ECONOSCITECH INTEGRATION

ISSUE 6

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 EVERY MONTHLY

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PROFESSORS-TEACHERS, SPECIALISTS AND SCIENTIFIC RESEARCHERS.

Google Scholar
Academic Resource Index ResearchBib
BASE
OpenAIRE
doi Digital Object Identifier
OPEN ACCESS

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

THE SCIENTIFIC-POPULAR ELECTRONIC JOURNAL **"ECONOSCITECH-INTEGRATION"** HAS BEEN REGISTERED UNDER THE NUMBER C-5669651 BY THE AGENCY FOR INFORMATION AND MASS COMMUNICATIONS (AOKA) OF THE REPUBLIC OF UZBEKISTAN, EFFECTIVE FROM OCTOBER 9, 2024.

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 5. 374 pages.
Approved for publication on Iyun, 2026.

Editorial Board Members:

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FORMULA-BASED DISTRIBUTION OF INTERGOVERNMENTAL TRANSFERS TO LOCAL BUDGETS IN UZBEKISTAN: A COMPARATIVE SIMULATION ANALYSIS BASED ON 2026 FORECAST INDICATORS

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Abstract

This article assesses the prospects for distributing intergovernmental transfers to the local budgets of Uzbekistan on a formula basis, using the approved 2026 forecast indicators of the State Budget Law (No. LRU-1105 of 25 December 2025). At present, the Republican budget allocates UZS 19,650 billion (about UZS 19.65 trillion) of regulating transfers to fourteen sub-national budgets, yet the criteria and weights that govern their inter-regional split are not published in an explicit, normative formula. Two simulation approaches are applied to the same data. The first is a single-factor (population-only) formula, $T_i = B \times N_i/N$, which yields a uniform per-capita transfer of 0.5234 million UZS per resident but ignores fiscal capacity and expenditure need. The second is a two-component learning model that splits the pool into a demographic base share and an equalisation share driven by the gap (GapF) between a fiscal-need index (NeedF) and a fiscal-capacity index (CapF). The single-factor formula over-allocates to high-capacity jurisdictions - it would raise the shares of Tashkent city and Tashkent region by UZS 1,334.0 and 1,332.8 billion respectively while cutting Karakalpakstan by UZS 1,436.2 billion. The two-component model instead identifies Surkhandarya (+708.2), Karakalpakstan (+605.3) and Namangan (+545.9 billion UZS) as the jurisdictions for which an objective case exists to exceed the official transfer. A Fiscal Profile Index composite ranks Navoi (89.47), Tashkent city (82.62) and Tashkent region (75.20) highest, and Karakalpakstan (38.17) and Surkhandarya (46.18) lowest. The paper concludes that Uzbekistan should move, in documented and incremental steps, toward a transparent multi-factor formula that combines demographic, fiscal-capacity and expenditure-need indicators while preserving incentive-compatibility for local revenue effort.

Keywords: intergovernmental transfers; fiscal equalisation; local budgets; fiscal decentralisation; formula-based transfers; fiscal capacity; fiscal need; fiscal gap; vertical fiscal imbalance; horizontal fiscal imbalance; transfer dependence; own-revenue capacity; regional budget policy; public finance management; local government finance; budget transparency; equalisation formula.

INTRODUCTION

1.1. Relevance of the problem

As fiscal decentralisation deepens in developing economies, the design of fair, transparent and accountable mechanisms for resourcing sub-national governments has become increasingly important. Intergovernmental transfers - the financial flows directed from the central government to lower-tier budgets - are recognised as

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the principal instrument for equalising public services across regions, softening vertical and horizontal fiscal imbalances, and guaranteeing minimum standards of regional development [1], [2], [9].

In Uzbekistan, intergovernmental relations have a multi-tier structure. For 2026, regulating transfers from the republican budget to the fourteen sub-national budgets are set at UZS 19,650 billion, while consolidated local-budget revenues amount to UZS 75,982.4 billion and expenditures to UZS 95,632.4 billion [38]. The aggregate vertical gap of UZS 19,650 billion is therefore covered entirely by transfers. This figure is itself the product of an active reform agenda: the 2026 pool is 6.4 per cent larger than the UZS 18,500 billion provided a year earlier, and the State Budget Law was accompanied by Presidential Resolution No. RP-387 of 26 December 2025 “On additional measures to increase the financial stability of local budgets and budget organisations and to strengthen budget discipline”, which retains a share of value-added tax locally (5 per cent in Tashkent and 20 per cent in Karakalpakstan and the regions) and shifts new spending mandates - including school and pre-school capital works - onto local budgets [38], [39]. These changes raise both the volume and the political salience of transfers, yet the rule governing their inter-regional distribution is still not codified as a public, explicit formula. This limits the transparency of intergovernmental relations and blurs the incentive signals facing regions [9], [10].

International experience shows that a formula-based transfer system serves at least three purposes: it guarantees minimum service standards for fiscally weak regions; it accounts systematically for differences in tax bases and expenditure needs; and it narrows the influence of discretionary, politically negotiated decisions [10], [16], [31]. For Uzbekistan, therefore, building a scientific case for a formula that combines population, fiscal need, fiscal capacity and regional expenditure pressure is a timely task.

1.2. Aim and objectives

The aim of the study is to systematise the theoretical and methodological foundations of formula-based transfer distribution to local budgets in Uzbekistan and, using the 2026 forecast indicators, to compare the outcomes of a single-factor and a two-component simulation against the official allocation, deriving economically grounded conclusions.

To achieve this aim, five objectives were set: (i) to review the international theoretical and empirical literature on formula-based fiscal equalisation; (ii) to compare at least five working models from developed and CIS economies; (iii) to compute, on Uzbekistan’s official 2026 forecast indicators, both a population-based single-factor simulation and a NeedF-CapF-GapF two-component model; (iv) to interpret the deviations from the official figures in economic terms; and (v) to formulate proposals for a future multi-factor formula.

1.3. Scientific novelty

The novelty of the paper is threefold. First, it is among the first studies to subject Uzbekistan’s legally approved 2026 indicators to an explicit formula-based simulation and a like-for-like comparison with the official allocation. Second, it unifies two distinct analytical lenses - a transparent demographic benchmark and a NeedF-CapF-GapF equalisation model that captures vertical and horizontal imbalance simultaneously. Third, it situates the analysis inside the Law of the Republic of Uzbekistan “On the State budget of the Republic of Uzbekistan for 2026” (No. LRU-1105 and Resolution RP-387), so that the simulation speaks directly to a live policy window rather than to a purely hypothetical setting [38], [39].

LITERATURE REVIEW

2.1. Foundations of fiscal-federalism theory

The classical foundations of fiscal-federalism theory were laid by Musgrave and Oates. Musgrave [1] distinguished the allocation, redistribution and macroeconomic-stabilisation functions of public finance and argued that redistribution belongs primarily at the central level. Oates’ decentralisation theorem [2] held that local governments hold superior information about local preferences, yet the uneven territorial distribution of the tax base makes equalisation transfers indispensable; his later work [3] incorporated political-economy considerations. Tiebout [4] theorised “voting with one’s feet”, introducing the important caveat that transfers must not distort the local tax-service choice. Brennan and Buchanan [5] and Weingast [6] deepened the institutional and political-economy dimension, showing that a rule-based fiscal system can constrain over-expansion of the state and sharpen local accountability.

2.2. Transfer design: balance equalisation and incentives

On the design of transfers and the equalisation-incentive trade-off, Rodden [7] raised the “soft budget constraint” problem: a region that expects a permanent transfer has a weaker incentive to broaden its own revenue base. Ter-Minassian [8] showed that, for transition economies, expenditure assignments, revenue sources and the equalisation mechanism should be reformed in a coherent sequence. Boadway and Shah [9] demonstrated that transfer design must hold equity, efficiency, accountability and incentives in balance, with fiscal need, fiscal capacity and the degree of equalisation forming the core of the formula. Shah [10] codified the

same three elements - expenditure-need standards, a fiscal-capacity measure and the equalisation standard - while Bird and Smart [11] argued that, especially in developing countries, transparent and predictable formulas outperform over-engineered ones, and that strengthening the data base should come first.

2.3. International practice and recent OECD evidence

Empirically, Bahl and Martinez-Vazquez [14] advocate sequencing - stabilising data and assignments first, introducing a simple formula next, and only then moving to a richer multi-factor model. Dougherty and Forman [16] classify OECD equalisation systems into pure revenue equalisation, joint revenue-and-cost equalisation, and gap-filling designs, and warn that very high equalisation can erode local revenue effort. The most recent OECD evidence reinforces this caution in a contemporary setting: Dougherty, Montes Nebreda and Mota [17] survey emerging and innovative transfer designs, and the 2025 OECD study on equalisation in a time of consolidation [18] finds that incentive-compatible formulas - which reward sub-national revenue effort and cost control - avoid perverse budgeting effects, that legal and procedural safeguards shielding equalisation from ad-hoc cuts sustain stability, and that aligning grant formulas with cross-cutting objectives such as climate and health is increasingly valuable. Comparative work by Blöchliger and King [19] documents a negative correlation between fiscal autonomy and transfer dependence, while Bergvall et al. [20] find that predictability, neutrality and accountability are the decisive virtues of a grant formula across twenty countries. Borge and Rattsø [21] and Moisio [22] show that formula systems in Norway and Finland reduced regional inequality and minimised political interference, and Eyraud and Lusinyan [23] establish across eighty countries that pronounced horizontal imbalance constrains growth. Dabla-Norris et al. [24] report that countries adopting formula-based equalisation improved social indicators by 12-18 per cent within five years.

Among developed-country systems, the Australian Commonwealth Grants Commission relies on a “relativity” coefficient that combines expenditure need and revenue capacity [31]; Canada’s Equalization programme is a constitutionally guaranteed mechanism that tops up provinces whose tax base falls below the national standard [32]; and the Russian Federation model, built from a base component and an equalisation component, is methodologically closest to the learning model used here [33]. de Mello and Ter-Minassian [30] show that digitalisation strengthens sub-national revenue mobilisation and fiscal transparency, Fjeldstad [28] links transfer reform in developing countries to institutional capacity, and Sanguinetti [29] exposes the tension between the “insurance” function of transfers and the “common-pool” problem. Ahmad and Tanzi [25] and Brosio and Jiménez [26] add, from CIS and Latin American evidence respectively, that discretionary distribution and population-only formulas are each insufficient on their own, and Shah and Shen [27] document how formula equalisation reduced regional inequality in China.

2.4. Uzbek context

Domestic research has reached convergent conclusions. Yunusov [34] shows that transfer dependence exceeds 40 per cent in some regions, evidencing limited regional financial autonomy; Musaev and Toshmatov [35] identify the under-weighting of economic-development and fiscal-capacity indicators as the central weakness of the present mechanism; Ergashev [36] finds that the local share of total revenue (15-18 per cent) is low by comparable-country standards; and Tursunov [37] documents per-capita expenditure differences of 2.5-3 times across regions. The 2026 State Budget Law [38] provides the empirical base, but the distributional methodology is not available as an open, normative document. More recent applied work on Uzbekistan’s 2026 reform package reads Resolution RP-387 together with the Budget Code and procurement rules and confirms that, despite local revenues rising from UZS 31.1 trillion in 2019 to 76.0 trillion in 2026 and expenditures from 38.9 to 95.6 trillion, the vertical fiscal gap persisted at around UZS 19.6 trillion, leaving regulating transfers as the key equalisation tool [38], [39], [40]. The overall conclusion of the literature is unambiguous: Uzbekistan needs a transfer system that is at once transparent, incremental and multi-factor.

2.5. Literature Synthesis

Table 1. Selected scholarship on intergovernmental transfers and fiscal equalisation

Author(s), year	Principal contribution
Musgrave (1959); Oates (1972, 1999)	Three functions of public finance; the decentralisation theorem as the basis of fiscal federalism.
Tiebout (1956)	“Voting with one’s feet”; transfers must not distort the local tax-service choice.
Brennan & Buchanan (1980); Weingast (2009)	Rule-based, institution-constrained fiscal systems limit state over-expansion.
Rodden (2002)	Soft budget constraint: high transfer dependence weakens local fiscal discipline.
Ter-Minassian (1997)	Transition economies require coherent sequencing of assignments, revenues and equalisation.
Boadway & Shah (2007); Shah (2007)	Equity-efficiency-accountability-incentive balance; need, capacity and equalisation standard as the formula core.

Author(s), year	Principal contribution
Bird & Smart (2002)	Transparent, predictable formulas outperform complex ones in developing countries.
Bahl & Martinez-Vazquez (2006)	Sequencing: data and assignments first, simple formula next, multi-factor model last.
Dougherty & Forman (2021); OECD (2024, 2025)	Typology of equalisation; incentive-compatible formulas and legal safeguards preserve discipline under consolidation.
Blöchliger & King (2006); Bergvall et al. (2006)	Autonomy vs dependence trade-off; predictability, neutrality and accountability as formula virtues.
Borge & Rattsø (2004); Moisio (2002)	Formula systems in Norway and Finland cut inequality and political interference.
Eyraud & Lusinyan (2013); Dabla-Norris et al. (2020)	Horizontal imbalance constrains growth; formula equalisation improves social outcomes by 12-18%.
Yunusov (2020); Musaev & Toshmatov (2021); Ergashev (2022); Tursunov (2019)	Uzbekistan: high transfer dependence, low local revenue share, under-weighted capacity factors, 2.5-3× per-capita gaps.

Source: compiled by the author. Full bibliographic details are listed in the References.

3. RESEARCH METHODOLOGY

3.1. Data sources

Two primary sources were used. The first is the 2026 State Budget Law (No. LRU-1105), specifically Annex 6 (forecast revenues and expenditures of the fourteen local budgets) and Annex 7 (regulating transfers to each jurisdiction) [38]. The second is the 2025 resident population of fourteen regions. All monetary indicators are expressed in billion UZS and population in thousands of persons; per-capita indicators are computed as billion UZS divided by thousands of persons, i.e. million UZS per resident.

3.2. Comparative foreign models

The methodology proceeds in three layers: a comparative reading of developed-country and CIS practice; a single-factor demographic simulation; and a two-component model that combines fiscal-need and fiscal-capacity indicators. This ordering mirrors the recommended progression from a simple formula to a richer equalisation design [14], [17].

Table 2. Formula-based equalisation models: international comparison

Model / country	Core formula	Key feature
Equalization payments (Germany)	$T_i = \alpha \cdot (\bar{K} - K_i) \cdot N_i$	Horizontal equalisation; strong Länder compensate weak ones.
Equalization (Canada)	$E_i = \max[0, \Sigma\, t^*_j \cdot (B^*_j - B_{ij})]$	Tops up provinces below the national tax-base standard (5 revenue sources).
Commonwealth Grants Commission (Australia)	$T_i = N_i \cdot [\Sigma\, w^E \cdot D_{ik} - \Sigma\, w^R \cdot C_{ik}]$	Assesses expenditure need and revenue capacity jointly via relativities.
Federal Fund for Financial Support of the Regions (Russian Federation)	$T_i = T\_base + T\_equal$	Base + equalisation components; closest analogue to the learning model.
Subvention (Kazakhstan)	$S_i = \max[0, \alpha \cdot N_i \cdot (X\_min - R_i/N_i)]$	Subvention only where own revenue per capita falls below a minimum standard.
Population-only (Uzbekistan, Model A)	$T_i = B \cdot (N_i/N)$	Equal per-capita transfer; ignores capacity and need.
Two-component (Uzbekistan, Model B)	$T_i = B[\lambda \cdot N_i/N + (1-\lambda) \cdot GapF_i N_i / \Sigma GapF_j N_j]$	Demographic base plus a NeedF-CapF gap-based equalisation share.

Source: compiled by the author from [31], [32], [33] and the model specifications below.

3.3. Model parameters

Table 3. Simulation parameters and their values

Parameter	Value	Description
B - total transfer pool	19,650 bln UZS	Regulating transfers from the republican budget to the regions.
λ (lambda) - base share	0.40	40% of the pool is demographic (base), 60% equalisation.
N - total population	37,543.2 ths	Aggregate population of the 14 regions (2025).
$\bar{R}$ (mean revenue p.c.)	2.0239 mln/person	Reference for NeedF/CapF normalisation.
$\bar{X}$ (mean expenditure p.c.)	2.5473 mln/person	Mean local expenditure per resident.

Parameter	Value	Description
$\bar{T}r$ (mean transfer p.c.)	0.5234 mln/person	Mean transfer per resident (= uniform Model-A rate).
$\bar{Own}$ (mean own-revenue p.c.)	0.6673 mln/person	Mean own-source revenue per resident.
$\bar{TD}$ (mean transfer dependence)	0.2055	Mean transfer-to-expenditure ratio.
$\bar{ODU}$ (mean own-revenue share)	0.5604	Mean own-revenue share.
$\bar{VFI}$ (mean vertical imbalance)	0.4396	Mean (1 − own-revenue share).
$\bar{SA}$ (mean tax-autonomy proxy)	0.5188	Mean tax-autonomy proxy.
GapPopDen = $\Sigma(GapF_i \cdot N_i)$	6,606.10	Denominator of the equalisation share.
MaxGapF	0.7395	Highest fiscal gap (Karakalpakstan).
Min / Max R p.c.	1.3316 / 4.0484	Bounds for min-max normalisation of income score.

Source: author's computations on No. LRU - 1105 (2025), Annexes 6-7.

3.4. Indicator and formula reference

Table 4. Indicators, formulas and their economic meaning

Indicator	Formula	Economic meaning
$NeedF_i$	$0.30(Xpc/\bar{X}pc) + 0.20(Trpc/\bar{T}rpc) + 0.20(TD/\bar{T}D) + 0.20(VFI/\bar{V}FI) + 0.10(\bar{R}pc/Rpc)$	Fiscal need index rises with expenditure pressure, transfer dependence and low own revenue.
$CapF_i$	$0.30(Rpc/\bar{R}pc) + 0.20(Ownpc/\bar{Own}pc) + 0.20(ODU/\bar{ODU}) + 0.20(SA/\bar{SA}) + 0.10((1-TD)/(1-\bar{T}D))$	Fiscal capacity index rises with own revenue and fiscal autonomy.
$GapF_i$	$\max(0; NeedF_i - CapF_i)$	Equalisation gap: positive where need exceeds capacity, else zero.
$T\_base_{,i}$	$B \cdot \lambda \cdot (N_i/N)$	Demographic base: 40% of the pool by population share.
$T\_equal_{,i}$	$B \cdot (1-\lambda) \cdot (GapF_iN_i)/\Sigma(GapF_jN_j)$	Equalisation share: 60% of the pool by gap-weighted population.
$T\_model_{,i}$	$T\_base_{,i} + T\_equal_{,i}$	Total transfer implied by Model B.
$T\_pop_{,i}$	$B \cdot (N_i/N)$	Single-factor (Model A) benchmark transfer.
Fiscal Profile Index	mean (ODU, SA, transfer-inverse, income-pc, TMB scores)	0-100 composite of a region's overall fiscal profile.

Notation: Rpc revenue p.c., Xpc expenditure p.c., Trpc transfer p.c., Ownpc own-revenue p.c., TD transfer dependence, ODU own-revenue share, VFI vertical fiscal imbalance, SA tax-autonomy proxy; a bar denotes the cross-region mean.

3.5. Model A - single-factor (population) simulation

The first approach distributes the pool in proportion to population:

$T\_pop_{,i} = B \times (N_i / N)$

Per-capita transfer is then identical for every region: B/N = 19,650 / 37,543.2 = 0.5234 million UZS per resident. The approach is maximally simple, transparent and politically neutral, but it disregards differences in fiscal capacity and expenditure need entirely.

3.6. Model B - two-component (NeedF-CapF-GapF) model

The second approach first computes a fiscal need and a fiscal capacity index for each region (Table 4), takes their positive difference as the equalisation gap, and then splits the pool into a base and an equalisation component:

$GapF_i = \max(0; NeedF_i - CapF_i)$

$T\_base_{,i} = B \cdot \lambda \cdot (N_i/N)$; $T\_equal_{,i} = B \cdot (1-\lambda) \cdot (GapF_iN_i)/\Sigma(GapF_jN_j)$

With λ = 0.40, the base component equals UZS 7,860 billion (allocated by population) and the equalisation component UZS 11,790 billion (allocated by gap-weighted population). The model is the central methodological contribution of the paper: it is a conditional, learning-oriented construct that does not claim to replicate the official allocation but interprets it through the logic of fiscal equalisation, integrating vertical imbalance (the revenue-expenditure gap) and horizontal imbalance (differences in capacity) within a single framework.

3.7. The Fiscal Profile Composite Index

For each region, five axes are scored on a 0-100 scale and averaged into an overall profile: the own-revenue share (ODU); the tax-autonomy proxy (SA); a transfer-inverse score, (1−TD)×100, higher where dependence is lower; an income-per-capita score, min-max normalised; and a balance score, TMB = 100

− (GapF/MaxGapF)×100, equal to 100 where the gap is zero. The composite condenses a region's fiscal standing into a single comparable number.

4. ANALYSIS AND RESULTS

4.1. Main budget indicators (2026 forecast)

Table 5. Local-budget indicators of the 14 regions of Uzbekistan, 2026 (bln UZS; population in ths)

No	Region	Population	Revenue	Expenditure	Official T	Own rev.	TD %
1	Karakalpakstan	2,029.7	3,815.5	6,314.0	2,498.5	982.6	39.57
2	Andijan	3,461.0	5,417.5	7,633.1	2,215.6	1,482.5	29.03
3	Bukhara	2,077.0	5,107.4	6,129.8	1,022.4	1,421.4	16.68
4	Jizzakh	1,537.6	2,921.2	4,173.6	1,252.4	893.8	30.01
5	Kashkadarya	3,639.3	5,899.0	7,168.7	1,269.7	1,643.6	17.71
6	Navoi	1,094.7	4,095.6	4,199.2	103.6	1,072.7	2.47
7	Namangan	3,131.7	4,697.8	6,985.2	2,287.4	1,363.2	32.75
8	Samarkand	4,297.5	7,200.0	8,903.3	1,703.3	2,327.6	19.13
9	Surkhandarya	2,945.5	3,922.2	6,087.7	2,165.5	1,285.7	35.57
10	Syrdarya	930.8	2,264.3	2,951.4	687.1	572.7	23.28
11	Tashkent region	3,108.5	7,439.5	7,733.7	294.2	3,202.5	3.80
12	Fergana	4,144.7	6,878.2	9,190.8	2,312.6	2,006.9	25.16
13	Khorezm	2,032.4	3,722.3	5,264.8	1,542.5	1,038.9	29.30
14	Tashkent city	3,112.8	12,601.9	12,897.1	295.2	5,757.2	2.29
	TOTAL	37,543.2	75,982.4	95,632.4	19,650.0	25,051.4	-

Source: No. LRU-1105 (2025), Annexes 6-7; author's computations. TD = transfer dependence = official transfer / expenditure × 100.

The vertical gap differs sharply across regions. Transfer dependence reaches 39.57 per cent in Karakalpakstan, 35.57 in Surkhandarya and 32.75 in Namangan, meaning a substantial part of their spending is covered by transfers. By contrast, Navoi, Tashkent region and Tashkent city show very low transfer shares, signalling stronger fiscal capacity - Tashkent city alone reports UZS 12,601.9 billion of revenue.

4.2. Per-capita and ratio indicators

Table 6. Per-capita indicators and fiscal-dependence ratios, 2026

Region	Rpc	Xpc	Trpc	Ownpc	ODU %	VFI %	SA %	RB %
Karakalpakstan	1.880	3.111	1.231	0.484	28.23	71.77	82.00	18.00
Andijan	1.565	2.206	0.640	0.428	40.09	59.91	82.39	17.61
Bukhara	2.459	2.951	0.492	0.684	58.16	41.84	79.66	20.34
Jizzakh	1.900	2.714	0.815	0.581	41.65	58.35	78.17	21.83
Kashkadarya	1.621	1.970	0.349	0.452	56.42	43.58	82.91	17.09
Navoi	3.741	3.836	0.095	0.980	91.19	8.81	69.95	30.05
Namangan	1.500	2.231	0.730	0.435	37.34	62.66	83.06	16.94
Samarkand	1.675	2.072	0.396	0.542	57.74	42.26	83.29	16.71
Surkhandarya	1.332	2.067	0.735	0.437	37.25	62.75	87.28	12.72
Syrdarya	2.433	3.171	0.738	0.615	45.46	54.54	73.25	26.75
Tashkent region	2.393	2.488	0.095	1.030	91.59	8.41	49.15	50.85
Fergana	1.660	2.218	0.558	0.484	46.46	53.54	81.73	18.27
Khorezm	1.832	2.590	0.759	0.511	40.25	59.75	82.56	17.44
Tashkent city	4.048	4.143	0.095	1.850	95.12	4.88	20.28	79.72

Source: author's computations on No. LRU-1105 (2025), Annex 6. Per-capita values in mln UZS/person. ODU own-revenue share; VFI vertical fiscal imbalance; SA tax-autonomy proxy; RB share retained by the republican budget.

Karakalpakstan and Surkhandarya combine below-average revenue per capita with own-revenue shares under 40 per cent, indicating constrained fiscal autonomy. Tashkent city, Tashkent region and Navoi, with the highest Rpc and ODU, can cover their own spending largely from own resources.

4.3. Model A: distribution by population share

Table 7. Population-only transfer (Model A) versus official allocation, 2026

Region	Share %	T_pop	Official T	Diff (Off−Pop)	Diff %	Direction
Karakalpakstan	5.41	1,062.3	2,498.5	+1,436.2	+135.2	Above
Andijan	9.22	1,811.5	2,215.6	+404.1	+22.3	Above
Bukhara	5.53	1,087.1	1,022.4	−64.7	−6.0	Below
Jizzakh	4.10	804.8	1,252.4	+447.6	+55.6	Above
Kashkadarya	9.69	1,904.8	1,269.7	−635.1	−33.3	Below
Navoi	2.92	573.0	103.6	−469.4	−81.9	Below
Namangan	8.34	1,639.1	2,287.4	+648.3	+39.6	Above
Samarkand	11.45	2,249.3	1,703.3	−546.0	−24.3	Below
Surkhandarya	7.85	1,541.7	2,165.5	+623.8	+40.5	Above
Syrdarya	2.48	487.2	687.1	+199.9	+41.0	Above
Tashkent region	8.28	1,627.0	294.2	−1,332.8	−81.9	Below
Fergana	11.04	2,169.3	2,312.6	+143.3	+6.6	Above
Khorezm	5.41	1,063.8	1,542.5	+478.7	+45.0	Above
Tashkent city	8.29	1,629.2	295.2	−1,334.0	−81.9	Below
TOTAL	100.00	19,650.0	19,650.0	0.0	-	-

Source: author's computations; $T\_pop_{,i} = 19{,}650 \times (N_i/37{,}543.2)$. "Above" = official transfer exceeds the population formula; "Below" = official transfer is lower.

Because Model A assigns the same per-capita amount everywhere, the official allocation appears far higher than the formula for high-need regions - Karakalpakstan (+UZS 1,436.2 billion), Namangan (+648.3) and Surkhandarya (+623.8) - and far lower for high-capacity ones, where the formula would over-allocate by up to UZS 1,334.0 billion to Tashkent city. In other words, a pure population formula would shift resources toward Tashkent city, Tashkent region and Navoi and away from Karakalpakstan, Surkhandarya, Namangan and Khorezm - the opposite of an equalising outcome. Model A is transparent, but it cannot express the economic logic of equalisation.

4.4. Model B: NeedF, CapF, GapF and the two-component transfer

Table 8. NeedF, CapF, GapF and two-component transfer results, 2026 (bln UZS)

Region	NeedF	CapF	GapF	T_base	T_equal	T_model	Official T	Diff (Mod−Off)
Karakalpakstan	1.656	0.917	0.740	424.9	2,678.9	3,103.8	2,498.5	+605.3
Andijan	1.189	0.910	0.278	724.6	1,719.5	2,444.1	2,215.6	+228.5
Bukhara	0.971	1.189	0.000	434.8	0.0	434.8	1,022.4	−587.6
Jizzakh	1.295	0.994	0.301	321.9	826.4	1,148.3	1,252.4	−104.1
Kashkadarya	0.861	1.000	0.000	761.9	0.0	761.9	1,269.7	−507.8
Navoi	0.606	1.566	0.000	229.2	0.0	229.2	103.6	+125.6
Namangan	1.281	0.891	0.390	655.7	2,177.7	2,833.3	2,287.4	+545.9
Samarkand	0.895	1.040	0.000	899.7	0.0	899.7	1,703.3	−803.6
Surkhandarya	1.308	0.879	0.429	616.7	2,257.1	2,873.7	2,165.5	+708.2
Syrdarya	1.214	1.086	0.127	194.9	211.5	406.3	687.1	−280.8
Tashkent region	0.489	1.301	0.000	650.8	0.0	650.8	294.2	+356.6
Fergana	1.085	0.966	0.119	867.7	877.7	1,745.4	2,312.6	−567.2
Khorezm	1.263	0.976	0.287	425.5	1,041.4	1,466.9	1,542.5	−75.6
Tashkent city	0.619	1.695	0.000	651.7	0.0	651.7	295.2	+356.5
TOTAL	-	-	-	7,860.0	11,790.0	19,650.0	19,650.0	0.0

Source: author's computations, $\lambda = 0.40$. A positive difference means the model implies more than the official transfer. Regions with GapF = 0 receive only the base component.

Eight regions return to a positive gap, i.e. need above capacity. The highest gaps are in Karakalpakstan (0.740), Surkhandarya (0.429) and Namangan (0.390), which therefore absorb most of the equalisation pool; Karakalpakstan alone takes 22.7 per cent (UZS 2,678.9 billion). The six regions with a zero gap - Bukhara, Kashkadarya, Navoi, Samarkand, Tashkent region and Tashkent city - receive only the demographic base, reflecting capacity in excess of need. The pattern indicates that the official allocation moves broadly in the direction of fiscal logic yet diverges materially from the model for several regions.

4.5. Worked example: Karakalpakstan

Karakalpakstan best illustrates how the equalisation model works. Its local revenue is UZS 3,815.5 billion, expenditure 6,314.0, official transfer 2,498.5, own revenue 982.6 billion, and population 2,029.7 thousand. Hence revenue per capita is 1.880 million UZS, expenditure 3.111, transfer 1.231 and own revenue 0.484 million UZS per resident.

The dependence ratios follow, transfer dependence TD = 2,498.5/6,314.0 = 0.3957 (39.57%); own-revenue share ODU = 982.6/(982.6+2,498.5) = 0.2823 (28.23%); vertical imbalance VFI = 1 − ODU = 0.7177 (71.77%); and the tax-autonomy proxy SA = 0.8200. These ratios reveal high transfer dependence and limited fiscal autonomy.

Substituting into the indices: NeedF = 0.30(3.111/2.547) + 0.20(1.231/0.523) + 0.20(0.3957/0.2055) + 0.20(0.7177/0.4396) + 0.10(2.024/1.880) = 1.6561, and CapF = 0.30(1.880/2.024) + 0.20(0.484/0.667) + 0.20(0.2823/0.5604) + 0.20(0.8200/0.5188) + 0.10((1−0.3957)/(1−0.2055)) = 0.9166. The gap is GapF = max (0; 1.6561 − 0.9166) = 0.7395.

The base transfer is T_base = 19,650 × 0.40 × (2,029.7/37,543.2) = 424.9 billion UZS. For the equalisation share, the denominator $\Sigma(GapF_iN_i)$ = 6,606.10, so T_equal = 19,650 × 0.60 × (0.7395 × 2,029.7)/6,606.10 = 2,678.9 billion UZS. The total is T_model = 424.9 + 2,678.9 = 3,103.8 billion UZS, exceeding the official transfer by UZS 605.3 billion. The model thus signals an even larger equalisation need for Karakalpakstan than the official figure recognises.

4.6. Three approaches side by side and the Fiscal Profile Index composite

Table 9. Official, single-factor and two-component transfers with GapF and Fiscal Profile Index, 2026 (bln UZS)

Region	Official T	T_pop	T_model	Off−Pop	Mod−Off	GapF	Fiscal Profile Index
Karakalpakstan	2,498.5	1,062.3	3,103.8	+1,436.2	+605.3	0.740	38.17
Andijan	2,215.6	1,811.5	2,444.1	+404.1	+228.5	0.278	52.88
Bukhara	1,022.4	1,087.1	434.8	−64.7	−587.6	0.000	72.53
Jizzakh	1,252.4	804.8	1,148.3	+447.6	−104.1	0.301	54.00
Kashkadarya	1,269.7	1,904.8	761.9	−635.1	−507.8	0.000	66.45
Navoi	103.6	573.0	229.2	−469.4	+125.6	0.000	89.47
Namangan	2,287.4	1,639.1	2,833.3	+648.3	+545.9	0.390	48.23
Samarkand	1,703.3	2,249.3	899.7	−546.0	−803.6	0.000	66.91
Surkhandarya	2,165.5	1,541.7	2,873.7	+623.8	+708.2	0.429	46.18
Syrdarya	687.1	487.2	406.3	+199.9	−280.8	0.127	63.75
Tashkent region	294.2	1,627.0	650.8	−1,332.8	+356.6	0.000	75.20
Fergana	2,312.6	2,169.3	1,745.4	+143.3	−567.2	0.119	59.81
Khorezm	1,542.5	1,063.8	1,466.9	+478.7	−75.6	0.287	54.62
Tashkent city	295.2	1,629.2	651.7	−1,334.0	+356.5	0.000	82.62

Source: author's computations. Off−Pop = official minus population formula; Mod−Off = two-component model minus official.

The synthesis shows that the official allocation departs strongly from a naive demographic split, confirming that factors beyond population already shape decisions; that the two-component model and the official figures coincide in direction for the high-need regions (Karakalpakstan, Surkhandarya, Namangan); and that the largest negative model differences fall on regions whose official transfers exceed their assessed gap (Samarkand, Fergana, Kashkadarya).

Table 10. Fiscal Profile Index ranking of regions (high to low), 2026

Rank	Region	ODU sc.	SA sc.	Transfer-inv.	Income-pc	TMB sc.	Fiscal Profile Index
1	Navoi	91.19	69.95	97.53	88.70	100.00	89.47
2	Tashkent city	95.12	20.28	97.71	100.00	100.00	82.62
3	Tashkent region	91.59	49.15	96.20	39.08	100.00	75.20
4	Bukhara	58.16	79.66	83.32	41.50	100.00	72.53
5	Samarkand	57.74	83.29	80.87	12.65	100.00	66.91
6	Kashkadarya	56.42	82.91	82.29	10.65	100.00	66.45
7	Syrdarya	45.46	73.25	76.72	40.53	82.79	63.75
8	Fergana	46.46	81.73	74.84	12.07	83.96	59.81
9	Khorezm	40.25	82.56	70.70	18.40	61.18	54.62
10	Jizzakh	41.65	78.17	69.99	20.92	59.28	54.00
11	Andijan	40.09	82.39	70.97	8.60	62.36	52.88
12	Namangan	37.34	83.06	67.25	6.20	47.31	48.23
13	Surkhandarya	37.25	87.28	64.43	0.00	41.94	46.18
14	Karakalpakstan	28.23	82.00	60.43	20.18	0.00	38.17

Source: author's computations. Bands: ≥75 high profile; 55-75 upper-middle; 40-55 lower-middle; <40 low profile.

The composite sorts the regions into four bands. The high-profile group (≥75) is Navoi (89.47), Tashkent city (82.62) and Tashkent region (75.20); the upper-middle group is Bukhara, Samarkand and Kashkadarya; the lower-middle group spans Syrdarya, Fergana, Khorezm, Jizzakh and Andijan; and the low-profile group (<40 for the bottom region) is led down by Namangan (48.23), Surkhandarya (46.18) and Karakalpakstan (38.17). The ranking aligns closely with the NeedF-CapF results: the regions with a positive gap cluster at the bottom of the composite.

4.7. Consistency of the official allocation with fiscal logic

The results show that the official transfers already reflect factors beyond population. Where transfer dependence and vertical imbalance are high and own revenue is low - Karakalpakstan (TD 39.57%, ODU 28.23%), Namangan, Surkhandarya and Khorezm - the official transfer markedly exceeds the demographic benchmark, and these same regions carry the largest fiscal gaps, so the official decision and the learning model reinforce one another. Conversely, Tashkent city (republican-budget retention 79.72%, ODU 95.12%) and Tashkent region receive far less than their population share, consistent with their role as the country's largest tax sources. The implication is not that the official allocation is irrational, but that its underlying criteria and weights are not documented - a transparency and accountability gap rather than an allocative one [9], [18].

4.8. Strengths and limits of the single-factor formula

Model A's virtues are simplicity, computability and political neutrality: a uniform 0.5234 million UZS per resident is an elementary equity benchmark. Its limits are equally clear. It ignores expenditure pressure (Xpc reaches 3.11 in Karakalpakstan against a 2.55 mean), fiscal-capacity differences (Rpc ranges from 1.33 in Surkhandarya to 4.05 in Tashkent city) and vertical imbalance (VFI of 71.77% in Karakalpakstan means own resources cover barely 28% of spending). Blind to this structure, a population formula cannot perform the equalisation function and is best understood as a starting benchmark for a richer model [2], [9].

4.9. Strengths and limits of the two-component model

The NeedF-CapF-GapF model captures vertical and horizontal imbalance systematically, weighting expenditure pressure (0.30), transfer dependence and vertical imbalance (0.20 each) on the need side, and own revenue and autonomy on the capacity side. Its limitations should be stated frankly: several indicators are proxies rather than direct measures of tax autonomy; the weights are set normatively and could differ under an empirical, regression-based calibration; and $\lambda = 0.40$ is to a degree a judgement parameter. The model is therefore a conditional, learning-oriented instrument that demonstrates the economic logic of formula equalisation for Uzbekistan rather than a normative replica of the existing system.

5.0. INTERPRETING THE FISCAL PROFILE INDEX

Fiscal Profile Index compresses the multi-dimensional profile into one figure. Navoi (89.47) scores high on every axis, while Tashkent city (82.62) tops income-per-capita and own-revenue but scores lowest on the tax-

autonomy proxy because 79.72% of the revenue it generates accrues to the republican budget. Karakalpakstan (38.17) and Surkhandarya (46.18) are weakest across the board - low own-revenue share, low income-per-capita and low balance score simultaneously. These profiles substantiate the case for prioritising such regions within any formula-based equalisation mechanism.

5.1. Implications for the 2026 reform package

The findings bear directly on the 2026 reforms. Retaining a VAT share locally (5% in Tashkent, 20% in the regions) and assigning major-taxpayer revenues to host regions will raise the dispersion of own revenue, increasing rather than reducing the salience of a transparent equalisation rule. Resolution RP-387, by linking greater local revenue retention to harder budget constraints and stronger budget discipline, is consistent with the recent OECD finding that incentive-compatible formulas - those rewarding revenue effort and cost control - protect local discipline during consolidation, and that legal and procedural safeguards shielding equalisation from ad-hoc adjustment sustain stability over time [18], [39]. Shifting new capital mandates (school and pre-school construction) onto local budgets further argues for explicit cost-need indicators in the formula, since such mandates fall unevenly across demographically younger and geographically remote regions [38].

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. Main conclusions

First. Uzbekistan's 2026 transfers are not simply proportional to population; the official figures already embody fiscal-gap and capacity considerations, but this methodology is not codified as an open formula - the principal accountability weakness identified in the study.

Second. The single-factor population formula, though the most transparent option, cannot deliver the equalisation that high-need regions - Karakalpakstan, Surkhandarya, Namangan and Khorezm - require; its proper role is to provide an initial benchmark for a richer model.

Third. The two-component NeedF-CapF-GapF model expresses the equalisation logic more fully. It implies even larger needs than the official figures for Karakalpakstan (+605.3), Surkhandarya (+708.2) and Namangan (+545.9 billion UZS), while Navoi, Tashkent region and Tashkent city register a zero gap and warrant only the demographic base.

Fourth. The Fiscal Profile Index composite classifies regions consistently with the NeedF-CapF results: high-profile Navoi, Tashkent city and Tashkent region against low-profile Karakalpakstan and Surkhandarya, providing a compact tool for monitoring fiscal standing.

6.2. Factors recommended for a multi-factor formula

Table 11. Factors recommended for the future formula

Factor	Indicator	Rationale	Literature
Population	N_i/N	Primary determinant of expenditure pressure	Shah (2007); Boadway & Shah (2007)
GRP per capita	regional GRP / population	Comprehensive measure of fiscal capacity	Oates (1999); Bird & Smart (2002)
Age structure	share aged 0-17	Education and paediatric expenditure need	Dafflon (2007); Moisio (2002)
Unemployment	official rate, %	Social-expenditure need	Eyraud & Lusinyan (2013)
Own-revenue share	own/(own+transfer)	Measure of horizontal imbalance	Blöchliger & King (2006)
Sectoral specialisation	mining / agriculture share	Shapes the structure of expenditure	Brosio & Jiménez (2012)
Infrastructure deficit	road density, remoteness	Geographic cost disability	Bergvall et al. (2006)
Poverty rate	share below the minimum basket	Social-transfer need	Shah (2007); Dabla-Norris et al. (2020)

6.3. The proposed formula

Building on the literature, international practice and the present results, a developed Uzbek formula could take the form:

$$T_i = B \cdot [\lambda \cdot N_i/N + (1-\lambda) \cdot NeedF_i N_i \,/\, \Sigma\, NeedF_j N_j]$$

$$NeedF_i = w_1(Xpc/Xpc) + w_2(VFI_i/VFI) + w_3(TD_i/TD) + w_4(age0\text{-}17/mean) + w_5(unemp_i/mean) + w_6(Xpc/GRPpc_i)$$

where the weights satisfy $\Sigma w_j = 1$ and should be fixed scientifically through a regression analysis of real data rather than set by judgement alone.

6.4. Staged policy recommendations

Stage 1 (short term) - disclose and cap. Publish at least a minimal formula and its parameters as an annex to the State Budget Law or as a Ministry of Economy and Finance methodology and introduce a rule limiting the per-capita transfer gap across regions (e.g. no more than 2.5 times).

Stage 2 (medium term) - a three-factor base. Ministry developed a simplified formula (population + GRP per capita + fiscal capacity) as the reference allocation and attach it to each annual budget law.

Stage 3 (long term) - full multi-factor model. Build an integrated formula in the spirit of the Australian Commonwealth Grants Commission - assessing expenditure need and revenue capacity jointly - supported by a regularly updated regional database (the OECD REGOFI/MUNIFI metrics offer a template) and embed it in legislation [17], [31].

Stage 4 (governance) - incentives and oversight. Preserve floor and ceiling limits and an explicit reward for own-revenue effort so that equalisation does not blunt local incentives, and require that distribution results be published annually, debated by the Legislative Chamber and subject to independent review [7], [16], [18].

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Proofreader: Xondamir Ismoilov

Layout and Designer: Hasan Maqsudov

2026. № 6

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