

Integral Assessment And Typological Grouping Of Regional Labor Markets In Uzbekistan

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Abstract: The article proposes a methodological approach to the integral assessment and typological grouping of regional labor markets in Uzbekistan. The approach combines six blocks: labor mobility, digital readiness, wage and income attractiveness, sectoral adaptability, skills matching and employment formalization. The indicators are normalized and aggregated using weights that reflect their role in regional adaptation. The Beveridge gap is introduced as an additional diagnostic indicator of the coexistence of unemployment and vacancies. Based on employment, unemployment, wages, gross regional product, informal employment and services development, four functional types of regions are identified: attraction centers, mass labor absorption regions, territories with high labor supply pressure and transition-balanced regions. Differentiated policy instruments are formulated for each type. The methodology supports targeted allocation of employment resources and improves the evidence base of regional labor market policy.

Keywords: integral index, regional labor market, typological grouping, Beveridge gap, labor mobility, informal employment, regional policy, Uzbekistan.

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Introduction

Regional labor markets in Uzbekistan differ substantially in terms of demographic pressure, sectoral structure, wage levels, the prevalence of informal employment, access to digital infrastructure and the intensity of labor force flows [1]. The unemployment rate alone does not capture these differences. Two regions with the same unemployment rate may exhibit opposite characteristics: in one, vacancies are filled quickly and workers move actively into productive industries, while in the other, skill gaps, informal employment and forced migration persist. A multidimensional diagnostic framework is therefore required that allows the state, potential and constraints of a regional labor market to be assessed simultaneously [2].

The aim of the study is to develop an integral system for assessing labor mobility and for the typological grouping of territories that is suitable for designing differentiated public policy measures. The methodological approach combines the normalization of indicators measured in different units, weighted aggregation, the diagnosis of structural mismatch and the substantive interpretation of the groups. Unlike a ranking, which merely orders regions, a typology reveals similar functioning mechanisms and thereby determines the set of appropriate regulatory instruments.

Limitations of Traditional Diagnostics

The traditional assessment of a regional labor market is built around the number of employed persons, the number of unemployed persons and the number of jobs created [3]. These indicators are necessary, but they primarily capture the final outcome. They do not show the extent to which workers are able to obtain information about vacancies, undergo retraining, change industry, relocate or move from informal to formal employment. Moreover, low

unemployment may coexist with low job quality, and high wages may coexist with limited housing affordability and high relocation costs [4].

The diagnostic system must meet three requirements. First, it must be comprehensive, that is, it must cover economic, institutional, skills-related and digital factors. Second, the indicators must be comparable across regions, which requires normalization [5]. Third, the final index must remain substantively interpretable: an increase in the indicator should mean an expansion of the territory’s capacity to match labor supply with the demand for jobs.

Structure of the Integral Index

The proposed index comprises six blocks. The labor mobility block reflects the intensity of territorial, sectoral, occupational and status transitions. Digital readiness characterizes access to electronic employment services, digital skills and online vacancies. Wage and income attractiveness shows the economic incentives for mobility. Sectoral adaptability reflects the economy’s capacity to generate employment in growing activities. Skills matching assesses the alignment of workers’ qualifications with vacancy requirements [6]. Formalization characterizes the transition to formal employment relations.

Table 1. Weighting structure of the integral labor mobility index

Block	Weight, %	Economic content
Labor mobility	25	Actual capacity of the labor force to make effective transitions
Digital readiness	20	Accessibility of information, platforms and digital competencies
Wages and income	20	Economic attractiveness of the territory and its jobs
Sectoral adaptability	15	Capacity of the economic structure to absorb released labor
Skills matching	10	Alignment of qualifications with employers’ requirements
Employment formalization	10	Prevalence of formal employment relations

Source: developed by the author.

The weight of labor mobility is set at 25%, since it is the direct outcome of the interaction of the other factors. Digital readiness and income attractiveness are assigned 20% each: the former reduces information and transaction costs, while the latter creates the basic economic incentive. Sectoral adaptability is weighted at 15%, and skills matching and formalization at 10% each. The weighting system may be refined using expert assessment or principal component analysis; however, the proposed structure ensures transparency and applicability for public monitoring [7].

Normalization and Aggregation of Indicators

Since the initial indicators are measured in percentages, monetary units, coefficients and absolute values, min–max normalization is applied. For stimulant indicators, the formula $Z=(X-X_{min})/(X_{max}-X_{min})$ is used, where a higher value corresponds to a more favorable state. For destimulant indicators, including unemployment, informal employment and job search duration,

inverse normalization $Z=(X_{max}-X)/(X_{max}-X_{min})$ is used. As a result, all variables take values from 0 to 1.

Sub-indices are calculated as the mean of the normalized indicators of the corresponding block, after which the final index is formed as a weighted sum: $I=0.25M+0.20D+0.20W+0.15S+0.10K+0.10F$. Here, M is mobility, D is digital readiness, W is

income attractiveness, S is sectoral adaptability, K is skills matching and F is formalization. A value close to one indicates a high potential for adaptive mobility, whereas a low value points to a combination of constraints.

To assess skills mismatch, the index $M=0.5\sum|u_k-v_k|$ can be applied, where u_k is the share of unemployed persons or job seekers with qualification k, and v_k is the share of vacancies requiring the corresponding qualification [8]. A value of zero means that the structures fully coincide, while an increase in the index reflects a growing imbalance. The advantage of this indicator is that it can be calculated by occupation as well as by level of education and digital competencies [9].

The Beveridge Gap as an Indicator of Structural Mismatch

An additional element of the diagnostics is the Beveridge gap. The Beveridge curve describes the inverse relationship between unemployment and the vacancy rate: under normal cyclical dynamics, an increase in vacancies is accompanied by a decrease in unemployment [10]. If vacancies increase but unemployment remains high, structural mismatch is observed [11]. For each region, the expected unemployment rate at the actual vacancy rate is estimated, and then $BG=U-\hat{U}$ is calculated. A positive gap shows that actual unemployment exceeds the level consistent with the existing labor demand.

The economic interpretation of a positive gap relates to insufficient territorial and occupational mobility, inefficient information exchange, excessive employer requirements or low vacancy quality. A negative value may indicate a labor shortage or incomplete registration of vacancies. The indicator should therefore be analyzed together with wages, formalization and vacancy filling time. The inclusion of the Beveridge gap distinguishes the proposed methodology from a static ranking and strengthens its diagnostic orientation.

Regional Differentiation in Uzbekistan

Data for 2025 confirm the considerable scale of the differences [12]. In the city of Tashkent, the employment rate was 86.9%, unemployment 4.0%, the average wage 10,753.8 thousand soums, and the share of informal employment 10.2%. In Navoi region, with employment at 75.9% and unemployment at 4.2%, gross regional product per capita reached 152,238.2 thousand soums, reflecting the high productivity of capital-intensive industries. In Surkhandarya region, employment was 64.8%, informal employment 37.2%, and GRP per capita 22,223.4 thousand soums. Such differences call for fundamentally different policy solutions.

Table 2. Selected indicators of regional labor markets in Uzbekistan, 2025

Region	Employment, %	Unemployment, %	Wage, thousand soums	Informal employment, %
Tashkent city	86.9	4.0	10,753.8	10.2

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Region	Employment, %	Unemployment, %	Wage, thousand soums	Informal employment, %
Navoi region	75.9	4.2	7,871.6	10.7
Tashkent region	72.9	4.8	5,967.7	20.0
Andijan region	73.0	4.8	5,238.6	26.8
Kashkadarya region	65.9	4.9	4,476.7	31.4
Surkhandarya region	64.8	4.9	4,481.8	37.2
Republic of Karakalpakstan	67.3	5.0	5,003.1	24.2

Source: author's calculations based on data from the National Statistics Committee of the Republic of Uzbekistan.

Statistical differences should not be interpreted unambiguously. High wages increase a region's attractiveness, but where housing supply is limited, they may intensify commuting migration. A high share of services creates broad employment opportunities, yet some of these jobs may remain informal. Low unemployment may be associated with external migration rather than with effective local demand [13]. This is precisely why the integral assessment combines outcome and institutional parameters.

Typological Grouping of Regions

Based on the set of indicators, four functional types are identified. The first type comprises attraction centers with high wages: the city of Tashkent and the Navoi and Tashkent regions. They are characterized by high economic activity, productivity and concentration of vacancies. Their main constraints relate to housing, transport accessibility, the cost of living and the need for rapid integration of incoming workers.

The second type comprises regions of mass labor absorption: the Andijan, Namangan, Samarkand and Fergana regions. A large population, a developed network of small businesses and diversified employment provide a substantial number of jobs, but at the same time maintain pressure on the labor market. The priorities are raising productivity, supporting inter-sectoral transitions and aligning vocational education with the needs of enterprises [14].

The third type comprises territories with high labor supply pressure and elevated informality: the Kashkadarya and Surkhandarya regions. Here, demographic growth and the limited capacity of the formal sector intensify forced mobility [15]. What is needed is the accelerated development of labor-intensive manufacturing and services, targeted training, organized interregional mobility, the legalization of employment relations and a reduction in the costs of job placement.

The fourth type comprises transition-balanced regions: the Republic of Karakalpakstan and the Bukhara, Jizzakh, Syrdarya and Khorezm regions. Their indicators occupy an intermediate position, but their internal constraints differ. For some, sectoral diversification is important; for others, transport connectivity or employment formalization [16]. Therefore, additional clustering by the dominant constraint is permitted within this type.

Table 3. Differentiated policy directions by type of region

Type	Regions	Priority measures
I. Attraction centers	Tashkent city, Navoi, Tashkent	Housing and transport support, adaptation, recognition of qualifications
II. Mass absorption	Andijan, Namangan, Samarkand, Fergana	Productivity growth, sectoral transitions, dual training
III. High supply pressure	Kashkadarya, Surkhandarya	Targeted training, organized mobility, formalization, new jobs
IV. Transition-balanced	Karakalpakstan, Bukhara, Jizzakh, Syrdarya, Khorezm	Diversification, local employment programs, development of digital infrastructure

Source: developed by the author.

Practical Application of the Methodology

It is advisable to calculate the integral index annually at the regional level and quarterly for a limited set of operational indicators. The results should be used when allocating funds for

vocational training, employer subsidies, and transport and housing support. It is important that a high level of funding be granted not simply to a region with a low index, but to a program that directly addresses the identified constraint. For example, where the Beveridge gap is high and skills matching is low, training should be prioritized; where suitable workers are available but mobility is low, relocation and rental compensation should take priority [17].

Improving reliability requires the integration of administrative data from employment services, tax authorities, the electronic employment contract system, educational institutions and digital vacancy platforms. The methodology should not depend solely on registered unemployment, since part of the population searches for work outside public channels. Sample surveys of households and employers are needed, as well as regular quality checks of online vacancies.

The index performs not only an analytical but also a managerial function. It makes it possible to set target values for individual blocks, assess dynamics and conduct a comparative analysis of the effectiveness of regional programs. At the same time, the final score should not replace substantive expert assessment. A public indicator dashboard should display both the aggregate index and its sub-components, so that regional authorities can see the source of the lag and do not seek to improve one indicator at the expense of another.

Robustness Testing and Limitations of the Integral Assessment

The reliability of the integral index depends on the choice of indicators and weights. Sensitivity analysis must therefore be conducted before the index is used in budgetary decisions [18]. The final typology is recalculated under alternative weights, with individual indicators excluded and with a different normalization method. If a region remains in the same type under most specifications, the classification is considered robust. If its position changes sharply, managerial decisions should be based on sub-indicators rather than on a single score.

Time lags must be taken into account. Investment or educational reform may initially increase registered unemployment, as more citizens begin an official job search, while the

positive employment effect appears later. Comparisons should therefore cover dynamics over several years and distinguish short-term fluctuations from the structural trend. It is advisable to calculate both the level of the index and its rate of change.

The quality of administrative data is also uneven. Vacancy registration depends on employer activity, and the share of informal employment is estimated using sampling methods. Online vacancies may be duplicated or lack precise wage information. To improve reliability, deduplication should be carried out, administrative sources should be cross-checked against labor force surveys, and data should be regularly verified through employer surveys [19].

The integral assessment should not be used to penalize regions facing objectively difficult conditions. Its purpose is to identify constraints and select appropriate instruments. The performance of local authorities should be assessed not only by their absolute position in the ranking, but also by their progress relative to the baseline, the quality of their data and the effectiveness of specific programs. This approach reduces the incentives for purely statistical improvement of indicators without any real change in employment.

Conclusion

The proposed methodology combines the key parameters of regional labor market adaptation: actual mobility, digital readiness, economic incentives, sectoral structure, skills

matching and formalization. Supplementing the integral index with the Beveridge gap makes it possible to identify situations in which unemployment persists despite the availability of vacancies, that is, where it is predominantly structural in nature.

The typological grouping of the regions of Uzbekistan substantiates the shift from a uniform to a differentiated employment policy. Attraction centers need infrastructure for receiving workers; labor-surplus territories need targeted training and mobility support; mass absorption regions need productivity growth; and transition regions need diversification and the removal of local constraints. Implementation of the methodology will improve the targeting of public expenditure, the quality of monitoring and the coherence of territorial development with human capital policy [20].

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