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Article

Determinants of Financial Management Decisions in a Public Higher Education Institution under Fiscal Autonomy Reform: Econometric Evidence from Uzbekistan (2021–2025)

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Abstract: This article examines how the financial management decisions of a public higher education institution are formed, and which factors determine them, during a period of radical funding reform. The study exploits a unique hand-collected dataset assembled from seven types of statutory annual financial statements of a flagship public pedagogical university in Uzbekistan (hereinafter "the University") for 2021–2025 – the five years spanning the country's transition to institutional financial autonomy. Drawing on resource dependence theory, we construct a panel of 45 source–category–year expenditure observations across three funding streams (state budget allocations, tuition-contract revenue and the institutional Development Fund) and estimate fixed-effects and first-difference regressions with cluster-robust, wild-cluster-bootstrap and jackknife inference appropriate for small samples. Four results stand out. First, expenditure is significantly revenue-driven: the pooled elasticity of expenditure with respect to own-source revenue is 1.42 ($p < 0.01$), while the within-unit short-run elasticity is 0.60, indicating partial consumption smoothing through carried-over balances. Second, elasticities are heterogeneous: wage expenditures are the stickiest (0.24), while discretionary current and capital expenditures respond three-and-a-half times more strongly (0.84), consistent with international evidence on expenditure protection hierarchies. Third, the autonomy period (2023–2025) is associated with a statistically significant acceleration of expenditure growth (+1.02 log points, $p < 0.01$) and with measurable revenue diversification: the Herfindahl–Hirschman index of revenue concentration fell from a peak of 0.77 to 0.47. Fourth, we document a critical emerging risk: accounts receivable grew at a compound rate of 86 per cent per annum, doubling roughly every 13 months and reaching 71 per cent of total assets by end-2025, while year-end cash holdings fell six-fold in the final year. The findings extend resource dependence theory to the under-studied setting of post-Soviet fiscal autonomy reforms and yield concrete recommendations for receivables governance, liquidity management and the design of state funding formulas.

Keywords: higher education finance; financial autonomy; financial management decisions; resource dependence theory; revenue diversification; budget execution; accounts receivable; panel econometrics; Uzbekistan

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1. Introduction

Higher education systems around the world are being reshaped by a common fiscal dilemma: enrolment is expanding faster than the public purse. Globally, tertiary enrolment more than doubled from roughly 100 million students in 2000 to over 235

million in 2020, lifting the world gross enrolment ratio from 19 to about 40 per cent [1]. Public budgets have not kept pace. Across OECD countries, governments now finance on average about two-thirds of tertiary education spending, with the private share – chiefly households – already at roughly one-third and growing faster than public outlays [2], [3]. The result has been a world-wide diffusion of cost-sharing: the deliberate shift of part of the cost burden from taxpayers to students and their families [4]. How individual public universities absorb this shift – how they plan, execute and adapt their budgets when the composition of their revenue changes – has therefore become a first-order question of both public economics and university governance.

Nowhere is this question posed more sharply than in Uzbekistan. Within a single decade the country moved from one of the most restrictive admission regimes in the post-Soviet space to one of its most expansionary. Tertiary enrolment coverage of the 18–23 age cohort rose from 6.8 per cent in 2014 and 8.3 per cent in 2017 to 45.9 per cent in 2023 and 47.7 per cent at the start of the 2024/25 academic year [5]. The number of higher education institutions grew from 69 in 2015/16 to 222 in 2024/25 – including 99 non-state and about 30 foreign institutions – while the student body expanded more than five-fold, from 264,300 to 1,432,800 [6]. Crucially, this expansion has been financed predominantly by households: state grant quotas covered only around 11–12 per cent of new intake in 2024/25, meaning that nearly nine out of ten new students pay tuition under the "to'lov-kontrakt" (payment-contract) system inherited from the dual-track model common to post-Soviet systems [7].

The institutional counterpart of this demand-side expansion was a supply-side governance revolution. The Concept for the Development of Higher Education until 2030, adopted by Presidential Decree No. PF-5847 of 8 October 2019, set explicit targets – enrolment coverage above 50 per cent, at least ten universities in recognised international rankings – and mandated the step-by-step transfer of public universities to self-financing and financial sustainability [8]. The operational breakthrough came with Presidential Resolution No. PQ-61 of 24 December 2021, which granted state universities financial independence from 2022: the right to retain extra-budgetary funds and unspent balances, to set tuition fees within a cap of three times the base rate, to determine staffing tables and salary levels autonomously, and to be financed from the budget on a per-student basis for state-grant places [9]. For the University studied here, a dedicated Presidential resolution of June 2022 approved a transformation programme and extended academic, organisational and financial independence from 1 January 2023. The resolution number is withheld to preserve the institution's anonymity. In parallel, the entire budget sector began migrating to new national budget accounting standards aligned with international public sector accounting standards (IPSAS), with new report formats applied to universities from the 2024 reporting year [10], [11], [12].

These reforms turned Uzbek public universities – within three years – from cash-rationed spending units of the treasury into quasi-autonomous financial organisations that must manage multi-source revenue portfolios, price their services, plan investment and carry financial risk. Yet almost nothing is known empirically about how their financial management decisions have actually responded. The international literature on university finance is dominated by North American and Western European evidence [13], [14], [15]; the single directly relevant econometric study of Uzbekistan uses data ending in 2013, a full reform-cycle before autonomy [16]. No published study, to our knowledge, has yet opened the audited books of an Uzbek public university across the autonomy watershed and asked the elementary questions of financial management: where did the money come from, where did it go, how disciplined was budget execution, and what risks accumulated on the balance sheet?

This article addresses that gap through an in-depth econometric case study of a flagship public pedagogical university – one of the country's largest teacher-training institutions – over 2021–2025. The choice of a pedagogical university is deliberate: teacher

education is the largest single branch of Uzbek higher education by enrolment, it is priced at the lower bound of the tuition scale (the base annual fee for pedagogy programmes was raised from 6.4 to 7.4 million UZS only in 2024, the first revision in four years), and it carries a strategic public mission that constrains purely commercial behaviour [17]. The University thus represents a "hard case" for financial autonomy: if diversification and financial self-management can work here, they can work almost anywhere in the system.

We assemble a unique dataset from seven types of statutory annual financial statements – balance sheets, reports on financial performance, budget expenditure execution reports, tuition-contract cash-flow reports, Development Fund reports, receivables/payables statements and non-financial asset reports – covering five complete fiscal years. From these we construct (i) a five-year series of twenty-plus financial indicators and (ii) a panel of 45 expenditure observations disaggregated by funding source (state budget, tuition contract, Development Fund) and economic category (wages and equivalents, social contributions, other current and capital expenditure). The panel design converts a single-institution case into a genuine econometric object: it permits fixed-effects and first-difference estimation of revenue–expenditure elasticities with inference methods designed for small clustered samples (wild cluster bootstrap; jackknife), an approach rarely applied in the higher education finance literature.

The article makes three contributions. First, it provides – to our knowledge – the first econometric evidence on university financial behaviour under Uzbekistan's post-2021 autonomy reform, extending the resource-dependence tradition [18], [14] to a setting where the dependence structure itself was redesigned by decree. Second, it quantifies the hierarchy of expenditure adjustment – wages sticky, discretionary spending elastic – that theory predicts but single-country panels rarely isolate at the level of an individual institution's funding streams. Third, it documents, with audited balance-sheet data, the build-up of a receivables-driven liquidity risk that is the direct financial mirror of accrual-based tuition expansion; this risk profile closely parallels the financial sustainability concerns now documented by regulators in England [19] and the United States [20], and yields policy lessons that generalise well beyond the case.

The article first reviews the literature and develops the hypotheses, then describes the institutional setting, data and econometric methods. The results cover revenue diversification, budget execution, expenditure elasticities and liquidity. The discussion relates these findings to prior research and considers their policy implications.

1.1 Literature Review and Hypotheses

1.1.1 Financial management of public universities: from stewardship to strategy

The financial management of public higher education institutions has evolved from passive stewardship of state appropriations toward active strategic management of diversified revenue portfolios. The foundational analytical toolkit comes from the non-profit financial vulnerability literature: Tuckman and Chang [21] proposed the four-ratio screen – net-asset adequacy, revenue concentration, administrative cost share and operating margin – that still underlies most university financial health indices. Modern applications have grown considerably more sophisticated: Kelchen, Ritter and Webber [20] show, on a panel of United States institutions covering 2002–2023, that machine-learning models using liquidity, leverage and enrolment indicators substantially outperform traditional regulatory screens in predicting college closures, and that deteriorating data-reporting behaviour is itself a distress signal. Regulatory practice mirrors the academic evidence. In England, the Office for Students' financial sustainability monitoring found that 45 per cent of providers (124 institutions) forecast deficits for 2025/26 and that roughly one in six projected fewer than 30 days of liquidity [19]. These tools and findings define the benchmark against which any university's financial trajectory – including the one studied here – can be judged: concentration, margin and liquidity are the vital signs.

1.1.2 Funding models and the economics of cost-sharing

A second stream analyses how the design of public funding shapes institutional behaviour. Johnstone [4] formulated the canonical account of world-wide cost-sharing; Jongbloed and Vossensteyn [22] mapped the diffusion of formula-based and performance-oriented allocation across OECD systems. The American evidence quantifies the substitution between public and private revenue: Webber [23] estimates that a 1,000-dollar cut in per-student state funding raises tuition by about 257 dollars, with the pass-through rate tripling after 2000; Delaney and Doyle [24] show that legislatures treat higher education as a fiscal "balance wheel", cutting it disproportionately in recessions precisely because tuition can absorb the shock. Performance-based funding, the most prominent reform wave, has yielded sobering results: the systematic synthesis by Ortagus et al. [25] finds "null or modest positive effects" on completion alongside well-documented unintended consequences, and later work shows PBF redistributes resources away from under-resourced institutions [26]. Difference-in-differences evaluations of individual state programmes reach similar conclusions [27], [28]. In Europe, the EUA Autonomy Scorecard – the fourth edition benchmarks 35 systems – demonstrates that formal financial autonomy (the right to keep surpluses, borrow, own real estate and set fees) varies enormously and correlates with universities' capacity to diversify income [29]. For a university acquiring precisely these rights in 2022–2023, this literature predicts both the opportunity (diversification, strategic investment) and the risk (exposure to enrolment markets and price regulation) that autonomy brings. The U.S. State Higher Education Finance report tracks public appropriations and tuition revenue, providing a basis for monitoring changes in the balance between these funding sources [30].

1.1.3 Resource dependence theory and revenue–expenditure links

The theoretical backbone of this article is resource dependence theory (RDT): organisations are governed by those who control their critical resources, and changes in revenue composition therefore change internal priorities [18]. Applied to universities, RDT generates a testable prediction: expenditure patterns follow revenue sources. The empirical record confirms it. Leslie et al. [13], using a 24-year panel of 96 US research universities, show that at public institutions tuition revenue flows disproportionately into instruction, whereas other revenues are redirected strategically. Fowles [14], with an 11-year panel and instrumental variables, finds institutional expenditures "quite responsive" to revenue composition: greater tuition dependence shifts spending toward educational functions. Jaquette and Curs [15] demonstrate the recruiting analogue – appropriation cuts push public universities toward higher-paying non-resident students. Of direct relevance here, Kholmuminov, Kholmuminov and Wright [16] applied RDT to a panel of 62 Uzbek public universities over 2000–2013 and found a significant positive association between the tuition share of revenue and the teaching share of expenditure, together with steadily rising tuition dependence – evidence that Uzbek universities behaved as RDT predicts even before autonomy. Revenue diversification itself has become a measurable object: Trinh et al. [31], computing Herfindahl–Hirschman indices for 134 Vietnamese universities, find that tuition averages 67 per cent of income and that only 0.75 per cent of institutions achieve high diversification; Mgaiwa [32] documents the fiscal fragility of Tanzanian public universities dependent on erratic state releases; and Mao, Chen and Wang [33] show for China's 36 top universities that revenue structure, not just volume, drives academic output.

1.1.4 Efficiency, budget execution and accounting reform

Three adjacent literatures complete the frame. First, the efficiency literature (DEA and stochastic frontier) consistently links funding structure to performance: Wolszczak-Derlacz [34], analysing about 500 European and 1,000 US universities, finds that reliance on core government funding is associated with lower efficiency while competitive external income raises it; Johnes [35] and Titus et al. [36] provide the methodological anchors. Second, the public financial management literature treats budget execution – the

gap between approved and executed budgets – as a governance indicator in its own right: Addison [37] shows execution deviations are systematically larger where PFM institutions are weaker, which motivates our use of execution rates as a dependent variable. Third, the accounting-reform literature cautions that accrual and IPSAS-style transitions change what financial statements mean: adoption is widespread but heterogeneous [38], [39], and there is a recognised evidence gap on whether accrual reform actually improves decision-making [40]. This is not a technicality for our case: Uzbekistan's new budget accounting standards, applied to universities from 2024, materially altered the recognition of tuition receivables – a fact our analysis must, and does, confront directly [41], [10], [11]. Cross-country studies have also used a two-stage approach to compare efficiency across European higher education institutions [42].

1.1.5 Post-Soviet and Asian autonomy reforms

Finally, the comparative reform literature situates Uzbekistan's experiment. Kazakhstan corporatised 27 public universities into non-profit joint-stock companies from 2019, with roughly a third of students on state grants; qualitative evidence shows that formal autonomy collides with inherited centralised habits [43]. Russia concentrated excellence funding through Project 5-100 with measurable but partial results [44]. Vietnam's Resolution 77 pilot – 23 autonomous universities – offers the closest structural parallel: over six years, state subsidies to pilot universities fell 2.1-fold while their revenues and expenditures grew 1.5-fold, and tuition reached about 80 per cent of autonomous universities' income [45]. Ruziev and Burkhanov [46] documented the pre-reform Uzbek baseline: a centralised, quota-rationed system with tertiary enrolment near 9 per cent. Against this backdrop, Uzbekistan's 2021–2022 autonomy package is among the most rapid institutional redesigns attempted in the region – and the present study provides its first institution-level financial evaluation.

1.2 Hypotheses

The reviewed theory and evidence motivate four hypotheses about the University's financial management decisions:

1. H1 (Resource dependence). Expenditure from each funding source responds positively and significantly to that source's revenue; the short-run elasticity is below unity because retained balances allow consumption smoothing.
2. H2 (Expenditure hierarchy). Revenue elasticity is heterogeneous across economic categories: wage expenditures, protected by contracts and staffing commitments, are less elastic than discretionary current and capital expenditure.
3. H3 (Autonomy effect). The financial-independence period (2023–2025) is associated with an acceleration of expenditure growth conditional on revenue, and with measurable revenue diversification (declining Herfindahl–Hirschman concentration).
4. H4 (Execution discipline). Budget execution rates are high (above 85 per cent) and statistically indistinguishable across expenditure groups, but deteriorate in years of rapid plan expansion, reflecting absorptive-capacity constraints rather than group-specific protection.

2. Materials and Methods

2.1 Institutional setting and case selection

The case institution is a flagship public pedagogical university in Uzbekistan – among the largest teacher-training institutions in Central Asia by enrolment – which we anonymise as "the University" in line with research-ethics practice for single-institution financial case studies. The analysis uses the University's audited statutory financial statements. The University is a budget-funded state organisation that historically operated under full treasury control. Its recent institutional timeline maps directly onto the national reform sequence described in the Introduction: in 2021 it operated under the classical budget regime; from 2022 the system-wide financial independence framework of

Resolution PQ-61 came into force; a dedicated June 2022 transformation resolution granted the University academic, organisational and financial independence from 1 January 2023; and from the 2024 reporting year its accounts migrated to the new national budget accounting standards. In 2025 the institution was reorganised by presidential decree into a national flagship university for teacher training, with a consolidated faculty structure. The 2021–2025 window therefore brackets the complete transition from treasury spending unit to autonomous financial organisation – precisely the natural-experiment variation this study exploits.

A single-case design is appropriate here for three reasons. First, the reform is recent: system-wide audited micro-data for the autonomy period do not yet exist in accessible form, and the University's complete statement set is, to our knowledge, the richest institutional financial record yet assembled for this period. Second, the case is critical in the methodological sense: as a lower-priced, mission-constrained pedagogical institution, it provides a conservative test of autonomy's financial effects. Third, the panel disaggregation strategy described below converts the case into a genuine econometric sample, mitigating the classical small-N objection while remaining honest about external validity (see Limitations of Design).

2.2 Data Sources and Reporting Period

The analysis covers fiscal years 2021–2025 and uses the audited statutory financial statements described in the Introduction. The source reports distinguish state budget, tuition-contract and Development Fund accounts.

2.3 Variable construction

From the statements we construct three families of variables. (i) Financial-position and flow indicators: total accrued revenue and its three components – state budget financing, tuition-contract revenue, Development Fund revenue – total actual expenditure, the annual financial result, total assets, gross and net fixed assets, accumulated depreciation, inventories, cash balances by account, receivables and payables. (ii) Structure and risk indicators: revenue shares by source; the Herfindahl–Hirschman index of revenue concentration, $HHI = \Sigma\, s_i^2$ where s_i is the share of source i [31]; the extra-budgetary share; the fixed-asset wear ratio (accumulated depreciation to gross book value); receivables-to-assets and receivables-to-revenue ratios; and a liquidity ratio of liquid assets (cash, receivables, inventories) to current payables. (iii) Execution indicators: for budget allocations, the cash execution rate – cash expenditure as a percentage of the refined annual plan – by economic group (Group I wages and equivalents; Group II social contributions; stipends; Group IV other expenditures).

The econometric panel is built by exploiting the three-source, three-category structure of the expenditure accounts. For each year $t \in \{2021,\ldots,2025\}$, funding source $s \in$ {budget, tuition, development fund} and economic category $g \in$ {wages and equivalents; social contributions; other current and capital expenditure}, we record cash expenditure E_{sgt} and the accrued revenue of the corresponding source R_{st}. This yields a balanced panel of 45 observations formed by nine source–category units observed over five years. While the units share one institution, the funding streams are legally segregated accounts with distinct revenue processes, spending rules and treasury sub-accounts – the panel therefore captures genuine cross-sectional variation in resource dependence within a controlled institutional environment.

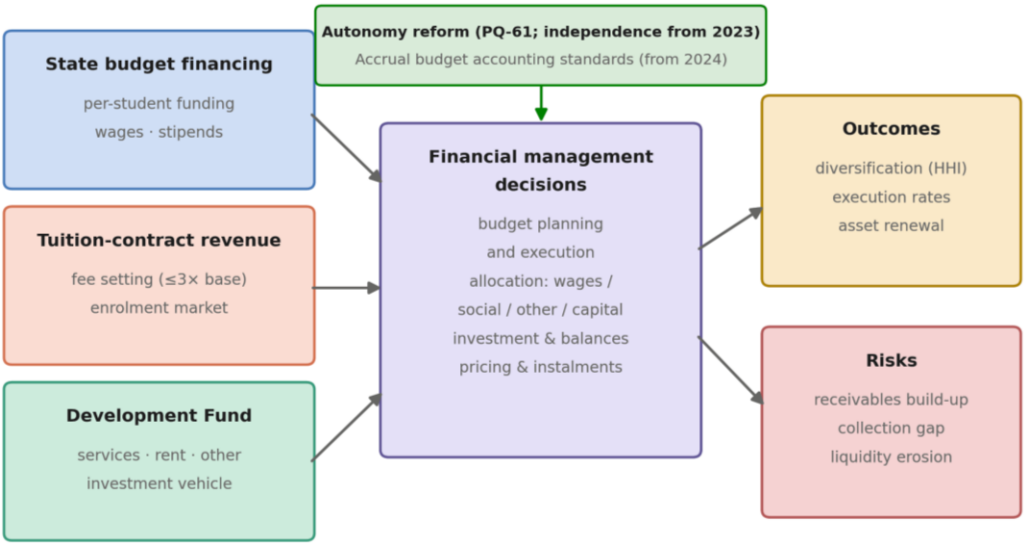

Figure 1. Analytical framework of the study: funding sources, decision variables, reform overlay and observed outcomes. Source: authors' elaboration

2.4 Econometric specification

Hypotheses H1–H3 are tested with log-linear expenditure equations. The baseline pooled specification with category fixed effects is:

$$\ln E_{sgt} = \alpha + \beta \ln R_{st} + \gamma AUT_t + \delta_g + \varepsilon_{sgt}, \quad (1)$$

where AUT_t is an indicator for the financial-autonomy period (2023–2025, dated from the University's own independence) and δ_g are category fixed effects. Because revenue varies at source–year level and scale differences across sources are large, we also estimate (1) with full source and category fixed effects, and a within-unit first-difference specification that removes all time-invariant unit heterogeneity:

$$\Delta \ln E_{sgt} = \beta^{FD} \Delta \ln R_{st} + \gamma AUT_t + \Delta \varepsilon_{sgt}. \quad (2)$$

Equation (2) identifies the short-run elasticity β^{FD} from year-on-year co-movement of expenditure and revenue within each source–category unit. Category-specific elasticities (H2) are obtained by interacting $\Delta \ln R$ with category indicators. Hypothesis H4 is tested on the budget-execution panel (four groups × five years):

$$EXEC_{gt} = \alpha + \theta \ln PLAN_{gt} + \gamma AUT_t + \delta_g + u_{gt}, \quad (3)$$

where $EXEC_{gt}$ is the cash execution rate and $PLAN_{gt}$ the refined plan.

Inference in short panels requires care. Throughout, standard errors are clustered at the unit level; given only nine (respectively four) clusters, conventional cluster-robust inference can over-reject, so we complement it with two small-sample methods: the wild cluster bootstrap with Rademacher weights (1,000–1,500 replications), which can improve inference with few clusters [47], and leave-one-unit-out jackknife re-estimation to verify that no single funding stream drives the results. Non-parametric Spearman rank tests support the trend analysis of diversification and receivables. We deliberately abstain from methods whose asymptotics five annual observations cannot support (unit-root, cointegration or VAR analysis) and interpret time-series correlations descriptively. All computations were performed in Python 3 (statsmodels 0.14).

2.5 Limitations of design

Three limitations bound the interpretation. First, external validity: one institution cannot represent 116 state universities, although the critical-case logic and consistency with sector-wide evidence (Discussion) mitigate the concern. Second, the autonomy indicator captures a period, not an isolated treatment: it absorbs concurrent shocks – notably the 2024 accounting reform and national wage policy – and is interpreted as the joint effect of the autonomy-era policy package. Third, accrual-basis revenue in 2022 embeds a recognition anomaly (multi-year contract sums recognised during the transition to financial independence), which we flag wherever it affects estimates and address by

jackknife exclusion. None of these caveats, we argue, overturns the central findings, which rest on within-panel variation and audited balance-sheet stocks.

3. Results

3.1 Scale, composition and diversification of revenue

Table 1 summarises the University's consolidated financial trajectory. Total accrued revenue rose from 204.5 billion UZS in 2021 to a peak of 539.6 billion in 2022, before settling at 400.7, 331.9 and 323.7 billion in 2023–2025; total actual expenditure grew monotonically from 138.9 to 289.7 billion UZS, a compound annual growth rate of 20.2 per cent against 12.2 per cent for revenue. The 2022 revenue spike is largely an accrual artefact of the independence transition – tuition income recognised that year (469.1 billion UZS) includes multi-year contract amounts booked during the account restructuring – and we therefore read the underlying revenue trend through its components rather than the headline total. In real terms (2021 prices), expenditure grew from 138.9 to 201.4 billion UZS (+45 per cent over four years), while real revenue in 2025 (225.0 billion) stood 10 per cent above its 2021 level: the University expanded activity substantially faster than inflation, but the gap between revenue and expenditure growth narrowed sharply – the accrued financial result fell from a peak of 321.8 billion UZS in 2022 to 40.4 billion in 2025, compressing the savings rate from 59.6 to 12.5 per cent of revenue (Figure 3).

Table 1. Key financial indicators of the University, 2021–2025 (billion UZS unless otherwise noted)

Indicator	2021	2022	2023	2024	2025
Total accrued revenue	204.5	539.6*	400.7	331.9	323.7
of which: state budget financing	39.8	56.5	86.0	74.4	131.0
tuition-contract revenue	148.0	469.1*	298.8	233.8	177.8
Development Fund revenue	16.8	13.9	15.9	23.6	14.9
Total actual expenditure	138.9	217.7	262.0	232.8	289.7
Financial result of the year	65.6	321.8	138.6	104.9	40.4
Savings rate, % of revenue	32.1	59.6	34.6	31.6	12.5
Total assets (year-end)	358.6	528.4	522.3	610.1	621.8
Gross fixed assets (year-end)	78.6	94.7	133.4	142.0	150.4
Fixed-asset wear ratio, %	40.8	42.7	31.1	37.6	36.6
Cash and equivalents (year-end)	261.7	401.1	328.2	302.1	48.8
Receivables (year-end)	36.6	68.2	97.6	215.5	441.3
Payables (year-end)	230.4	55.7	13.0	23.4	30.6
Receivables, % of total assets	10.2	12.9	18.7	35.3	71.0

Note: * – the 2022 tuition figure embeds accrual recognition of multi-year contract amounts during the transition to financial independence (see Limitations of Design). 2024–2025 statements follow the new budget accounting standards. Source: authors' calculations from the University's statutory financial statements.

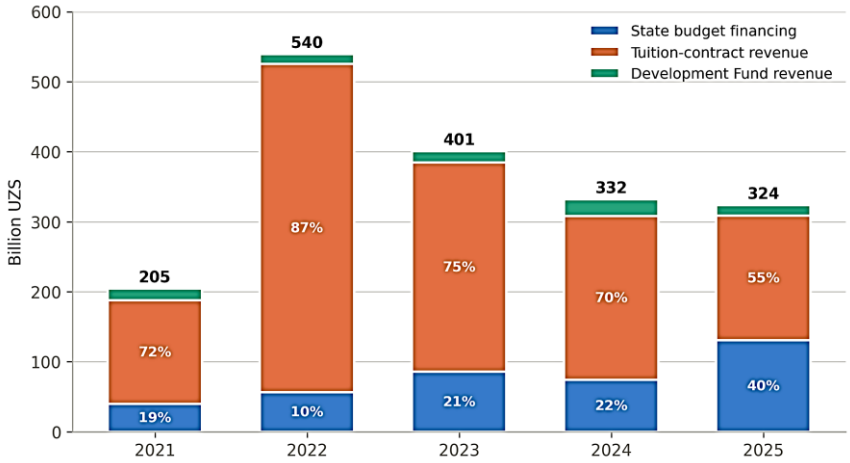

Figure 2. Revenue of the University by source, 2021–2025, billion UZS (labels show source shares of total). Source: authors' calculations from the University's reports on financial performance.

The composition of revenue shifted fundamentally (Figure 2). State budget financing more than tripled in nominal terms, from 39.8 billion UZS in 2021 to 131.0 billion in 2025 (CAGR 34.7 per cent), lifting the budget share of revenue from 19.4 to 40.5 per cent. The tuition-contract share fell correspondingly from a 2022 peak of 86.9 per cent to 54.9 per cent in 2025, while the Development Fund contributed a comparatively stable 2.6–8.2 per cent. Two forces drove the re-balancing: the doubling of state grant places nationally between 2019/20 and 2024/25 combined with per-student budget financing introduced by the autonomy framework, and – from 2025 – large targeted budget allocations accompanying the University's designation as a national flagship institution. The Herfindahl–Hirschman index of revenue concentration consequently fell from a peak of 0.77 in 2022 to 0.47 in 2025 (Figure 7), and the extra-budgetary share declined from 89.5 to 59.5 per cent. Measured against the Vietnamese benchmark distribution of Trinh et al. [31] – where 71 per cent of universities show weak-to-moderate diversification and tuition averages 67 per cent of income – the University moved, within three years, from the highly concentrated tail toward the moderately diversified middle of the international distribution. This trajectory supports the diversification component of H3, although the Spearman trend test on five annual HHI observations falls short of conventional significance ($\rho = -0.70$, $p = 0.19$), reflecting the short sample rather than the absence of a trend.

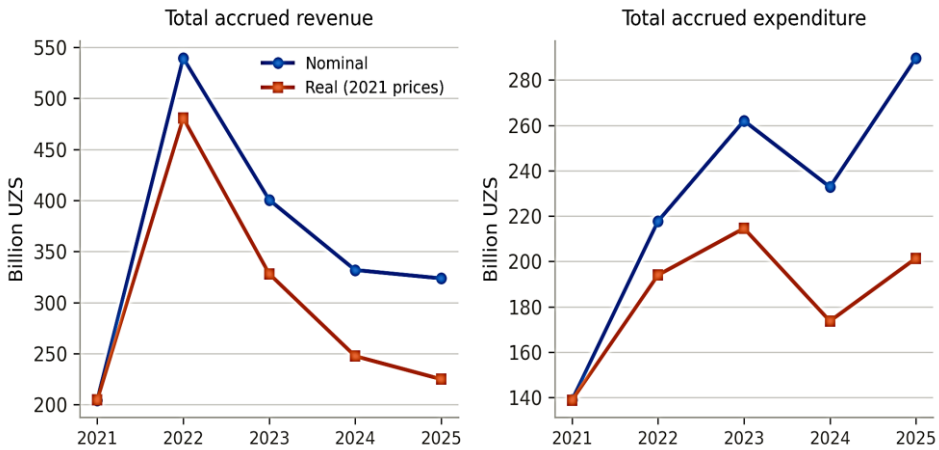

Figure 3. Nominal and real (2021 prices) accrued revenue and expenditure, billion UZS. Source: authors' calculations; deflated by chained official year-end CPI.

3.2 Expenditure structure

Disaggregation by funding source and economic category reveals the behavioural signature of the reform (Table 2). Personnel costs dominate but decreasingly so: wages and social contributions absorbed 74.9 per cent of tuition-account cash expenditure in 2021 but 38.4 per cent in 2025, as the University redirected contract revenue toward development purposes – capital repair, equipment, information technology and, in 2024–2025, co-financing of major infrastructure. Symmetrically, Group IV "other" expenditures from the tuition account grew from 23.4 to 245.6 billion UZS. On the budget side, the expansion of state financing was absorbed primarily by Group I – wages, equivalents and stipends – whose cash execution rose from 33.5 billion UZS in 2021 to 54.4 billion in 2025, within which stipends alone doubled from 16.3 to 33.5 billion, consistent with the state's use of the University as a channel for national teacher-workforce and student-support policy. The Development Fund, small in scale, behaved as a genuine investment vehicle: its capital expenditure component jumped from near zero in 2021–2023 to 6.3 billion UZS in 2025. Gross fixed assets nearly doubled over the window (78.6 to 150.4 billion UZS), while the wear ratio improved from 40.8 to 36.6 per cent, indicating that investment outpaced depreciation – a rare pattern among post-Soviet public universities, where capital stock decay is the norm.

Table 2. Cash expenditure by funding source and economic category, billion UZS

Source and category	2021	2022	2023	2024	2025
Tuition-contract account – total	93.0	98.7	116.3	248.9	398.6
Group I: wages and equivalents	56.4	55.0	82.7	135.8	151.5
Group II: social contributions	13.3	13.0	9.3	2.4	1.5
Group IV: other current and capital	23.4	30.7	24.3	110.7	245.6
Personnel share (I+II), %	74.9	68.9	79.1	55.5	38.4
Budget allocations – total	38.7	30.9	47.0	71.2	99.8
Group I: wages, equivalents and stipends	33.5	27.0	25.9	46.4	54.4
of which stipends	16.3	13.6	16.3	28.6	33.5
Group II: social contributions	4.4	3.3	1.2	2.0	2.4
Group IV: other expenditures	0.8	0.6	19.9	22.7	43.0
Development Fund – total	1.7	1.0	2.4	7.6	28.0
of which capital expenditure	0.24	0.00	0.06	0.53	6.29

Note: cash execution by treasury accounts. Source: authors' calculations from Forms 2, 4 and 4009.

3.3 Budget execution discipline

Execution of the budget-funded expenditure estimate was generally strong but uneven across years (Figure 4, Table 3). The aggregate cash execution rate was 88.2 per cent in 2021, 99.7 and 99.5 per cent in 2022–2023, 95.8 per cent in 2024 and 86.2 per cent in 2025. Regression (3) confirms the visual pattern: no expenditure group is executed systematically better or worse than others once year variation is accounted for – group coefficients are individually and jointly insignificant – and neither plan size nor the autonomy dummy predicts execution (Table 4, column 5). What does correlate with under-execution is plan expansion: the two weakest years are 2021, when pandemic-period plan revisions disrupted spending schedules, and 2025, when the refined plan rose 55.8 per cent year-on-year to 115.8 billion UZS and 16.0 billion of it – 14 per cent – went

unspent. This supports H4: execution shortfalls at the University reflect absorptive-capacity limits during rapid scale-up, not chronic indiscipline or the protection of particular line items. The pattern echoes the cross-country finding of Addison [37] that execution deviations concentrate where budgets change fastest, and suggests that the treasury's refined-plan mechanism, rather than institutional management, is the binding constraint in expansion years.

Table 3. Execution of the budget expenditure estimate, per cent of the refined annual plan

Economic group	2021	2022	2023	2024	2025
Group I: wages and equivalents	88.5	99.8	99.1	97.5	79.7
of which stipends	92.4	100.0	99.9	98.4	87.8
Group II: social contributions	87.3	100.0	99.9	91.3	77.6
Group IV: other expenditures	83.0	95.1	99.9	92.8	96.7
Total	88.2	99.7	99.5	95.8	86.2

Note: cash expenditure as a percentage of the refined annual plan (Form 2). Source: authors' calculations.

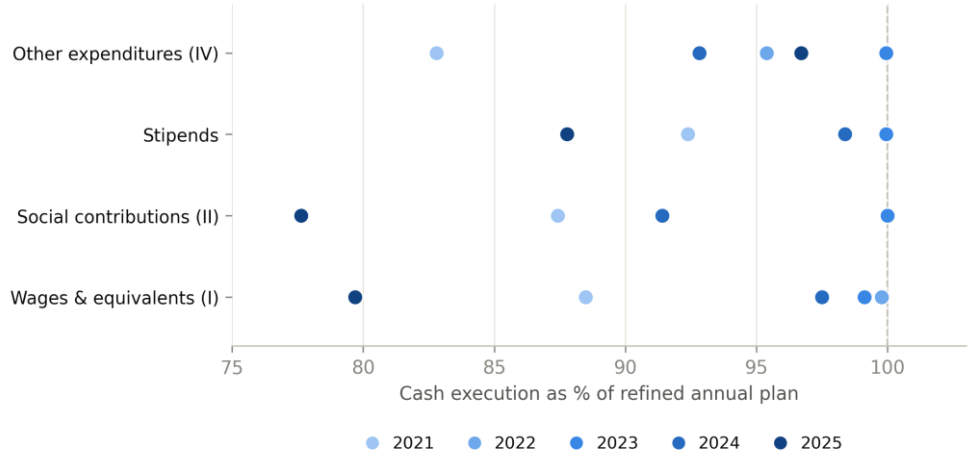

Figure 4. Cash execution of the budget expenditure estimate by economic group, 2021–2025 (per cent of refined annual plan). Source: authors' calculations from Form 2 reports.

3.4 Econometric estimates: revenue dependence and the autonomy effect

Table 4 reports the regression evidence. The pooled specification (column 1) yields a revenue elasticity of expenditure of 1.42 (cluster-robust $p < 0.001$): across funding streams, a 1 per cent difference in source revenue is associated with a 1.4 per cent difference in expenditure – an elasticity above unity that reflects both within-stream adjustment and the strong cross-sectional scale gradient between the tuition, budget and Development Fund accounts. Once full source and category fixed effects absorb that gradient (column 2), the elasticity falls to 0.38 and loses significance, and in the first-difference specification (column 3) the short-run within-unit elasticity is 0.60 (wild-bootstrap $p = 0.15$; conventional cluster $p = 0.13$). The point estimate – positive, below unity, and stable across jackknife exclusions (range 0.44–0.75 for first differences; −0.04 to 0.66 for fixed effects) – supports the smoothing version of H1: expenditure follows own-source revenue, but the University's ability to carry balances across years (a right granted precisely by the autonomy framework) damps the year-to-year transmission to roughly 0.6, so that a 10 per cent revenue shock moves same-year spending by about 6 per cent. That the elasticity

is imprecisely estimated is an honest reflection of five annual transitions; we emphasise the consistency of sign and magnitude across estimators over any single p-value.

Table 4. Regression estimates: determinants of expenditure and budget execution

Variable	(1) Pooled OLS, ln E	(2) FE (source + category), ln E	(3) First differences, Δln E	(4) FD by category, Δln E	(5) Execution rate, EXEC
ln R (source revenue)	1.422*** (0.134)	0.379 (0.606)	—	—	—
Δln R (source revenue)	—	—	0.604 (0.394) [p_boot = 0.15]	—	—
Δln R × wages	—	—	—	0.238 (0.282)	—
Δln R × social contributions	—	—	—	0.735 (0.689)	—
Δln R × other expenditure	—	—	—	0.841 (0.590)	—
Autonomy period (2023–2025)	0.089 (1.244)	0.606 (0.599)	1.024*** (0.313)	1.024*** (0.320)	0.082 (4.009)
Autonomy × extra-budgetary	0.406 (1.364)	—	—	—	—
ln PLAN (refined plan)	—	—	—	—	0.051 (1.901)
Category fixed effects	Yes	Yes	(differenced out)	(differenced out)	Yes
Source fixed effects	No	Yes	(differenced out)	(differenced out)	—
Observations	45	45	36	36	20
R^2	0.776	0.796	0.175	0.191	0.050

Note: dependent variables: columns 1–2 – log cash expenditure of source–category units; columns 3–4 – its first difference; column 5 – cash execution rate of budget line groups, %. Cluster-robust standard errors in parentheses (clusters: nine source–category units in columns 1–4; HC1 in column 5). p_boot – wild cluster bootstrap p-value (Rademacher weights, 1,000–1,500 replications). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Source: authors' estimations.

Category heterogeneity (column 4) is economically large and consistent with H2. The short-run elasticity is 0.24 for wages and equivalents, 0.73 for social contributions and 0.84 for other current and capital expenditure: discretionary spending responds about three-and-a-half times more strongly to revenue movements than wages, which are insulated by employment contracts, tariff commitments and – after 2021 – national mandates on academic salaries. This hierarchy of adjustment mirrors, at institutional level, the protection patterns documented for US universities [13] and confirms that the University manages revenue volatility primarily through the timing of purchases, maintenance and investment rather than through payroll.

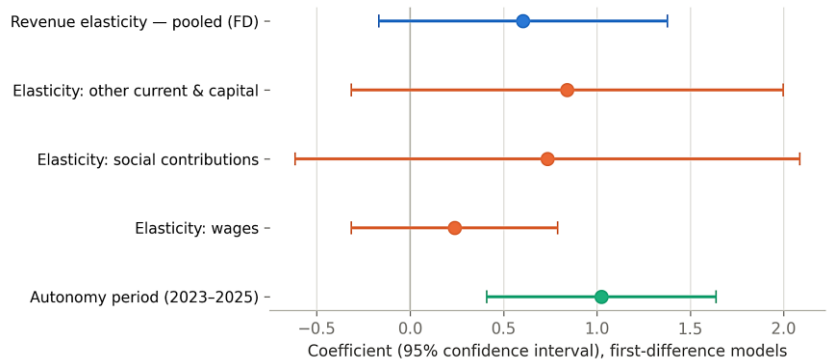

Figure 5. First-difference estimates with 95 per cent confidence intervals (cluster-robust). Source: authors' estimations (Table 4, columns 3–4).

The autonomy-period effect is the most robust coefficient in the system. In first differences, expenditure growth in 2023–2025 exceeds pre-autonomy growth by 1.02 log points conditional on revenue growth ($p = 0.001$; significant in every jackknife replication), and the effect is statistically indistinguishable between budget and extra-budgetary streams (column 2 of the interaction specification: the autonomy × extra-budgetary term is small and insignificant). Substantively: after gaining financial independence the University systematically spent down accumulated balances and accelerated real activity across all funding streams – exactly the behavioural shift from balance hoarding to programme execution that the autonomy legislation intended. Combined with the diversification evidence of Results.1, this constitutes strong support for H3.

3.5 The receivables build-up: an emerging liquidity risk

The balance sheet, however, records the cost of expansion (Figure 6, Table 1). Accounts receivable – overwhelmingly student tuition receivables – grew from 36.6 billion UZS at end-2021 to 68.2 (2022), 97.6 (2023), 215.5 (2024) and 441.3 billion (2025): a compound growth rate of 86.4 per cent per annum, a doubling time of 13 months, and a perfectly monotonic trend (Spearman $\varrho = 1.00$, $p < 0.001$). Receivables rose from 10.2 to 71.0 per cent of total assets and from 17.9 to 136.3 per cent of annual revenue. Mirror-wise, year-end cash and equivalents collapsed from 302.1 billion UZS at end-2024 to 48.8 billion at end-2025; across the five years the correlation between annual changes in receivables and changes in cash is −0.81. The composite liquidity ratio remains formally comfortable (16.4 at end-2025) only because receivables themselves are counted among liquid assets; cash alone covered just 1.6 times current payables at end-2025, against 12.9 a year earlier.

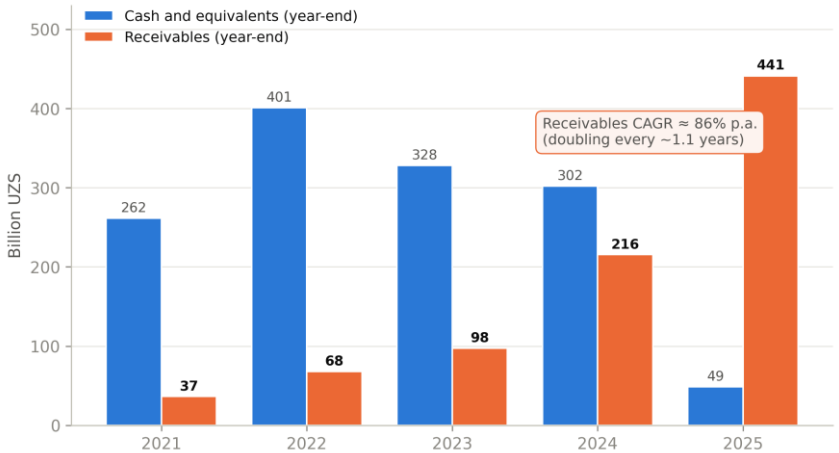

Figure 6. Year-end cash balances and receivables, billion UZS. Source: authors' calculations from balance sheets

Three mechanisms jointly explain the build-up, and their relative weight matters for policy. First, an accounting mechanism: from 2024 the new budget accounting standards recognise accrued tuition claims for the full academic year (and the balance-sheet posting of multi-year contract relations changed), so part of the 2024–2025 jump is a measurement effect of the accrual transition – the receivables and revenue series are not fully comparable across the 2023/2024 boundary. Second, a price-and-volume mechanism: contract prices rose by about 15 per cent in 2024 after a four-year freeze, and enrolment continued to expand, mechanically raising the stock of claims outstanding at year-end. Third – and most consequential – a collection mechanism: cash actually collected lagged accrued income persistently (the cash-to-accrual gap on the tuition account widened from 8.3 per cent in 2021 to 36.2 per cent in 2024 and 52.7 per cent in 2025), indicating that a growing fraction of billed tuition remains unpaid within the year. Even under the most conservative reading – attributing the entire 2024 level shift to accounting – the pre-reform trajectory (86.5 and 43.1 per cent growth in 2022–2023, under unchanged accounting) already signalled structural deterioration in collection. The University has, in effect, become an involuntary consumer lender to its student body at a scale approaching half a trillion soums, without the credit-risk management apparatus such a portfolio requires.

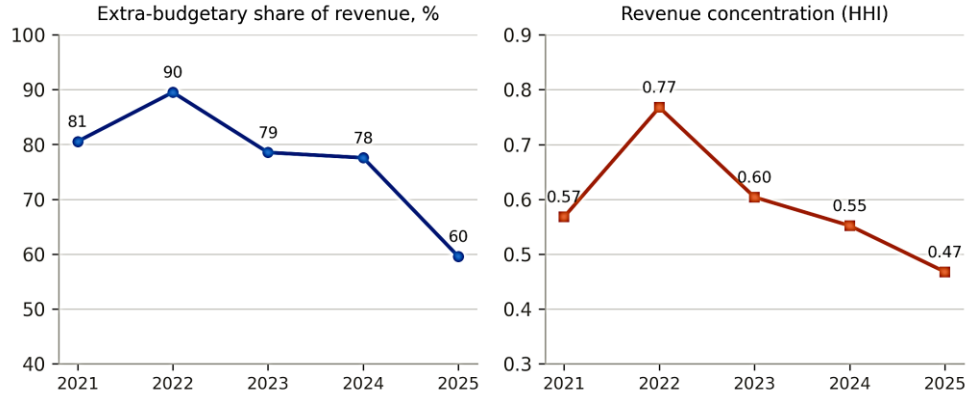

Figure 7. Revenue diversification: extra-budgetary share (left) and Herfindahl–Hirschman concentration index (right). Source: authors' calculations

4. Discussion

4.1 Resource dependence under redesigned dependence

The results extend resource dependence theory in a setting its founders could hardly have envisaged: one where the state deliberately redesigned the dependence structure of its universities by decree. The core RDT prediction – expenditure follows revenue – survives the redesign. The within-unit elasticity of 0.60, with wages at 0.24 and discretionary spending at 0.84, reproduces at the level of a single institution's funding streams what Fowles [14] and Leslie et al. [13] found across hundreds of US universities: revenue composition, not merely revenue volume, shapes spending behaviour, and the adjustment burden falls on discretionary categories. The comparison with Kholmuminov et al. [16] is instructive. In their 2000–2013 panel, Uzbek universities were becoming ever more tuition-dependent – resource concentration was rising. Our case documents the reversal of that trajectory: the tuition share of the University's revenue fell by 32 percentage points from its 2022 peak, and the HHI declined from 0.77 to 0.47, driven by the per-student budget financing and flagship allocations of the autonomy era. Uzbekistan thus offers a rare natural experiment in managed re-diversification – the state buying back influence over a system it had allowed to drift toward household financing. RDT would predict that this re-balancing shifts internal priorities toward state objectives;

the expenditure record confirms it, with budget-side growth concentrated in wages and stipends, the categories through which national teacher-policy mandates operate.

4.2 The autonomy dividend – and its price

The autonomy period brought a statistically robust acceleration of expenditure (+1.02 log points conditional on revenue) and a visible reorientation from personnel toward investment: the personnel share of tuition-account spending nearly halved, gross fixed assets almost doubled, and the wear ratio improved – a pattern consistent with the intended logic of Resolution PQ-61, which allowed universities to retain balances and spend them on development. The Vietnamese parallel is close: under Resolution 77 [45], autonomous universities raised revenues and expenditures 1.5-fold while state subsidies fell 2.1-fold. The Uzbek case differs in one crucial respect – the state did not withdraw; it expanded its financing 3.3-fold in nominal terms while granting autonomy, a "both-and" strategy closer to China's Double First-Class model of concentrated public investment [33] than to the substitution logic of Anglo-American systems [23], [24].

Yet the balance sheet records autonomy's price. The receivables build-up documented in The Receivables Build-up is structurally identical to the risk that regulators elsewhere monitor as the leading indicator of institutional distress: revenue recognised but not collected, liquidity eroding beneath a formally healthy income statement. In England, the Office for Students now reports 45 per cent of providers in forecast deficit and one in six with under 30 days of liquidity [19]; in the United States, closure-prediction models weight liquidity and receivables quality heavily [20]. The University's cash position – 48.8 billion UZS at end-2025 against annual expenditure of 289.7 billion – corresponds to roughly two months of operating outlays, a level the English regulator would classify as requiring enhanced monitoring. The comparison should not be overdrawn: the University's claims are on a growing student market with rising household demand, in an economy expanding at 6–7 per cent, and a substantial share of the 2024–2025 receivables jump is an accrual-accounting artefact. But the collection-gap evidence (cash lagging accrual by 53 per cent on the tuition account in 2025) is not an artefact, and it converts a bookkeeping observation into a management problem: tuition pricing above household liquidity, instalment schedules back-loaded beyond the fiscal year, and the absence of provisioning for doubtful student debt.

4.3 Execution, absorptive capacity and the accounting transition

The budget-execution findings qualify a common narrative about post-Soviet public financial management. The University is not an undisciplined spender: in stable years it executes 99–100 per cent of its refined plan across every economic group. Under-execution appears exactly when plans expand fastest – 2021 (COVID-era plan volatility) and 2025 (a 56 per cent plan increase in the flagship year) – matching by Addison [37] cross-country result that execution quality is a function of budget stability. For the design of Uzbekistan's per-student funding formula, this implies that the binding constraint on absorbing larger state allocations is procedural (procurement cycles, treasury release timing, capital project readiness) rather than motivational; funding surges should be accompanied by multi-year commitment authority, which the 2025–2030 public financial management strategy indeed envisages [48]. The accounting transition tells a parallel story consistent with the IPSAS literature: accrual reform changed what the numbers mean before it changed how decisions are made [40]. The 2024 restatement simultaneously revealed the true scale of the University's claims on students – information invisible under cash accounting – and broke series comparability. Both effects argue for what Christiaens et al. [38] call the "reform-completion" agenda: accrual recognition is only useful if paired with provisioning rules, ageing analysis and collection accountability, none of which the current statement formats yet require.

4.4 Policy implications

Five implications follow. First, receivables governance should become a supervisory-board priority: quarterly ageing reports, provisioning for claims outstanding beyond

twelve months, and collection KPIs for faculties would convert an invisible risk into a managed portfolio. Second, instalment design should be aligned with the fiscal year – front-loading a larger share of annual tuition before year-end, with hardship-based exceptions – while the national student-loan infrastructure now being built with international financial institutions (the 250-million-dollar EduImkon programme approved in 2025) offers the systemic solution: shifting student credit risk from university balance sheets to specialised lenders [49]. Third, liquidity floors: an internal policy of holding cash equal to at least three months of operating expenditure would have flagged the 2025 position a year in advance. Fourth, the state funding formula should reward diversification rather than replace it: the University's experience shows budget expansion and extra-budgetary development can be complements, but only if per-student financing follows enrolment predictably enough to plan against. Fifth, disclosure: publishing universities' audited statements in machine-readable form would allow the sector-wide replication of this study's methods, moving Uzbekistan toward the regulatory analytics now standard in England and the United States.

5. Conclusion

This article has provided the first econometric account of financial management decisions inside a public university during Uzbekistan's transition to institutional financial autonomy, using a hand-collected panel from five years of audited statutory statements. The evidence supports a coherent narrative. The University behaves as resource dependence theory predicts: expenditure tracks own-source revenue with a short-run elasticity of about 0.6, and the adjustment is borne by discretionary spending (elasticity 0.84) while wages remain protected (0.24). Autonomy changed behaviour in the intended direction – expenditure growth accelerated by roughly one log point conditional on revenue, balances accumulated under treasury control were converted into investment, gross fixed assets nearly doubled, and revenue concentration fell from an HHI of 0.77 to 0.47 as tripled state financing re-balanced a tuition-heavy portfolio. Budget execution remained essentially complete in stable years, with shortfalls confined to episodes of rapid plan expansion. The reform's unresolved liability is financial rather than managerial: a receivables portfolio growing at 86 per cent per annum, reaching 71 per cent of assets, against a cash position that fell six-fold in the final year – the joint product of accrual-accounting recognition, tuition growth and, most importantly, a widening collection gap.

The study's limitations chart the research agenda. A single institution, five annual observations and a period-level autonomy indicator cannot deliver causal certainty; the 2024 accounting transition breaks series comparability precisely where the risk indicators move most; and cash-basis category data limit the expenditure panel to nine units. Replication across the 116 state universities – feasible as soon as statement-level data are disclosed – would allow difference-in-differences designs exploiting the staggered granting of financial independence, and event-study analysis of the 2024 accrual transition. Extension to quarterly treasury data would sharpen the liquidity analysis. Finally, linking financial behaviour to academic outcomes – the efficiency frontier tradition of Wolszczak-Derlacz and the output evidence of Mao et al. – remains the ultimate test of whether autonomy's financial dividend purchases educational quality. For policymakers, the message of this case is balanced: Uzbekistan's autonomy reform demonstrably activated university financial management, but autonomy without credit-risk governance converts universities into unsecured lenders. Completing the reform means building the receivables, liquidity and disclosure infrastructure that autonomous finance requires.

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