*, 204(7–8), 33–44. <https://doi.org/10.21003/ea.V204-05>
- [30] SRSD [Samarkand Regional Department of Statistics], 2025a, Volume of services by territories, growth rates and per capita volume of services, 2010–2024 (Appendices 2.1, 3.1 and 6.1). Samarkand.
- [31] SRSD [Samarkand Regional Department of Statistics], 2025b, Production of services by type of economic activity: Statistical bulletin, 2024. Samarkand.
- [32] SRSD [Samarkand Regional Department of Statistics], 2026, Volume of services by territories, 2010–2025 and January–March 2026 (Appendix 2.1). Samarkand.

-
- [33] NSC [National Statistics Committee of the Republic of Uzbekistan]., 2023, Distribution of the resident population of Samarkand region [Press release, 19 May 2023]. <https://stat.uz>
- [34] Williamson, J. G., 1965, Regional inequality and the process of national development: A description of the patterns. *Economic Development and Cultural Change*, 13(4, Part 2), 1–84. <https://doi.org/10.1086/450136>
- [35] Rey, S. J., and Montouri, B. D., 1999, US regional income convergence: A spatial econometric perspective. *Regional Studies*, 33(2), 143–156.
- [36] Baumol, W. J., 1967, Macroeconomics of unbalanced growth: The anatomy of urban crisis. *The American Economic Review*, 57(3), 415–426.
- [37] Ghani, E., and O'Connell, S. D., 2014, Can service be a growth escalator in low-income countries? (Policy Research Working Paper No. 6971). World Bank.
- [38] President of the Republic of Uzbekistan., 2026, Decree No. PF-21 on the consistent continuation of reforms within the priority directions of the country's development until 2030 (16 February 2026). <https://lex.uz>