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EMPLOYMENT INTENSITY OF REGIONAL ECONOMIC GROWTH IN UZBEKISTAN: EVIDENCE FROM EMPLOYMENT ELASTICITIES AND OKUN'S LAW, 2010–2025

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Abstract. This article examines the extent to which economic growth across the regions of Uzbekistan translates into employment growth and lower unemployment. Using official annual data from the National Statistics Committee for 14 territorial units—the Republic of Karakalpakstan, 12 regions and Tashkent city—over 2010–2025, the study estimates arc employment elasticities of real gross regional product (GRP) and panel versions of Okun's law, treating the 2018 revision of labour statistics as a structural break. The national employment elasticity was 0.28 in 2018–2025, or 0.21 when the preliminary 2025 data are excluded, compared with 0.31 in 2010–2017. Regional elasticities ranged from 0.09 in Tashkent region and 0.10 in Bukhara to 0.47 in Jizzakh and Tashkent city. Pooled panel estimates for 2019–2025 yield an employment elasticity of 0.56 and an Okun coefficient of -0.16 to -0.21 , indicating that one additional percentage point of GRP growth is associated with an approximately 0.2 percentage-point decline in regional unemployment, while about 2.4% annual growth is required to keep unemployment stable. After controlling for common year effects, however, neither relationship remains statistically significant, suggesting that cross-regional growth differences do not correspond to comparable differences in job creation. Employment dynamics appear to be influenced primarily by nationwide factors, while capital-intensive regions such as Tashkent and Navoi generate relatively fewer jobs per unit of growth. The study proposes a four-group regional typology and outlines implications for employment-oriented regional development.

Keywords: employment elasticity; Okun's law; employment intensity of growth; regional labour markets; unemployment; gross regional product; panel data; Uzbekistan.

Аннотация. В статье исследуется, в какой степени экономический рост в регионах Узбекистана сопровождается ростом занятости и снижением безработицы. На основе официальных годовых данных Национального комитета по статистике по 14 территориальным единицам — Республике Каракалпакстан, 12 областям и городу Ташкенту — за 2010–2025 гг. рассчитаны дуговые коэффициенты эластичности занятости по реальному валовому региональному продукту (ВРП) и оценены панельные модели закона Оукена с учётом пересмотра статистики труда в 2018 г. как структурного разрыва. Национальная эластичность занятости в 2018–2025 гг. составила 0,28, а без учёта предварительных данных за 2025 г. — 0,21 по сравнению с 0,31 в 2010–2017 гг. Региональные значения варьировались от 0,09 в Ташкентской области и 0,10 в Бухарской области до 0,47 в Джизакской области и городе Ташкенте. Объединённые панельные оценки за 2019–2025 гг. показали эластичность занятости на уровне 0,56 и коэффициент Оукена от $-0,16$ до $-0,21$. Это означает, что дополнительный процентный пункт роста ВРП ассоциируется со снижением регионального уровня безработицы примерно на 0,2 процентного пункта, тогда как для поддержания безработицы на стабильном уровне требуется около 2,4% годового роста. После учёта общих временных эффектов обе зависимости утрачивают статистическую значимость, что свидетельствует об отсутствии устойчивого соответствия между межрегиональными различиями в темпах роста и создании рабочих мест. Динамика занятости в большей степени связана с общенациональными факторами, тогда как в капиталоемких регионах, таких как Ташкентская и Навоийская области, на единицу экономического роста приходится сравнительно меньше рабочих мест. В исследовании предложена четырёхгрупповая типология регионов и сформулированы выводы для развития региональной политики занятости.

Ключевые слова: эластичность занятости; закон Оукена; трудоёмкость экономического роста; региональные рынки труда; безработица; валовой региональный продукт; панельные данные; Узбекистан.

INTRODUCTION

Since 2017 Uzbekistan has combined rapid output growth with large-scale market reforms: currency liberalisation, tax and customs reform, the opening of the economy to foreign investment and the privatisation of state assets. Real GDP grew at 6–8% a year in most of this period, with the exception of the pandemic year 2020, and the national unemployment rate, after a sharp statistical rise in 2018–2020, fell to 4.8% in 2025 [11–13]. The updated Uzbekistan-2030 Strategy, approved under Presidential Decree No. PF-21, sets targets

to reduce unemployment to 4% by 2030, expand income-generating employment and create 1.8 million high-income jobs in industry [1]. Whether growth is sufficiently job-rich, and whether this is true of all regions, is therefore a central question for employment policy.

The literature measures the link between growth and jobs in two complementary ways. The employment elasticity of growth shows by how many percent employment rises when output grows by one percent [5; 9]; Okun's law relates changes in the unemployment rate to output growth [2; 15]. At national level, the ILO estimated the employment elasticity of the Uzbek economy at about 0.2 for 2010-2019, meaning that 5% growth generated only about 1% more jobs [4]. Regional estimates, however, are practically absent, although the regions of Uzbekistan differ sharply in economic structure - from the mining and metallurgical economy of Navoi region to the agrarian economies of Surkhandarya and Kashkadarya and the service-based metropolis of Tashkent. International evidence shows that Okun coefficients and employment elasticities vary widely across regions within a country, depending on sectoral composition, labour mobility and labour-market institutions [3; 8; 16].

Existing domestic studies of regional labour resources, including research on Navoi region, concentrate on the level and efficiency of labour-resource use, integral indicators, informal employment and poverty. The dynamic question - how much employment and unemployment respond to regional growth, and how this response differs between regions and periods - has not been examined systematically. This article fills that gap. Its aims are: (1) to estimate employment elasticities of real GRP for all 14 regions in two sub-periods separated by the 2018 statistical break; (2) to estimate panel versions of Okun's law for the regional labour markets; (3) to test whether cross-regional differences in growth translate into differences in employment outcomes; and (4) to derive a typology of regions and policy implications.

LITERATURE REVIEW

Okun [15] observed that in the post-war United States each percentage point of output growth above its trend reduced unemployment by about one third of a percentage point. Later research confirmed that the relationship is stable over time in most advanced economies but that its coefficient differs considerably across countries: Ball, Leigh and Loungani [2] report Okun coefficients from about -0.15 in Japan to -0.85 in Spain and attribute the differences to labour-market institutions and the composition of employment. In developing and transition economies the relationship is typically weaker because a large share of the labour force is self-employed or informal and because adjustment occurs through working hours, wages and migration rather than through open unemployment [4; 5].

The employment-intensity literature, initiated in its modern form by Kapsos [9], estimates the elasticity of employment with respect to GDP. For the world as a whole Kapsos found an elasticity of about 0.3 in 1991-2003, with higher values in services-oriented economies and lower values in economies driven by capital-intensive sectors. Crivelli, Furceri and Toujas-Bernat  [5], using data for 167 countries, show that elasticities are higher where the services sector is larger and where labour regulation is less restrictive, and that they have increased over time in many emerging economies. For Uzbekistan, Campbell and Ronnas [4] conclude that growth before 2020 was relatively capital-intensive, with comparatively low employment intensity in parts of manufacturing and mining, and that employment was created mainly in low-productivity services, construction and agriculture.

At the regional level, Blanchard and Katz [3] and Elhorst [6] show that regional labour markets adjust to shocks through migration, participation and wages, so that regional unemployment responds less to regional output than national unemployment does to national output. Kangasharju, Tavera and Nijkamp [8] find strongly heterogeneous Okun coefficients across Finnish regions, and Palombi, Perman and Tav ra [16] show that regional differences in Great Britain are also associated with commuting, labour mobility and interregional linkages. The general lesson is that national averages conceal large regional differences; this is precisely what has not yet been documented for Uzbekistan.

RESEARCH METHODOLOGY

The study uses official annual series of the National Statistics Committee of the Republic of Uzbekistan, published on its open-data portal (siat.stat.uz): the number of employed persons [12], the number of unemployed persons [13], the growth rates of gross regional product at constant prices [11] and GRP at current prices [14] for the 14 territorial units in 2010-2025. The regional employment and unemployment series add up exactly to the national totals; regional GRP excludes net taxes on products and therefore sums to about 86% of GDP. Data for 2025 are preliminary.

The unemployment rate of region i in year t is computed as $uit = U_{it} / (E_{it} + U_{it}) \times 100$, where E is employment and U the number of unemployed. The series contain an important discontinuity: between 2017

and 2018 national unemployment rose from 837 to 1,369 thousand persons while employment fell by 247 thousand. According to the ILO, this change “would seem to have largely been a statistical artifact, resulting from a redefinition of unemployment” [4]. The sample is therefore divided into two sub-periods, 2010-2017 and 2018-2025, and the transition year 2017/2018 is excluded from all growth-rate calculations.

The arc employment elasticity for region i over the period from year a to year b is calculated as

$$\varepsilon_i = \ln(E_{ib} / E_{ia}) / \sum \ln(1 + g_{it}/100), \quad (1)$$

where g_{it} is the annual real GRP growth rate (%) and the sum runs over the years $a+1, \dots, b$. The denominator is therefore the cumulative real growth of GRP, so that (1) is free of price effects. To estimate average relationships, two panel equations are estimated for the 14 regions:

$$\Delta \ln E_{it} = \alpha + \beta \cdot \ln(1 + g_{it}/100) + \mu_i + \varepsilon_{it}, \quad (2)$$

$$\Delta u_{it} = \gamma + \theta \cdot g_{it} + \mu_i + v_{it}, \quad (3)$$

where β is the employment elasticity, θ the Okun coefficient and μ_i optional regional fixed effects. The ratio $-\gamma/\theta$ in the pooled version of (3) gives the growth rate that keeps unemployment unchanged. Equations (2)-(3) are estimated by OLS for 2011-2017 and 2019-2025 (98 observations each), with standard errors clustered by region. In a robustness specification, year fixed effects are added; in that case the coefficients are identified only from differences between regions within the same year, which directly tests whether regions that grow faster also create more jobs.

ANALYSIS AND RESULTS

Regional unemployment: level, dynamics and convergence

Table 1 and Figure 1 show the unemployment rate by region. Before 2018 unemployment was relatively stable at 5-6% nationally, with persistent regional differences: 3.3% in Tashkent city against 7.4% in Karakalpakstan in 2010. After the statistical break the rate jumped to 9.3% in 2018 and peaked at 10.5% in the pandemic year 2020, when the range across regions widened to 8.0-11.1%. From 2021 unemployment fell steadily in all regions, to 4.8% nationally in 2025.

Table 1.

Unemployment rate by region, %¹

Region	2010	2017	2018	2020	2022	2024	2025
Republic of Karakalpakstan	7.4	6.0	9.5	10.5	9.1	5.8	5.0
Andijan	5.8	6.0	9.6	10.9	9.1	5.4	4.8
Bukhara	5.2	5.5	8.7	10.6	8.9	5.4	4.7
Jizzakh	5.7	5.0	9.8	11.0	9.3	5.8	4.9
Kashkadarya	5.8	6.1	9.7	11.1	9.3	5.9	4.9
Navoi	4.9	5.2	8.6	9.4	8.0	4.9	4.2
Namangan	5.9	5.8	9.6	10.6	8.9	5.6	5.0
Samarkand	6.0	6.5	9.7	11.0	9.3	5.4	4.7
Surkhandarya	5.8	6.7	9.7	11.1	9.3	5.9	4.9
Syrdarya	4.5	5.1	9.3	11.0	9.3	5.9	5.0
Tashkent region	4.1	5.2	9.0	10.5	8.8	5.7	4.8
Fergana	5.7	6.4	9.7	10.9	9.2	6.0	4.9
Khorezm	5.5	5.7	9.4	11.0	9.0	5.4	4.7
Tashkent city	3.3	4.5	7.9	8.0	6.5	4.5	4.0
Republic of Uzbekistan	5.4	5.8	9.3	10.5	8.9	5.5	4.8
Standard deviation, p.p.	0.94	0.62	0.52	0.81	0.75	0.42	0.30

¹ Source: computed by the author from [12; 13].

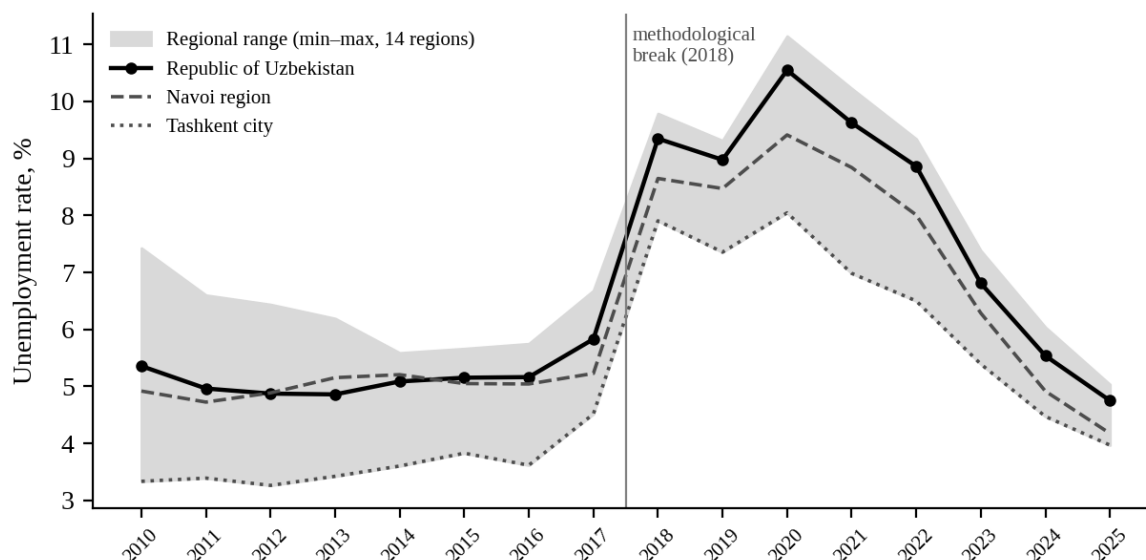


Figure 1. Unemployment rate in Uzbekistan and its regional range, 2010-2025, %²

An important result is the strong convergence of regional unemployment rates during the recovery: the standard deviation across regions fell from 0.81 percentage points in 2020 to 0.30 in 2025, the lowest in the whole period, and the 2025 range was only 4.0-5.0%. Navoi region consistently has the second-lowest unemployment after Tashkent city (4.2% in 2025). The decline in unemployment was thus a nationwide process, which already suggests that common national factors - the post-pandemic recovery, the return of labour migrants' earnings, state employment programmes and the formalisation of self-employment - may have contributed more substantially than region-specific growth.

Employment elasticities by region

Table 2 reports average annual growth of real GRP and employment and the arc elasticities (1) for both sub-periods. At national level, the elasticity decreased from 0.31 in 2010-2017 to 0.28 in 2018-2025. If the preliminary 2025 data - which show an unusually large 4.7% increase in employment, concentrated in the category "other services" [10] - are excluded, the elasticity for 2018-2024 is only 0.21, consistent with the ILO estimate of about 0.2 [4]. Economic growth in Uzbekistan therefore remains comparatively modest in employment intensity relative to selected international benchmarks: Kapsos [9] reports a global average of about 0.3 and values of 0.5-0.7 for service-driven middle-income economies.

Table 2.

Real GRP growth, employment growth and arc employment elasticities by region³

Region	GRP growth, % p.a. 2010-17	Empl. growth, % p.a. 2010-17	ϵ 2010-17	GRP growth, % p.a. 2018-25	Empl. growth, % p.a. 2018-25	ϵ 2018-25	ϵ 2018-24
Republic of Uzbekistan	7.19	2.18	0.310	6.18	1.70	0.281	0.208
Republic of Karakalpakstan	10.68	1.56	0.152	4.49	1.92	0.434	0.311
Andijan	6.63	2.47	0.380	5.98	1.55	0.264	0.162
Bukhara	8.03	1.05	0.136	5.51	0.52	0.097	-0.054
Jizzakh	8.45	2.96	0.360	6.24	2.87	0.467	0.403
Kashkadarya	6.29	3.28	0.529	5.21	1.25	0.245	0.204
Navoi	4.46	0.50	0.114	6.85	2.14	0.319	0.167
Namangan	7.90	3.47	0.448	7.79	1.63	0.215	0.219
Samarkand	7.84	3.10	0.405	6.22	1.39	0.229	0.112
Surkhandarya	7.95	3.41	0.438	5.56	1.04	0.190	0.129
Syrdarya	5.85	1.42	0.248	6.29	0.78	0.127	-0.026
Tashkent region	5.43	1.58	0.297	6.92	0.60	0.089	0.048
Fergana	6.36	1.87	0.300	6.35	1.46	0.236	0.212

² Source: computed by the author from [12; 13].

³ Source: computed by the author from [11; 12] using formula (1).

Region	GRP growth, % p.a. 2010-17	Empl. growth, % p.a. 2010-17	ϵ 2010-17	GRP growth, % p.a. 2018-25	Empl. growth, % p.a. 2018-25	ϵ 2018-25	ϵ 2018-24
Khorezm	7.88	2.66	0.346	6.26	2.40	0.390	0.260
Tashkent city	9.98	0.22	0.023	9.76	4.42	0.465	0.423

The regional picture is highly heterogeneous. In 2018-2025 the highest elasticities were observed in Jizzakh (0.47), Tashkent city (0.47), Karakalpakstan (0.43) and Khorezm (0.39); the lowest in Tashkent region (0.09), Bukhara (0.10) and Syrdarya (0.13). The ranking also changed markedly between the two periods. In 2010-2017 the most employment-intensive regions were the densely populated agrarian regions of Kashkadarya (0.53), Namangan (0.45) and Surkhandarya (0.44), where employment expanded largely through agriculture and household self-employment; in 2018-2025 their elasticities roughly halved. Tashkent city moved in the opposite direction, from a growth pattern with very low employment elasticity (0.02) to one of the most employment-intensive (0.47), reflecting the expansion of market services, information and communication, finance and construction in the capital. Navoi region, whose economy is dominated by mining and metallurgy, had the lowest elasticity of all in 2010-2017 (0.11); in 2018-2025 its value rose to 0.32, but excluding the preliminary 2025 data, it is only 0.17 - below the national average despite the second-highest growth rate among the regions (6.85% a year).

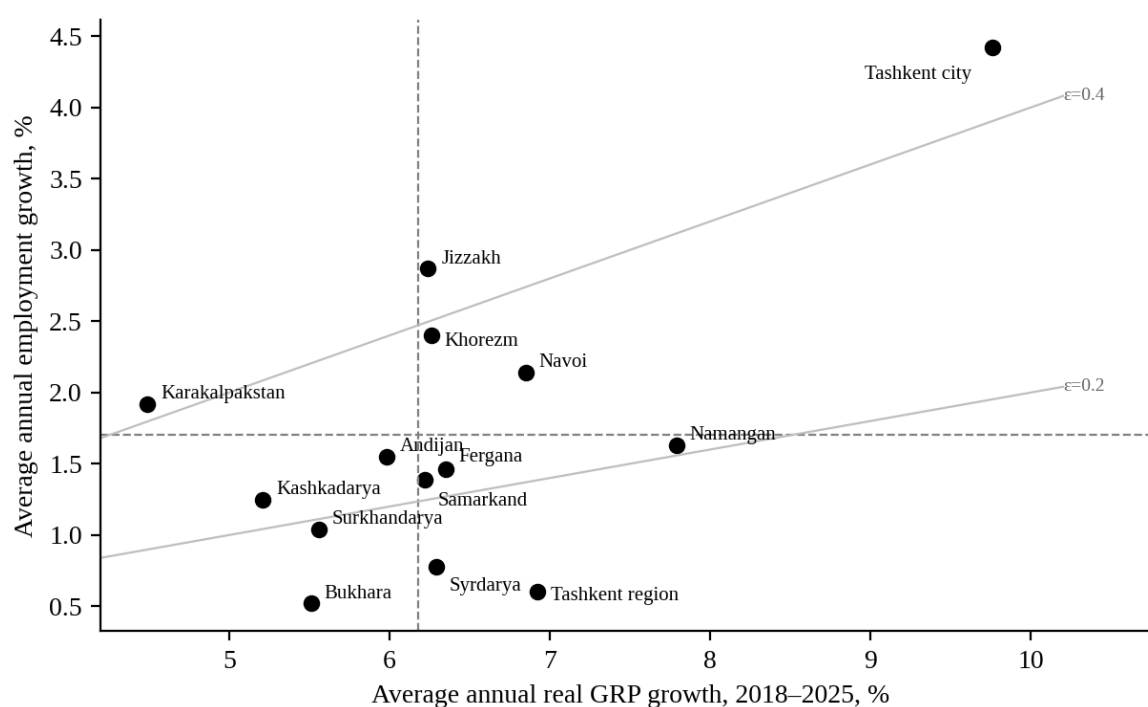


Figure 2. Real GRP growth and employment growth by region, 2018-2025 (average annual rates, %)⁴

Note: dashed lines show national averages; grey rays show elasticities of 0.2 and 0.4.

Panel estimates: employment elasticity and Okun's law

Table 3 presents the panel estimates of equations (2) and (3). In 2011-2017 the link between regional growth and employment was weak: the pooled elasticity (0.09) is not significant, and the Okun coefficient is small (−0.06 to −0.08). This pattern may reflect the statistical, institutional and measurement characteristics of the labour market during that period. In 2019-2025 both relationships became much stronger and highly significant: the elasticity is 0.56-0.57, and the Okun coefficient is −0.16 in the pooled and −0.21 in the fixed-effects model. One additional percentage point of GRP growth is thus associated with a reduction in the regional unemployment rate by about 0.2 percentage points. The pooled equation implies that GRP must grow by about 2.4% a year simply to keep unemployment constant, reflecting labour-force growth and productivity gains.

⁴ Source: computed by the author from [11; 12].

Excluding the preliminary 2025 data changes the estimates only slightly (elasticity 0.43-0.45, Okun coefficient -0.17 to -0.22).

Table 3.

Panel estimates of employment elasticity and Okun's law for 14 regions⁵

Specification	Employment elasticity β , eq. (2)	Okun coefficient θ , eq. (3)	N
2011-2017, pooled OLS	0.089 (0.073)	-0.061*** (0.015)	98
2011-2017, regional FE	0.113*** (0.018)	-0.078*** (0.017)	98
2019-2025, pooled OLS	0.561*** (0.096)	-0.163*** (0.040)	98
2019-2025, regional FE	0.571*** (0.161)	-0.210*** (0.037)	98
2019-2024, pooled OLS	0.454*** (0.087)	-0.174*** (0.042)	84
2019-2025, regional + year FE	-0.004 (0.179)	0.003 (0.030)	98

Note: standard errors clustered by region in parentheses; *** $p < 0.01$.

A notable result is in the last row. When year fixed effects are added, both coefficients become practically zero and insignificant. This suggests that the strong relationships observed in the pooled data come from the common movement of all regions over time - the 2020 recession and the subsequent recovery - and not from differences between regions. A two-percentage-point higher regional growth rate in a given year is not, on average, associated with higher employment growth or a faster decline in unemployment. This finding is consistent with the rapid convergence of unemployment rates documented in Section 4.1 and with the international evidence that regional labour markets adjust through commuting, migration and participation [3; 6]. For Uzbekistan it has an additional structural explanation: the fastest regional growth has been concentrated in capital-intensive sectors - mining, metallurgy, chemicals and energy in Navoi, Tashkent and Bukhara regions - whose employment requirements are small relative to their value added. Navoi region illustrates this: its nominal GRP rose from 5.8% of the total of regions in 2017 to 10.5% in 2025, while its share of employment remained at about 3%.

Typology of regions

Combining growth rates and employment growth in 2018-2025 relative to the national averages (Figure 2) yields four groups of regions (Table 4). The typology is intended not as a ranking, but as a guide to differentiated employment policy.

Table 4.

Typology of regions by growth and employment intensity, 2018-2025⁶

Group	Regions	Main policy priority
I. Above-average growth and employment growth	Tashkent city, Jizzakh, Khorezm, Navoi*	Sustain services and SME expansion; raise job quality and formalisation
II. Above-average growth with below-average employment growth	Tashkent region, Namangan, Syrdarya, Fergana, Samarkand	Link large investment projects to local suppliers and SMEs; employment conditions in investment agreements
III. Below-average growth with above-average employment growth	Republic of Karakalpakstan	Raise productivity of new jobs; infrastructure and agro-processing
IV. Below-average growth and employment growth.	Andijan, Bukhara, Kashkadarya, Surkhandarya	Diversification, labour-intensive manufacturing and services, support for internal mobility

Note: * Navoi belongs to group II if the preliminary 2025 data are excluded.

Three conclusions follow for regional employment policy. First, the employment content of growth in Uzbekistan remains low - about one fifth to one quarter of a percentage point of employment growth per percentage point of output growth - and has not increased since the reforms began, except in Tashkent city. With a young and growing labour force, growth alone may not be sufficient to absorb all new entrants to the labour market; employment intensity could therefore be considered as an additional policy indicator. Second, because regional growth differentials do not necessarily translate into corresponding differences in employment outcomes, GRP growth may be complemented by additional employment-related indicators when assessing regional development. Regional development programmes could therefore incorporate employment-intensity measures - for example, the number of jobs created per billion soums of investment or per percentage point

⁵ Source: estimated by the author from [11-13].

⁶ Source: compiled by the author.

of growth - alongside GRP targets. Third, in capital-intensive regions (groups II and, partly, I), the employment effect of large projects depends on local linkages: supplier development programmes, industrial parks for small and medium-sized firms around large enterprises, and vocational training tied to the skill needs of major investors or large enterprises. In regions with relatively lower growth and employment dynamics (group IV), greater attention could be given to economic diversification through labour-intensive manufacturing, agro-processing and tradable services, together with measures that facilitate internal labour mobility towards areas with stronger employment opportunities.

The study has limitations. The 2018 break and the preliminary character of 2025 data require caution, and the employment series include informal and self-employed workers whose measurement has changed over time. Regional output is measured at the place of production, whereas workers may commute across regional borders, particularly between Tashkent city and Tashkent region. With 14 regions and seven years per sub-period, estimates for individual regions are necessarily arc-based rather than econometric. Future research could extend the analysis to sectoral employment elasticities by region, to district-level data and to the role of external labour migration as an adjustment mechanism.

CONCLUSION AND SUGGESTIONS

The article provides the first systematic estimates of employment elasticities and Okun's law for the regions of Uzbekistan. It shows that (1) the national employment elasticity of growth fell from 0.31 in 2010-2017 to 0.21-0.28 in 2018-2025; (2) regional elasticities in 2018-2025 range from 0.09 to 0.47, with Tashkent city moving from very low employment elasticity to above-average growth and employment growth, while the agrarian regions show lower employment intensity than in the earlier period; (3) in 2019-2025 one percentage point of additional growth reduced regional unemployment by about 0.2 percentage points, and about 2.4% growth was needed to stabilise unemployment; (4) regional unemployment rates converged strongly after 2020, and cross-regional growth differences did not produce corresponding differences in employment outcomes. These findings suggest that employment intensity could be considered alongside other objectives of regional development policy, with instruments differentiated according to the proposed typology.

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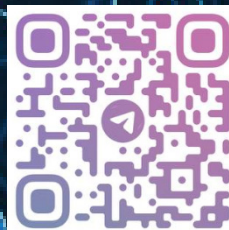
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