ECONOSCITECH INTEGRATION

ISSUE 11

INTERNATIONAL SCIENTIFIC ELECTRONIC JOURNAL

TASHKENT STATE UNIVERSITY OF ECONOMICS

American University of Technology
Powered by Arizona State University®

ISSN: 3060-5075



Acceptance of articles
PUBLISHED MONTHLY

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ISSN INTERNATIONAL STANDARD SERIAL NUMBER DENMARK

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



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

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

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PANEL DATA ASSESSMENT OF THE IMPACT OF TAX EXPENDITURES ON UZBEKISTAN'S REGIONAL BUDGETS

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Abstract: Tax expenditures granted by the central government reduce the revenues of subnational budgets that do not participate in the decision-making process, yet their regional fiscal costs are rarely measured. In Uzbekistan, the Tax Committee reports tax expenditures at the national and taxpayer levels, while regional budgets receive shares of corporate profit tax and personal income tax revenues and fully retain property, land, and turnover tax revenues. The extent to which regional budgets lose revenue as a result of these tax reliefs, and whether such losses are offset by an expanded tax base or lead to reduced fiscal self-sufficiency, remains unclear. This study measures the revenue losses of 14 regional budgets using taxpayer-level records and estimates their association with fiscal stability indicators through a fixed-effects panel model covering 2021–2025 (70 observations), employing cluster-robust inference and the wild cluster bootstrap method. Regional budgets lost 13.3–16.1% of their own revenues during 2023–2025, while official regional tables underestimated these losses by up to a factor of 2.07. Across regions, larger revenue losses were associated with faster revenue growth; however, this association was not statistically significant within regions ($\beta = 2.008$, $p = 0.127$). A 10-percentage-point increase in the lagged revenue-loss share was followed by a 6.1-percentage-point decline in the share of expenditure covered by own revenues ($\beta = -0.608$, cluster-robust $p = 0.008$, bootstrap $p = 0.050$), closely corresponding to the mechanical effect implied by the mean coverage ratio of 0.60. The findings do not provide evidence that centrally granted tax reliefs generate sufficient additional revenue to offset their fiscal costs at the regional level. Regional tax expenditure reporting, targeted assessment of the relatively small number of taxpayers accounting for 80% of revenue losses, and an explicit compensation mechanism are recommended, particularly in light of the changes introduced in 2026, when a portion of value-added tax revenue is shared with regional budgets.

Key words: tax expenditures, regional budgets, fiscal stability, fiscal decentralization, Uzbekistan.

Аннотация: Налоговые расходы, возникающие в результате предоставления налоговых льгот центральными органами государственной власти, сокращают доходы субнациональных бюджетов, которые не участвуют в процессе принятия соответствующих решений. При этом их фискальные последствия на региональном уровне остаются недостаточно изученными. В Узбекистане Налоговый комитет публикует сведения о налоговых расходах на общенациональном уровне и в разрезе налогоплательщиков, тогда как региональные бюджеты получают определённые доли поступлений от налога на прибыль организаций и налога на доходы физических лиц, а также в полном объёме сохраняют поступления от налога на имущество, земельного налога и налога с оборота. Вопрос о масштабах выпадающих доходов региональных бюджетов вследствие предоставления налоговых льгот, а также о возможности их компенсации за счёт расширения налоговой базы или влиянии на уровень бюджетной самостоятельности регионов остаётся недостаточно исследованным. В настоящем исследовании на основе данных по отдельным налогоплательщикам оцениваются выпадающие доходы 14 региональных бюджетов и определяется их взаимосвязь с показателями бюджетной устойчивости с использованием панельной модели с фиксированными эффектами за 2021–2025 годы (70 наблюдений). Для обеспечения статистической надёжности результатов применяются кластерно-робастные методы оценки и метод дикого кластерного бутстрепа (wild cluster bootstrap). Установлено, что в 2023–2025 годах выпадающие доходы региональных бюджетов составляли 13,3–16,1% их собственных доходов, при этом официальные региональные таблицы занижали величину потерь до 2,07 раза. Межрегиональный анализ выявил положительную связь между масштабами выпадающих доходов и темпами роста бюджетных поступлений, однако при анализе изменений внутри отдельных регионов данная взаимосвязь оказалась статистически незначимой ($\beta = 2{,}008$; $p = 0{,}127$). Увеличение доли выпадающих доходов

в предыдущем периоде на 10 процентных пунктов сопровождалось последующим снижением доли расходов, покрываемых собственными доходами, на 6,1 процентного пункта (β = −0,608; кластерно-робастное p = 0,008; бутстреп p = 0,050), что близко к механическому эффекту, соответствующему среднему коэффициенту покрытия расходов на уровне 0,60. Полученные результаты не подтверждают предположение о том, что налоговые льготы, предоставляемые на центральном уровне, обеспечивают достаточный прирост региональных доходов для полной компенсации связанных с ними фискальных издержек. В целях совершенствования региональной бюджетной политики рекомендуется развивать систему отчётности по налоговым расходам, проводить адресную оценку относительно небольшой группы налогоплательщиков, на долю которых приходится 80% выпадающих доходов, а также внедрить прозрачный механизм компенсации. Особую актуальность данные меры приобретают в связи с изменениями, предусмотренными с 2026 года, в рамках которых часть поступлений от налога на добавленную стоимость распределяется в пользу региональных бюджетов.

Ключевые слова: налоговые расходы, региональные бюджеты, бюджетная устойчивость, бюджетная децентрализация, Узбекистан.

INTRODUCTION

A tax relief measure entails forgone revenue for a particular budget. When the central government exempts a company from property tax or reduces its corporate profit tax rate, the resulting revenue loss does not necessarily affect the central budget. In countries where tax revenues are shared across levels of government, a substantial proportion of the fiscal cost is borne by regional and local budgets that neither participated in designing the relief nor have the authority to monitor its outcomes. Since the work of Surrey and McDaniel [26], tax expenditures have been regarded as a form of spending through the tax system, and international guidelines now recommend that governments measure, report, and evaluate them with the same rigour as direct budgetary expenditures [21, 29]. However, these guidelines primarily address individual budgets and provide limited guidance on allocating the costs of tax expenditures across different levels of government in a multilevel fiscal system.

Uzbekistan provides a clear example of this issue. The country is a unitary state in which tax rates, tax bases, and reliefs are determined centrally, while local councils are authorised only to apply adjustment coefficients to property and land tax rates. The regional budgets of the Republic of Karakalpakstan, 12 provinces, and the city of Tashkent retain all revenues from property, land, and turnover taxes and receive shares of corporate profit tax and personal income tax revenues established annually by the budget law [3]. Tax reliefs relating to these taxes are generally granted by the central government through the Tax Code or presidential and government decrees. National tax expenditure data have been available from the Tax Committee since 2015, while taxpayer-level records for 2023–2025 identify individual taxpayers, regions, districts, tax types, and amounts [27]. However, comprehensive regional estimates of forgone revenue have not yet been published, and official regional tables do not fully allocate tax reliefs granted to large taxpayers.

The current policy context makes this issue particularly relevant. The Presidential Decree of 16 February 2026 on further reforms within the country's development priorities through 2030 establishes fiscal stability targets, including maintaining the consolidated budget deficit within 3% of GDP and increasing tax revenue, including social tax, to 17.3% of GDP [1]. In December 2025, the Cabinet of Ministers approved a regulation on monitoring and evaluating the efficiency of subsidies, benefits, and preferences granted to businesses. The regulation assigns responsibility for evaluating tax reliefs to the Tax Committee and defines their budgetary efficiency as the change in taxes, customs duties, and other payments made by beneficiaries to the State Budget and state targeted funds relative to the amount of support received [5]. This indicator is calculated for the State Budget as a whole and does not distinguish which level of government bears the fiscal cost of a particular relief. From 2026, regional budgets also receive a share of value-added tax revenue [2], meaning that reliefs relating to this tax may also affect regional revenues. These reforms create both the need and the informational basis for evaluating tax expenditures at the regional level.

Two research questions arise. The first is descriptive: how much revenue do regional budgets forgo as a result of centrally granted tax reliefs, and how are these losses distributed across regions, tax types, and taxpayers? The second is evaluative and remains subject to debate. Proponents of tax incentives often argue that such measures expand the tax base and subsequently generate additional budgetary revenues. If this effect occurs at the regional level, the initial revenue loss may be temporary, without adversely affecting regional fiscal stability. Otherwise, the loss may reduce the capacity of regional governments to finance expenditures from their own revenues and increase their dependence on transfers from the republican budget.

This paper addresses both questions using data from 14 regions over the period 2021–2025. It constructs taxpayer-level estimates of regional revenue losses, compares them with official regional tables, and

subsequently estimates two sets of panel data models. The first examines the relationship between lagged revenue losses and the growth of regional own revenues, providing a direct assessment of whether tax reliefs generate sufficient additional revenue to offset their fiscal costs. The second examines the relationship between the lagged revenue-loss share and four indicators of regional fiscal stability. Given that the panel contains only 14 clusters, all statistical inferences are verified using the wild cluster bootstrap method [9].

The paper makes three contributions. First, it allocates tax expenditures to regional budgets in Uzbekistan using taxpayer-level records, an approach that, to the author's knowledge, has not previously been applied, and demonstrates that official regional statistics underestimate revenue losses by approximately a factor of two. Second, it distinguishes between-region and within-region relationships, showing that the positive cross-sectional association between revenue losses and revenue growth, which might otherwise be interpreted as evidence of self-financing, becomes statistically insignificant after introducing region fixed effects. Third, it quantifies the within-region association between revenue losses and fiscal self-sufficiency, demonstrating that this relationship closely corresponds to the mechanical change expected when forgone revenues are not recovered.

LITERATURE REVIEW

The literature on tax expenditures comprises two main strands that are rarely examined together. The first focuses on measurement. The OECD distinguishes three approaches: initial revenue loss, final revenue loss, and outlay equivalence. It notes that, in practice, countries rely almost exclusively on the revenue-forgone method because it does not require assumptions about behavioural responses [21]. The World Bank manual introduces a set of evaluation criteria, including relevance, efficiency, effectiveness, equity, and fiscal sustainability, and emphasises that tax reliefs should be assessed against the outcomes that would have occurred in their absence [29]. Beer and co-authors explain how such counterfactual evaluations can be conducted ex ante and ex post, while acknowledging the methodological challenges involved in constructing reliable counterfactuals for most tax relief measures [8].

The second strand examines the effects of tax incentives. Zee, Stotsky, and Ley emphasise that tax incentives in developing countries may be redundant when the investments they encourage would have occurred without additional support, while their fiscal costs may not be fully captured in official estimates [30]. Using panel data from a large group of developing countries, Klemm and Van Parys find that lower tax rates and longer tax holidays contribute to attracting foreign direct investment but have limited measurable effects on aggregate private investment or economic growth [13]. These findings raise questions about the extent to which tax reliefs can generate sufficient additional revenue to offset their fiscal costs, although the evidence relates primarily to national budgets and macroeconomic outcomes.

The fiscal federalism literature explains why the regional fiscal costs of tax reliefs warrant separate consideration. Within the classical framework, subnational governments are expected to finance local public services through locally generated revenues, allowing taxpayers to establish a connection between their tax contributions and the services they receive [20]. When regional revenues are determined centrally and regional budget deficits are covered through intergovernmental transfers, this relationship becomes less direct. Weingast argues that subnational governments' incentives to develop their own tax bases depend on the proportion of additional revenue they are permitted to retain [28]. Rodden demonstrates that substantial dependence on intergovernmental transfers is associated with challenges in maintaining fiscal discipline at the subnational level [24]. The share of own revenues in subnational expenditures and the share of transfers in subnational revenues are commonly used indicators for assessing these relationships.

Studies directly linking tax expenditures to subnational budgets remain relatively limited. Felis and Gołębiowski examine Polish municipalities over the period 2007–2019 and find that higher tax expenditures relating to property and transport taxes were followed by increased revenues from these taxes. However, in Poland, municipal councils determine some tax relief measures themselves and can assess their potential local benefits [11]. Kosov and co-authors report that, in Russian regions, the budget sustainability coefficient initially declines following the introduction of a tax relief measure and subsequently recovers gradually [14].

Uzbek academic research has approached this issue primarily from the perspective of local budgets. Normurzayev examined the efficiency of tax incentives in Uzbekistan from theoretical, methodological, and practical perspectives [19], while Isayev considers tax relief as an instrument of tax policy designed to stimulate specific economic activities and distinguishes between its budgetary, economic, and social efficiency [12]. Ashurova emphasises the importance of evaluating the budgetary, economic, and social efficiency of local tax reliefs and their effects on enterprises and regional economic development [7]. Musagaliyev demonstrates that, in Karakalpakstan, local budgets receiving subsidies and subventions face practical limitations in exercising their authority to grant tax reliefs [18]. Meyliyev associates the dependence of local budgets on higher-level budgets

with the intergovernmental transfer system and identifies the annual revision of revenue-sharing rates as a factor affecting budgetary predictability [16]. Ergashov incorporates the value of local tax reliefs as a separate explanatory variable in a revenue forecasting model for the city of Tashkent and concludes that reducing tax reliefs could support stable growth in local budget revenues [10]. However, this conclusion depends on whether tax reliefs contribute to expanding the tax base, which is the central question examined in the present study. Previous research by the author has evaluated the efficiency of tax preferences in Surkhandarya province and identified potential directions for using them to strengthen regional fiscal stability [22-23]. Collectively, these studies recognise that tax reliefs influence local revenues and that dependence on intergovernmental transfers is an important indicator of fiscal stability. However, none of them estimates the regional fiscal costs of centrally granted tax reliefs using taxpayer-level data or examines whether the associated revenue losses are subsequently recovered by regional budgets.

The present paper examines a fiscal system in which the central government grants nearly all tax reliefs while regional budgets bear part of their fiscal costs. This institutional arrangement makes it possible to assess whether tax reliefs generate sufficient additional revenue to compensate the budgets that bear their costs.

RESEARCH METHODOLOGY

Data. The panel covers 14 regions: the Republic of Karakalpakstan, 12 provinces, and the city of Tashkent. Data on regional budget revenues, expenditures, and regulatory transfers are obtained from the annual budget execution reports of the Ministry of Economy and Finance and the conclusions of the Accounts Chamber [6, 17]. Gross regional product, resident population, and fixed capital investment data are obtained from the official statistical information system of the Statistics Agency (SIAT indicators 1299, 246, and 1326) [25]. Tax expenditure data are drawn from two sources provided by the Tax Committee. National tables disaggregated by tax type and region cover 2022–2025. However, these tables report tax reliefs granted to companies administered by the Interregional Inspectorate for Large Taxpayers as a separate category without allocating them to individual regions. Taxpayer-level records for 2023–2025, provided to the author by the Tax Committee, contain information on each instance of tax relief, including the taxpayer identification number, region, district, tax type, and amount. The dataset comprises 424,461 records for 2023, 597,968 for 2024, and 542,962 for 2025 [27].

Three legal changes affect the comparability of regional budget data. In 2024, a portion of excise tax revenue previously classified as regional revenue was reclassified as transfers; child allowances and material assistance for low-income families, amounting to 7,379.4 billion UZS in 2024, were transferred to the republican budget; and centralised investment expenditures financed through local budgets decreased from 18,243.6 billion UZS to 10,186.2 billion UZS. To ensure the comparability of fiscal stability indicators, excise tax revenues included in transfers during 2024–2025 are reallocated to regional own revenues. The remaining structural changes are accounted for through year fixed effects.

Measuring the Revenue Loss of Regional Budgets. The fiscal cost of a tax relief measure to a regional budget depends on the type of tax and the applicable revenue-sharing arrangements. For 2021 and 2022, when only national totals are available by tax type, national tax expenditures for tax s are allocated across regions in proportion to their respective shares of the tax base.

$$L_{s,ht} = \frac{L_{s,t} \cdot B_{s,ht}}{\sum_{h=1}^{14} B_{s,ht}}, \quad (1)$$

where $L_{s,t}$ is the national tax expenditure on tax s in year t and $B_{s,ht}$ is the base of tax s in region h. For shared taxes the base is recovered by dividing the regional revenue by the sharing rate. The regional budget loss is then

$$Z_{ht} = \sum_s n_{s,ht} \cdot L_{s,ht}, \quad (2)$$

where $n_{s,ht}$ is the share of tax s that goes to the regional budget. The rate equals 1 for property, land and turnover taxes, is set annually by the budget law for profit tax and personal income tax, and was zero for value added tax (VAT) in 2021-2025. Profit tax paid by large taxpayers on the presidential list is not shared with regions, so the corresponding reliefs do not enter equation (2).

For 2023-2025 the allocation in equation (1) is replaced by direct aggregation of the record-level data. Each relief of a large taxpayer is assigned to the district and region in which the taxpayer is registered. Because the records are not broken down by property location, a company with assets in several regions is assigned to one of them, which is a limitation of the estimate. The allocation-based figures for 2021-2022 are 1.31 and 1.45 times lower than the record-based figures in the two years where both are available (2023 and 2024), with correlations of regional shares of 0.87 and 0.79. They should therefore be read as a lower bound.

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Fiscal stability indicators. Regional fiscal stability is measured with four indicators. The first is the coverage of expenditure by own revenue, K1 = D/X, where D is regional revenue excluding transfers (assigned taxes, shares of national taxes and non-tax revenue) and X is cash expenditure. The second is dependence on regulatory transfers, K2 = T/X, where T is the regulatory transfer from the republican budget. The third is the uncovered part of expenditure relative to gross regional product, K3 = (X − D)/Y, and the fourth is the deviation of the growth rate of own revenue from its regional mean, K4. The four indicators are normalized to the 0-1 interval by the min-max method over all regions and years, with K1 entering positively and the others negatively, and averaged into a composite index Ic

$$Ic_{ht} = \frac{1}{4}\sum_{j=1}^{4} N_{j,ht}, \quad (3)$$

The prime sign used in the tables (K1′, K2′) denotes indicators computed with the excise correction described above.

Empirical specification. The direct test of self-financing relates the growth of regional own revenue to the loss of the previous year

$$\Delta D_{ht} = \alpha + \beta Z_{h,t-1} + \gamma \Delta Y_{ht} + \tau_t + \mu_h + \varepsilon_{ht}, \quad (4)$$

where ΔD_{ht} is the change in own revenue of region h in year t, $Z_{h,t-1}$ is the revenue loss of the previous year from equation (2), ΔY_{ht} is the change in gross regional product, and τ_t and μ_h are year and region fixed effects. In this equation β is the additional own revenue that returns to the regional budget in the following year per unit of revenue lost. A value of β above 1 would mean that the relief pays for itself within a year. The model is estimated on losses for 2022-2024 and revenue growth for 2023-2025 (42 observations), in billion sum and per capita. The loss in this equation is computed from the official regional tables, because record-level data do not exist for 2022 and would leave only 28 observations.

The second set of models relates fiscal stability to the lagged loss share

$$S_{ht} = \alpha + \beta z_{h,t-1} + \gamma' X_{ht} + \mu_h + \tau_t + \varepsilon_{ht}, \quad (5)$$

where S_{ht} is K1′, K2′ or Ic, $z_{h,t-1} = Z_{h,t-1}/D_{h,t-1}$ is the loss as a share of own revenue in the previous year, and X_{ht} contains the natural logarithm of gross regional product per capita and the ratio of fixed capital investment to gross regional product. For revenue growth the model takes the log-difference form

$$\Delta \ln D_{ht} = \alpha + \beta z_{h,t-1} + \gamma_1 \Delta \ln Y_{ht} + \gamma_2 I_{ht} + \mu_h + \tau_t + \varepsilon_{ht}. \quad (6)$$

where I_{ht} is the investment ratio. The panel covers 2021-2025 with losses lagged by one year, which gives 70 observations. A lag is used for two reasons. Reliefs affect the budget through the later behaviour of taxpayers, and the same-year loss is part of the calculation of same-year revenue, so a contemporaneous correlation would be partly mechanical.

The rule for interpreting β in the K1′ equation was set before estimation. Since K1′ = D/X, returning the lost amount Z to revenue would raise the ratio by z · K1′. A negative and significant β whose absolute value is close to the mean of K1′ would therefore mean that the loss passes almost entirely into lower self-sufficiency. A β that is clearly smaller in absolute value would mean that part of the loss comes back through a wider tax base.

Inference. With 14 clusters, conventional cluster-robust standard errors can overstate significance [9, 15]. All coefficients of interest are therefore also tested with the restricted wild cluster bootstrap with Rademacher weights. Because 2^{14} = 16,384, all possible weight combinations are enumerated, so the bootstrap p-values do not depend on random draws. Estimation was carried out with the statsmodels 0.15 package for Python. No instrument is available, and reliefs are not randomly distributed among regions, so the coefficients describe stable within-region associations rather than causal effects.

Artificial intelligence (AI) tools were used to a limited extent, accounting for approximately 10% of the overall research preparation process. Their use was primarily confined to language refinement, technical editing, and structural support. The selection of research methods, statistical analysis, interpretation of findings, and formulation of scientific conclusions were carried out independently by the author.

ANALYSIS AND RESULTS

Descriptive statistics. Table 1 summarizes the estimation sample. Own revenue covered on average 60 % of regional expenditure, with a range from 38 % to 88 %. The lagged loss share averaged 13 % of own revenue and reached 34 % at its maximum (Table 1).

Table 1. Descriptive statistics of the estimation sample

Variable	Mean	SD	Min	Max
K1′, own-revenue coverage of expenditure (ratio)	0.595	0.135	0.383	0.884
K2′, dependence on regulatory transfers (ratio)	0.172	0.118	0.000	0.409
Ic, composite stability index (0-1)	0.637	0.184	0.224	0.994
zt−1, lagged loss share of own revenue (ratio)	0.130	0.048	0.066	0.335
ln GRP per capita (million sum per person)	3.349	0.559	2.560	5.033
Fixed capital investment / GRP (ratio)	0.357	0.124	0.216	0.755
Δln own revenue	0.189	0.121	−0.384	0.444
Δln GRP	0.182	0.042	0.107	0.331

Note: 70 observations, 14 regions, 2021-2025. Own revenue in 2024-2025 includes the excise transferred through regulatory transfers. Source: author's calculations based on [17, 27] and [25].

Size and Distribution of Regional Revenue Losses. Regional budgets experienced revenue losses attributable to tax reliefs amounting to 7,399.1 billion UZS in 2023, 10,204.2 billion UZS in 2024, and 11,445.6 billion UZS in 2025, representing 13.3%, 16.1%, and 15.4% of their own revenues, respectively (Table 2). The allocation-based estimates for 2021 and 2022 amounted to 4,249.1 billion UZS and 4,388.2 billion UZS, equivalent to 12.1% and 9.3% of own revenues, respectively. Of the 2,805.1 billion UZS increase recorded in 2024, 1,081.9 billion UZS was attributable to property tax reliefs, while 861.1 billion UZS resulted from corporate profit tax reliefs granted to companies administered by regional tax inspectorates. In 2025, property and land taxes accounted for 49.5% of total revenue losses, corporate profit tax for 34.9%, personal income tax for 13.6%, and turnover tax for no more than 2.0% (Table 2).

Table 2. Revenue loss of regional budgets from tax expenditures, 2021-2025, billion sum

Region	2021 (est.)	2022 (est.)	2023	2024	2025	2025, % of own revenue	Ratio to official tables, 2024
Republic of Karakalpakstan	256.7	208.1	470.2	367.2	479.0	13.7	1.44
Andijan	234.9	219.3	317.7	546.6	607.1	11.8	1.66
Bukhara	343.4	409.6	570.1	792.7	937.2	19.6	1.93
Jizzakh	164.9	160.8	247.9	339.8	386.0	14.1	1.48
Kashkadarya	358.7	407.5	452.5	567.9	797.7	13.9	1.92
Navoi	234.6	235.0	670.1	962.3	890.7	23.4	6.10
Namangan	266.5	362.3	317.1	456.1	407.0	9.2	1.46
Samarkand	383.1	364.2	676.6	1,017.8	1,263.7	18.5	1.96
Surkhandarya	205.9	177.1	362.5	441.0	422.7	11.2	1.69
Sirdarya	100.6	92.7	339.0	537.1	693.6	34.5	3.10
Tashkent region	495.2	425.6	1,028.5	1,524.4	1,615.0	21.1	2.89
Fergana	385.2	453.7	562.9	703.0	805.2	12.0	1.33
Khorezm	219.7	249.0	352.4	500.5	483.8	13.5	1.70
Tashkent city	599.7	623.0	1,031.6	1,447.8	1,656.9	12.1	1.48
Total	4,249.1	4,388.2	7,399.1	10,204.2	11,445.6	15.4	1.94

Note: 2021-2022 are allocation-based estimates by equation (1), 2023-2025 are computed from record-level data by equation (2). Own revenue in 2024-2025 includes the excise transferred through regulatory transfers. The last column is the ratio of the record-based loss to the loss computed from the official regional tables without the line of the large taxpayer inspectorate. Source: author's calculations based on [17, 27] and [3].

The fiscal burden is distributed unevenly across regions. In 2025, the revenue-loss share ranged from 9.2% in Namangan to 34.5% in Sirdarya, representing a 3.8-fold difference. Sirdarya was followed by Navoi (23.4%), Tashkent region (21.1%), and Bukhara (19.6%). In industrial regions, property and land taxes accounted for the largest shares of revenue losses, reaching 82.0% in Tashkent region and 70.1% in Navoi. By contrast, in Kashkadarya, Surkhandarya, Fergana, and Namangan, 46–51% of revenue losses resulted from corporate profit tax reliefs granted to companies administered by regional tax inspectorates.

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The official regional tables indicate substantially lower revenue losses. According to these tables, the estimated losses amounted to 3,566.8 billion UZS in 2023 and 5,273.3 billion UZS in 2024, which were 2.07 and 1.94 times lower than the taxpayer-level estimates, respectively. The largest discrepancies were observed in Navoi (6.10 times in 2024), Sirdarya (3.10 times), and Tashkent region (2.89 times), where property and land tax reliefs granted to large industrial enterprises were recorded under the Interregional Inspectorate for Large Taxpayers rather than attributed to the corresponding regions. Consequently, the ranking of regions differed depending on the estimation method. According to the official tables, the largest revenue loss was recorded in the city of Tashkent (979.0 billion UZS), whereas the taxpayer-level estimates placed Tashkent region first (1,524.4 billion UZS), with Navoi moving from 14th to 4th place. In 2025, the overall discrepancy narrowed to a factor of 1.15, although the official tables continued to underestimate revenue losses in Navoi and Tashkent region by factors of 1.6–1.7.

Revenue losses were also concentrated among a relatively small number of taxpayers. In 2025, 130,016 taxpayers benefited from tax reliefs that reduced regional budget revenues, while 8,782 of them (6.8%) accounted for 80% of the total loss. This number remained relatively stable during 2023–2025, ranging from 8,782 to 9,440 taxpayers. The number of taxpayers accounting for 80% of revenue losses varied from 64 in Navoi to 1,603 in Karakalpakstan. In Navoi, the largest individual taxpayer, a mining and metallurgical enterprise, accounted for 27.4% of the region's total revenue loss in 2025 and 54.2% in 2024.

Revenue losses were not concentrated in regions with lower levels of fiscal stability. During 2023–2025, the Spearman correlation coefficient between the revenue-loss share and the composite fiscal stability index ranged from 0.25 to 0.36 and was statistically insignificant ($p = 0.20–0.38$). The correlation with dependence on intergovernmental transfers was negative and strengthened over time, reaching −0.35 ($p = 0.22$), −0.43 ($p = 0.13$), and −0.61 ($p = 0.02$), respectively. These findings indicate that tax reliefs were predominantly concentrated in regions with relatively strong tax bases, where large enterprises are located. Sirdarya represented an exception, combining a relatively low level of fiscal stability with the highest revenue-loss share.

In regions receiving regulatory transfers, the fiscal costs of tax reliefs are effectively covered by the republican budget, although no explicit compensation mechanism is established. Transfers are determined to balance individual regional budgets, meaning that forgone revenues are incorporated into the overall financing gap. In 2023, the 11 recipient regions experienced revenue losses of 4,668.9 billion UZS, equivalent to 19.2% of the transfers they received. In 2025, this ratio reached 47.6% of transfers excluding excise tax revenues and 94.6% in Sirdarya, partly reflecting the reduction in transfers following the centralisation of expenditures in 2024. An explicit compensation mechanism was applied on one occasion. In 2020, the Anti-Crisis Fund allocated 478.4 billion UZS to compensate local budgets for revenue losses resulting from tax reliefs, including 210.0 billion UZS for the city of Tashkent and 58.3 billion UZS for Tashkent region. This practice was discontinued following the closure of the fund on 1 January 2021 [27].

Do Tax Reliefs Pay for Themselves? Between-Region and Within-Region Analysis. Table 3 presents the estimates obtained from equation (4). Without region fixed effects (columns 1 and 3), the coefficient on lagged revenue losses is positive and statistically significant, reaching 1.792 when measured in billion UZS and 1.716 on a per capita basis. Interpreted directly, these estimates suggest that each UZS of forgone revenue would be followed by nearly two UZS of additional revenue in the subsequent year. However, after introducing region fixed effects, the coefficients become statistically insignificant ($p = 0.127$ and $p = 0.984$), while the per capita coefficient declines to 0.087 (Table 3).

Table 3. Lagged revenue loss and next-year growth of regional own revenue, estimates of equation (4)

	(1)	(2)	(3)	(4)
Lagged loss $Z_{h,t-1}$, β	1.792 (0.378)	2.008 (1.316)	1.716 (0.763)	0.087 (4.206)
p-value of β	<0.001	0.127	0.025	0.984
ΔY_{ht}, γ	0.018 (0.004)	0.017 (0.018)	0.009 (0.004)	−0.004 (0.013)
p-value of γ	<0.001	0.346	0.038	0.783
Year fixed effects	yes	yes	yes	yes
Region fixed effects	no	yes	no	yes
Units of variables	billion sum	billion sum	per capita	per capita
Observations	42	42	42	42
R^2	0.727	0.766	0.422	0.557

Note: Standard errors clustered by region in parentheses. Losses for 2022-2024 are computed from the official regional tables, revenue growth refers to 2023-2025. Per capita variables are in million sum. Source: author's calculations.

The positive association observed in columns 1 and 3 therefore reflects differences between regions. Regions with larger economies both benefit from more tax reliefs and experience greater absolute increases in revenue. Within individual regions, however, changes in revenue losses are not followed by corresponding changes in revenue growth. The positive cross-sectional relationship remains significant when the city of Tashkent is excluded (β = 1.33, p < 0.001). When taxpayer-level revenue-loss estimates are used, for which only 28 observations are available, the coefficient decreases to 0.47 (p = 0.09), further indicating a predominantly cross-sectional relationship. The available data do not provide conclusive evidence in either direction. In column 2, the 95% confidence interval ranges from −0.57 to 4.59, encompassing outcomes consistent with both full self-financing and the absence of any additional revenue.

Revenue Losses and Fiscal Stability. Table 4 presents the estimates obtained from equations (5) and (6). The principal finding concerns the coverage of regional expenditures by own revenues. With region fixed effects, the estimated coefficient is β = −0.608, statistically significant at the 1% level using cluster-robust standard errors and at the 5% significance threshold using the wild cluster bootstrap (p = 0.050). A 10-percentage-point increase in the revenue-loss share is followed by a 6.1-percentage-point decline in the proportion of expenditures covered by own revenues in the subsequent year. The absolute value of the coefficient is approximately equal to the mean value of K1′ (0.60), and the confidence interval includes this value.

Without region fixed effects, the association is not statistically significant (β = −0.430, p = 0.251). This reflects the fact that regions with the highest revenue-loss shares, including Navoi, Tashkent region, and Sirdarya, occupy different positions within the distribution of expenditure coverage, while the level of economic development, measured by the logarithm of gross regional product per capita (coefficient = 0.168, p < 0.001), dominates the cross-sectional relationship. The association between tax reliefs and fiscal self-sufficiency becomes evident only when changes within individual regions are examined (Table 4).

Table 4. Lagged loss share and regional fiscal stability, 14 regions, 2021-2025

	K1′	Ic	K2′	ΔIn D
With region and year fixed effects				
Loss share $z_{h,t-1}$, β	−0.608 (0.228)	−0.515 (0.427)	0.083 (0.305)	0.630 (0.709)
p-value, cluster / wild bootstrap	0.008 / 0.050	0.227 / 0.321	0.785 / 0.827	0.375 / 0.433
95 % confidence interval	−1.05 to −0.16	−1.35 to 0.32	−0.51 to 0.68	−0.76 to 2.02
In GRP per capita	0.027 (0.088)	−0.415 (0.209)	0.181 (0.126)	-
Investment / GRP	−0.143 (0.085)	−0.060 (0.124)	0.008 (0.061)	0.074 (0.249)
ΔIn GRP	-	-	-	0.126 (0.564)
R^2	0.917	0.920	0.913	0.464
With year fixed effects only				
Loss share $z_{h,t-1}$, β	−0.430 (0.375)	−0.536 (0.445)	0.148 (0.262)	0.353 (0.286)
p-value, cluster / wild bootstrap	0.251 / 0.453	0.228 / 0.394	0.572 / 0.608	0.217 / 0.249
In GRP per capita	0.168 (0.025)	0.255 (0.033)	−0.180 (0.022)	-
Observations	70	70	70	70

Note: Standard errors clustered by region in parentheses. Wild cluster bootstrap p-values use Rademacher weights and enumerate all 16,384 combinations for 14 clusters. The loss share is the allocation-based estimate in 2020-2022 and the record-based figure in 2023-2024. Source: author's calculations based on [17, 27] and [25].

For the other three outcomes, the estimated coefficients are not statistically significantly different from zero. The coefficient for the composite index has the same negative sign as that for K1′ (−0.515) but is not statistically significant. The index also incorporates the deficit-to-GRP ratio and revenue volatility, which are not directly associated with revenue losses, while min–max normalisation reduces the strength of the observed relationship. The coefficient for transfer dependence is close to zero (0.083). Within individual regions, changes in the revenue-loss share are not associated with changes in the share of regulatory transfers, which are determined annually by the budget law on the basis of forecasts and are not adjusted to reflect actual revenue losses. In the revenue growth equation, the coefficient β = 0.630 could be interpreted as an additional 63 tiyin of revenue for each UZS of forgone revenue. However, the confidence interval ranges from −0.76 to 2.02 and includes both zero and one. Therefore, two alternative specifications, equation (4) expressed on a per capita basis and equation (6), lead to the same conclusion: the regional-level data do not provide sufficient evidence that tax reliefs generate enough additional revenue to offset their fiscal costs.

Robustness. Table 5 demonstrates that the main coefficient remains relatively stable across alternative sample specifications. Excluding the city of Tashkent yields β = −0.467, excluding Navoi gives β = −0.629,

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excluding Tashkent region results in β = −0.659, and excluding Sirdarya produces β = −0.605. Restricting the sample to 2022–2025 yields a coefficient of −0.459. The bootstrap p-values range from 0.045 to 0.173. When a second lag is introduced (56 observations), its coefficient is close to zero (−0.057, p = 0.89), indicating that the observed association emerges within one year and does not persist into the subsequent year. The coefficient remains negative across all specifications, with its magnitude ranging from approximately −0.43 to −0.66. These results suggest that the direction of the association is consistent across specifications, although its precise magnitude remains subject to estimation uncertainty, as expected given the sample of 70 observations distributed across 14 clusters (Table 5).

Table 5. Robustness of the main coefficient in the K1′ equation

Specification	β	Cluster SE	Cluster p	Wild bootstrap p	Observations
Baseline	−0.608	0.228	0.008	0.050	70
Excluding Tashkent city	−0.467	0.294	0.112	0.113	65
Excluding Navoi	−0.629	0.299	0.036	0.149	65
Excluding Tashkent region	−0.659	0.233	0.005	0.045	65
Excluding Sirdarya	−0.605	0.295	0.040	0.108	65
2022-2025 only	−0.459	0.285	0.107	0.173	56
Two lags, first lag	−0.433	0.291	0.136	-	56
Two lags, second lag	−0.057	0.414	0.890	-	56

Note: All models include region and year fixed effects and the controls of Table 4. With 13 clusters the bootstrap enumerates all 8,192 weight combinations. Source: author's calculations.

The findings do not support the claim, frequently advanced in discussions of tax incentives, that centrally granted tax reliefs expand regional tax bases sufficiently to offset their fiscal costs. The within-region estimates indicate that revenue losses are reflected almost proportionally in reduced regional budget self-sufficiency. This finding is consistent with cross-country evidence suggesting that tax incentives have limited effects on aggregate investment [13] and with the argument that many tax relief measures may be redundant [30]. The results also demonstrate why simple comparisons across regions can be misleading. A policymaker examining columns 1 and 3 of Table 3 might conclude that tax reliefs generate additional revenues amounting to nearly twice their fiscal costs. However, an analysis of changes within individual regions using the same data does not provide evidence supporting this conclusion.

Felis and Gołębiowski identify a positive effect of tax expenditures on subsequent municipal revenues, although Polish municipal councils independently determine some of the tax relief measures [11]. This allows them to select reliefs whose benefits are expected to accrue within their own jurisdictions. In Uzbekistan, nearly all tax reliefs are established centrally, while regional authorities have limited opportunities to target these measures or monitor their outcomes. The pattern observed in Russia, characterised by an initial decline followed by gradual recovery [14], is also not evident in the present analysis, at least within the two-year observation horizon permitted by the available data. From the perspective of fiscal federalism, Uzbekistan's existing arrangements provide opportunities to strengthen the relationship between regional decision-making and regional revenues, which Oates and Weingast identify as a fundamental principle of fiscal responsibility [20, 28].

The absence of a statistically significant effect on transfer dependence warrants particular attention. It might be expected that regions experiencing greater revenue losses would receive larger intergovernmental transfers. The cross-sectional evidence indicates that, in recipient regions, revenue losses are effectively absorbed through balancing transfers. In Sirdarya, the estimated revenue loss in 2025 was equivalent to 94.6% of transfers excluding excise tax revenues. However, within individual regions, the share of transfers did not respond significantly to changes in the revenue-loss share. Transfers are determined ex ante on the basis of revenue forecasts, while actual revenue losses, which are not systematically reported by region, are not explicitly incorporated into the calculation. Consequently, the fiscal costs of centrally granted tax reliefs are borne partly by the republican budget through balancing transfers and partly by regional budgets through reduced expenditure coverage from own revenues. The respective shares are not explicitly identified in budget documentation. This arrangement highlights opportunities to improve the transparency and predictability of intergovernmental fiscal relations, consistent with Rodden's findings concerning the relationship between fiscal arrangements and subnational fiscal discipline [24].

Under the 2026 budget law, 20% of value-added tax (VAT) revenue, or 5% in the city of Tashkent, is allocated to local budgets, excluding VAT paid by large taxpayers included in the presidential list [2]. Consequently, VAT reliefs granted to taxpayers administered by regional tax inspectorates become a source of forgone revenue for

regional budgets for the first time. At the same time, amendments to Article 75 of the Tax Code make property and land tax reliefs for legal entities conditional on three requirements: revenue exceeding the value of the tax relief, wages amounting to at least twice the minimum wage, and an average workforce of at least three employees [4]. The author's projections based on data for the first half of 2026 suggest that these two changes, taken together, will increase regional revenue losses by 44%, bringing them to 20.7% of own revenues. The findings of this study suggest that, without an explicit compensation mechanism, a substantial proportion of this increase may be reflected in reduced regional budget self-sufficiency.

Three practical recommendations follow from the analysis. First, the Tax Committee should report tax expenditures according to the regional budgets that bear their fiscal costs, regardless of the tax inspectorate with which individual taxpayers are registered. This would enable regional authorities to obtain a more comprehensive assessment of revenue losses, as existing regional reports capture only approximately half of the estimated total. Second, given that between 64 and 1,603 taxpayers in each region account for 80% of revenue losses, a comprehensive evaluation of tax reliefs at the regional administrative level would be feasible if initially focused on this group. Third, compensation for revenue losses resulting from centrally granted tax reliefs should be established through an explicit mechanism, similar to the arrangement implemented in 2020, rather than being incorporated implicitly into balancing transfers.

CONCLUSION AND RECOMMENDATIONS

This paper assessed the revenue losses incurred by regional budgets in Uzbekistan as a result of centrally granted tax reliefs and examined whether these losses were subsequently recovered. Regional budgets experienced revenue losses equivalent to 13.3–16.1% of their own revenues during 2023–2025. The official regional tables underestimated these losses by a factor of up to 2.07, while 80% of the total losses were attributable to fewer than 7% of taxpayers benefiting from tax reliefs. Across regions, larger revenue losses were associated with faster revenue growth, but no such association was observed within individual regions. In fixed-effects models, a 10-percentage-point increase in the lagged revenue-loss share was followed by a 6.1-percentage-point decline in the proportion of regional expenditures covered by own revenues. This result is close to the mechanical effect expected when forgone revenues are not subsequently recovered. The direction of this association remains robust to the exclusion of individual regions and years, although its precise magnitude should be regarded as approximate.

Recommendations

1. Improve the transparency of regional tax expenditure reporting. The Tax Committee should provide comprehensive region-specific data on tax reliefs, including those granted to large taxpayers administered by interregional inspectorates. This would enable regional authorities to assess revenue losses more accurately and strengthen fiscal planning.

2. Introduce an explicit compensation mechanism for regional revenue losses. Revenue losses resulting from centrally granted tax reliefs should be incorporated into a transparent compensation framework rather than being implicitly absorbed through balancing transfers. Such a mechanism would support regional budget stability and strengthen fiscal responsibility.

3. Strengthen the evaluation of tax relief effectiveness. Regional authorities, in cooperation with the Tax Committee, should regularly assess the fiscal outcomes of major tax relief measures, prioritising taxpayers responsible for the largest shares of revenue losses. Particular attention should be given to whether these measures generate sufficient additional tax revenues to offset their fiscal costs over time.

The study has four limitations. First, revenue losses for 2021–2022 are based on allocation estimates rather than taxpayer-level records. Second, the reclassification of excise tax revenues and the centralisation of expenditures in 2024 are accounted for through year fixed effects, although these changes may have affected individual regions differently. Third, tax reliefs are not randomly distributed across regions; therefore, the estimates describe statistical associations rather than causal effects. Finally, VAT revenues were not shared with regional budgets during 2021–2025, meaning that the model does not account for VAT reliefs. Future research should assess the extent to which tax reliefs generate sufficient additional revenue to offset their fiscal costs at the individual taxpayer level, using data on taxes paid by beneficiaries in the years following the receipt of reliefs. Further studies should also reassess the regional estimates once data under the new VAT revenue-sharing arrangements become available.

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INTERNATIONAL SCIENTIFIC ELECTRONIC JOURNAL

Proofreader: Xondamir Ismoilov

Layout and Designer: Oloviddin Sobir o‘g‘li

2026. № 11

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