attention to their history and culture, makes students more confident users of English as an international language.

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FOREIGN INVESTMENT AND REGIONAL INDUSTRIAL GROWTH IN UZBEKISTAN: PANEL EVIDENCE FROM 14 REGIONS, 2017–2025

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Annotation. This article tests whether foreign investment and loans per capita are associated with faster growth of industrial output per capita across 14 regions of Uzbekistan, using an official SIAT panel for 2017–2025. A two-way fixed-effects model (region and year effects, region-clustered standard errors) finds no association: the coefficient on lagged log investment per capita is 0.004 (p = 0.87), on same-year investment –0.019 (p = 0.62), and the results are unchanged

when Navoi and Tashkent city are excluded (–0.002, p = 0.93; –0.027, p = 0.47). The raw pooled correlation between growth and lagged investment is negative (r = –0.27), which disappears within regions, and the cross-section rank link between cumulative investment and 2017–2024 growth is weak (Spearman ρ = 0.16; p = 0.57). Given 14 regions, nominal values, a constant population snapshot and the fact that foreign investment is only part of total investment, the results show no evidence of an effect rather than evidence of no effect.

Keywords: foreign investment, regional industrial growth, panel data, fixed effects, Uzbekistan, regional policy.

Introduction

Foreign investment and loans have risen sharply in Uzbekistan, from UZS 17.1 trillion in 2017 to UZS 433.9 trillion in 2025 [1], and regional programmes treat them as a driver of industrial growth. Whether regions that attract more foreign capital per head actually grow faster in industry is an empirical question that the official regional series allow us to test directly. A cross-section comparison of 14 regions showed no clear link in an earlier study [5]; this article moves to a panel design that controls for permanent regional differences and common yearly shocks.

The aim is to estimate the association between foreign investment and loans per capita and the growth of industrial output per capita across regions in 2017–2025. Hypotheses: H1 — lagged investment per capita is positively associated with output growth within regions; H2 — the result holds when the two outlier regions (Navoi and Tashkent city) are excluded; H3 — the raw pooled association differs from the within-region association because of permanent regional differences. The study is part of the author's work on regional investment policy and the investment dimension of the textile industry.

Literature review

Foreign capital is expected to raise growth through technology transfer and capital accumulation, but cross-country evidence shows that the effect depends on the host country's absorptive capacity, notably human capital [3]. Fixed-effects panels remove time-invariant regional characteristics, while with few regions the standard errors clustered by region have to be treated with care [4]. These points define the design here: a within-region estimate with clustered errors and cautious reading of precision.

Data and methods

Data. Foreign investment and loans in fixed capital (UZS billion, current prices, 14 regions, 2017–2025) [1] and industrial output per capita (thousand UZS, current prices, 2017–2024) [2] come from the SIAT portal of the National Statistics Committee; regional values of investment sum to the national value in every year. Population by region (1 January 2024) [6] is used to express investment per capita; it is held constant, so within-region variation in investment per capita comes only from the investment flow. All values are nominal; year effects absorb the common price level.

Model. $g(it) = \alpha(i) + \gamma(t) + \beta \cdot x(it) + \varepsilon(it)$, where $g(it)$ is the log change in industrial output per capita of region i in year t (2018–2024; 7 years), $x(it)$ is the log of foreign investment per capita in year t or t–1, $\alpha(i)$ are region effects, $\gamma(t)$ year effects. Standard errors are clustered by region (14 clusters, t13 reference distribution). Five specifications are reported: same-year and lagged investment, each for all regions and excluding Navoi and Tashkent city, and a specification in the growth of investment. Raw pooled and cross-section correlations (Pearson and Spearman) are given for comparison.

Results

Descriptive picture. Mean annual log growth of industrial output per capita is 23.6 per cent (nominal; standard deviation 14.2 percentage points across region-years). Table 1 shows that regions differ widely in both growth and investment intensity: Navoi received UZS 54.7 million per head in 2017–2023 and grew 32.5 per cent a year, while Kashkadarya received 19.9 million and grew 16.1 per cent; but Syrdarya (37.2 million, 21.9 per cent) and Tashkent city (34.4 million, 21.4 per cent) received much and grew relatively slowly, and Khorezm (7.7 million) grew 26.1 per cent. The cross-section rank association between cumulative investment per capita and 2017–2024 growth is weak (Spearman $\rho = 0.16$, $p = 0.57$; Pearson $r = 0.34$, $p = 0.24$).

Table 1.

Regional output growth and foreign investment per capita

Region	Initial output per capita 2017, thousand UZS	Output per capita 2024, thousand UZS	Avg. annual growth, %	Foreign inv. per capita 2017–2023, million UZS
Navoi	13 755.1	134 209.0	32.5	54.7
Syrdarya	4 702.3	21 751.7	21.9	37.2
Bukhara	3 458.6	20 501.3	25.4	34.7
Tashkent city	12 460.5	55 807.3	21.4	34.4
Jizzakh	1 941.2	16 357.3	30.4	21.0
Kashkadarya	3 509.9	10 865.8	16.1	19.9
Tashkent reg.	7 624.6	44 983.4	25.4	19.9
Surkhandarya	947.0	4 746.9	23.0	13.3
Karakalpakstan	3 701.4	12 064.0	16.9	11.1
Namangan	1 724.8	10 228.2	25.4	10.9
Andijan	4 442.4	26 439.6	25.5	9.2
Samarkand	2 507.4	10 676.7	20.7	8.4
Fergana	2 708.0	11 185.8	20.3	7.8
Khorezm	2 272.9	14 120.6	26.1	7.7

Source: SIAT [1; 2], population [6]; author's calculations. Nominal values; investment per capita uses population at 1 January 2024. Ordered by cumulative foreign investment per capita.

Panel estimates (H1, H2). Table 2 shows that no specification yields a significant coefficient. For lagged investment per capita the coefficient is 0.004

(cluster s.e. 0.025, p = 0.87) for all regions and –0.002 (p = 0.93) excluding Navoi and Tashkent city; for same-year investment it is –0.019 (p = 0.62) and –0.027 (p = 0.47). The specification in investment growth gives –0.022 (p = 0.26). The within R^2 never exceeds 0.012. H1 and H2 are not supported: there is no evidence of a positive within-region association, and the conclusion is the same with and without the outliers. An estimate of 0.004 with a standard error of 0.025 means that a 10 per cent difference in lagged investment per capita is associated with a change in growth of about 0.04 percentage points, and the 95 per cent interval (roughly ±5 points per unit of log investment) cannot exclude effects of economic interest in either direction.

Table 2.

Two-way fixed-effects estimates: output growth per capita on foreign investment per capita

Specification	Regressor	Coefficient	Cluster s.e.	p-value	Within R^2	Obs.
(1) Same year, all regions	ln(inv. per capita), t	-0.0187	0.0369	0.62	0.005	98
(2) Same year, excl. Navoi and Tashkent city	ln(inv. per capita), t	-0.0274	0.0369	0.47	0.012	84
(3) Lagged, all regions	ln(inv. per capita), t−1	0.0041	0.0247	0.87	0.000	98
(4) Lagged, excl. Navoi and Tashkent city	ln(inv. per capita), t−1	-0.0018	0.0206	0.93	0.000	84
(5) Growth of investment, same year	Δ ln(inv. per capita), t	-0.0220	0.0188	0.26	0.008	98

Source: author's calculations from SIAT [1; 2]. Dependent variable: log change in industrial output per capita, 2018–2024. Region and year fixed effects; standard errors clustered by region (14 clusters). Nominal values.

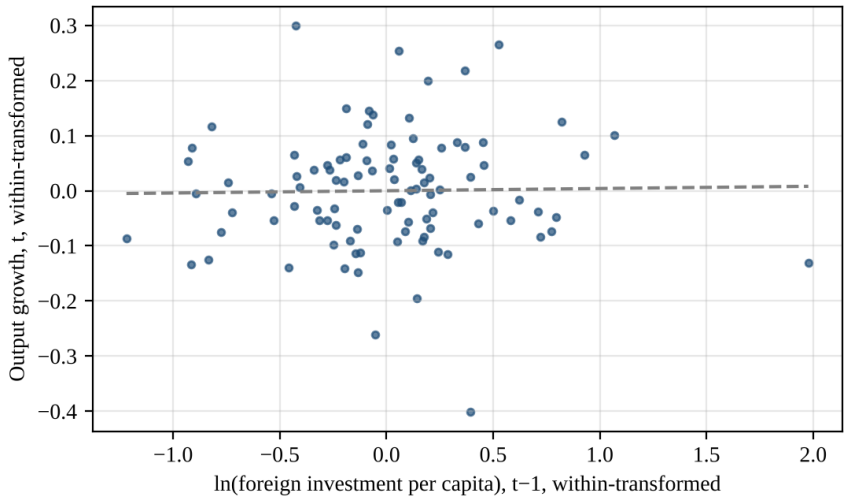

Figure 1. Within-region association between lagged investment per capita and output growth (both after removing region and year means)

Raw versus within association (H3). Pooling all region-years, growth is negatively correlated with lagged log investment per capita (Pearson r = –0.27; the

naive p-value of 0.008 ignores clustering and should not be read as evidence). The negative sign reflects permanent differences between regions — regions that started with a high level (such as Navoi, Tashkent city and Syrdarya) both attract more investment per head and, from a high base, grow more slowly in some years — and it disappears once region effects are included (coefficient 0.004). H3 is supported.

Discussion

The data give no evidence that regions attracting more foreign capital per head grew faster in industry in 2017–2025. This must not be read as a proof that foreign investment has no effect. First, there are only 14 regions and 7 growth observations per region, so precision is low. Second, foreign investment and loans are only part of fixed-capital investment and are not split by sector, whereas the outcome is all industry. Third, the effect of investment on output typically comes with a lag of several years and through capacity that takes time to build, which seven annual observations cannot resolve. Fourth, values are nominal and population is fixed at early 2024. Finally, investment by one large project in one year (for instance Bukhara in 2017) creates outliers that fixed effects do not remove.

For policy this means that assessing regional programmes by the volume of attracted foreign capital alone is not supported by the regional statistics; results indicators (output, jobs, exports) should be reported by region and sector with a consistent deflator. For the textile industry, which is the focus of the author's dissertation, sector-level investment series by region are needed; they are currently not published.

Conclusion

Using an official panel of 14 regions for 2017–2025, we find no significant association between foreign investment and loans per capita and the growth of industrial output per capita: coefficients are 0.004 (lagged, $p = 0.87$) and –0.019 (same year, $p = 0.62$), and the result is robust to excluding Navoi and Tashkent city. The negative pooled correlation ($r = –0.27$) disappears within regions. Given the short panel, nominal values and aggregate investment and output measures, the results indicate no evidence of an effect rather than evidence of no effect. Recommendations: publish foreign investment by sector and region, use real output indicators in regional programmes, and test the relationship on firm-level or sector-level data with longer lags.

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