

ECONOSCITECH INTEGRATION

ISSUE
9

INTERNATIONAL SCIENTIFIC
ELECTRONIC JOURNAL



**TASHKENT STATE
UNIVERSITY OF ECONOMICS**



**American University
of Technology**

Powered by Arizona State University®

ISSN: 3060-5075



Acceptance of articles

PUBLISHED EVERY MONTHLY



ARTICLE CONTRIBUTORS

**PROFESSORS-TEACHERS, SPECIALISTS
AND SCIENTIFIC RESEARCHERS.**



Google
scholar

OpenAIRE

ISSN

INTERNATIONAL
STANDARD
SERIAL
NUMBER
DENMARK

CONTACT:



+998 94 3540880



<https://econoscitech-integration-journal.uz>



2026

**EDITOR-IN-CHIEF:**

Zufarova Nozima Gulamiddinovna
DSc., Dean of Tourism Faculty, TSUE

DEPUTY EDITOR-IN-CHIEF:

Makhmudov Nosir Makhmudovich
DSc., Prof., Academician

DEPUTY EDITOR-IN-CHIEF:

Suyunov Dilmurod Xolmurodovich
Doctor of Economics (DSc), Professor,

DEPUTY EDITOR-IN-CHIEF:

Allayarov Shamsiddin Amanullayevich
doctor of economics (DSC), professor

RESPONSIBLE SECRETARY:

Otaboyev Axmed Maxsudbek o'g'li
TSUE independent researcher

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

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

Partners: Tashkent State University of Economics / American University of Technology in Tashkent (AUT)

Electronic publication. Issue 9. 500 pages.
Approved for publication in September 2026.

Editorial Board Members:

Sharipov Kongratbay Avezimbetovich,
Doctor of Technical Sciences (DSc), Professor



Teshabayev To'liqin Zakirovich,
Doctor of Economic Sciences (DSc), Professor



Said Irandoust,
Doctor of Chemical Engineering Sciences,
Professor



Abdurakhmanova Gulnora Kalandarovna,
Doctor of Economic Sciences (DSc), Professor



Khudoykulov Sadirdin Karimovich,
Doctor of Economics, (DSc), Professor



Tokunaga Masahiro,
professor, PhD of Economics of the Faculty of
Business and Commerce



Debasis Das,
professor Department of Computer Science



Nitin Goje,
professor and Program Lead - Computer Science



Nargizakhon Shamshieva
Doctor of Economic Sciences, Professor



Rakhmonov Norim Razzakovich,
Doctor of Economic Sciences (DSc), Professor

Bayxonov Bahodirjon Tursunbayevich
Doctor of Science (DSc), Professor



Shomurodov Ravshan Tursunkulovich,
PhD, Associate Professor



Boymuratov Abduraxmat Djumayevich
Doctor of Philosophy (PhD) in Economics



Sharopova Nafosat Radjabovna
DSc, Associate Professor



Sultanova Kamila Mukhtorali Kizi
Master of Science

CONTENTS

GROWTH TRENDS IN ELECTRICITY CONSUMPTION IN UZBEKISTAN AND PROBLEMS OF MODERNIZING THE GRID INFRASTRUCTURE.....	20
Bobobekov Ergash Abdumalikovich	
DETERMINANTS OF THE INTENTION TO PARTICIPATE IN FAMILY TAKAFUL IN A PREMARKET SETTING: A STRUCTURED REVIEW OF THE EVIDENCE AND A CONCEPTUAL FRAMEWORK FOR UZBEKISTAN.....	24
Usmanov Nematjon Gulomovich	
TOURISM RESOURCE EFFICIENCY AND SUSTAINABLE REGIONAL SERVICE SECTOR DEVELOPMENT: AN EMPIRICAL ASSESSMENT OF UZBEKISTAN	40
Safarov Bahadirkhon Shaxriyrovich	
Toshkhujaev Mustafokhon Abduvosi ugli	
TERRITORIAL DISPARITIES IN EMPLOYMENT EFFICIENCY IN KHOREZM REGION: ASSESSMENT AND POLICY DIRECTIONS	47
Azadova Gulnoza Sardorbekovna	
ЦИФРОВАЯ ЭКОНОМИКА КАК ДРАЙВЕР ЭКОНОМИЧЕСКОГО РОСТА.....	55
Динара Ташевна Гафарова	
DIGITAL PLATFORM-BASED TRANSFORMATION OF ENTERPRISE E-COMMERCE SYSTEMS: FACTORS, EFFICIENCY AND DEVELOPMENT PROSPECTS	59
Tuychiyev Shavkatjon Shokirali o'g'li	
WAYS TO OPTIMALLY ORGANIZE AND IMPROVE DIRECT TAXATION IN UZBEKISTAN	68
Kadyrov Bahodir Kudratovich	
EFFICIENCY OF SMALL AND MEDIUMSIZED BUSINESS FINANCING BASED ON MUSHARAKAH: AN ANALYSIS OF OPPORTUNITIES AND RISKS.....	73
Kenjaeva Durdona Ravshan qizi	
СОВЕРШЕНСТВОВАНИЕ БЮДЖЕТНОГО УЧЕТА В РЕСПУБЛИКЕ УЗБЕКИСТАН В УСЛОВИЯХ ЦИФРОВИЗАЦИИ И УСИЛЕНИЯ ГОСУДАРСТВЕННОГО ФИНАНСОВОГО КОНТРОЛЯ	79
Джамбакиева Гулнора Сайфутдиновна	
ANALYSIS OF INDICATORS OF HUMAN CAPITAL UTILIZATION AND LABOR RELATIONS EFFICIENCY IN THE SMALL BUSINESS SECTOR	89
Ulugmuradova Nodira Berdimuradovna	
THE EFFECT OF MANDATORY IFRS ADOPTION ON EQUITY GROWTH OF UZBEK PUBLIC INTEREST ENTITIES (PIEs).....	96
Mokhirjon Shavkatov Omon o'g'li	
METHODS FOR ASSESSING THE IMPACT OF SMALL BUSINESS DEVELOPMENT ON NATIONAL ECONOMIC GROWTH.....	103
Akmaljon Adkhamovich Ermatov	
LEGISLATION AS AN ENABLER OF MARKET FORMATION: THE SIGNIFICANCE OF ADOPTING ISLAMIC FINANCE LEGISLATION FOR THE DEVELOPMENT OF ISLAMIC FINANCE IN UZBEKISTAN.....	111
Sultanov Bakhtiyor Bakhodirovich	
ANALYSIS OF REGIONAL INTEGRATION PROCESSES INTO FOREIGN MARKETS.....	117
Ozodova Farida Zarif kizi	
FINANCIAL INTENSITY AND YOUTH ENTREPRENEURSHIP IN UZBEKISTAN: EVIDENCE FROM A TWO-WAY FIXED-EFFECTS REGIONAL PANEL MODEL	122
Isakjanova Saboxat	

FINANCIAL INTENSITY AND YOUTH ENTREPRENEURSHIP IN UZBEKISTAN: EVIDENCE FROM A TWO-WAY FIXED-EFFECTS REGIONAL PANEL MODEL

Isakjanova Saboxat

Doctoral Student of Tashkent State University of Economics

Аннотация. Исследуется взаимосвязь между финансовой интенсивностью и молодёжным предпринимательством в Узбекистане на основе региональных панельных данных по 14 регионам за 2020–2025 годы. В связи с отсутствием полных официальных региональных данных о молодёжном предпринимательстве региональные показатели были рассчитаны с использованием процедуры калибровки и согласованы с официальными общенациональными данными. Интенсивность молодёжного предпринимательства измерялась как расчётное количество самозанятых лиц и индивидуальных предпринимателей в возрасте 15–29 лет на 10 000 молодых людей. Для периода 2021–2025 годов была оценена панельная модель с двусторонними фиксированными эффектами (two-way fixed effects), в которой объясняющие переменные использовались с лагом в один год, а охват интернетом, уровень безработицы и плотность студентов высших учебных заведений были включены в качестве контрольных переменных. Результаты свидетельствуют об отрицательной взаимосвязи между общей финансовой интенсивностью с лагом в один год и последующей интенсивностью молодёжного предпринимательства (коэффициент = $-0,116686$; $p = 0,004$). Согласно спецификации log-log, увеличение финансовой интенсивности на 10% связано со снижением интенсивности молодёжного предпринимательства примерно на 1,1% в следующем году. Плотность студентов высших учебных заведений положительно связана с молодёжным предпринимательством (коэффициент = $0,564796$; $p = 0,004$), тогда как охват интернетом и уровень безработицы не являются статистически значимыми. Отрицательный знак коэффициента финансовой интенсивности сохраняется в альтернативных спецификациях и в 99,4% из 500 повторений моделирования методом Монте-Карло. Однако при объединении неопределённости, связанной с процедурой калибровки и регрессионным оцениванием, по правилам Рубина коэффициент остаётся отрицательным, но становится статистически незначимым ($-0,117622$; $p = 0,150$). Отдельный перекрёстный анализ целевого кредитования молодёжи в 2019 году выявил положительную, но статистически незначимую связь с последующим ростом молодёжного предпринимательства (коэффициент = $0,466245$; $p = 0,178$). Полученные результаты показывают, что общее инвестиционное финансирование и целевое кредитование молодёжи могут воздействовать на молодёжное предпринимательство посредством различных механизмов, тогда как среда высшего образования положительно связана с молодёжной предпринимательской активностью. Вместе с тем взаимосвязь с финансовой интенсивностью следует интерпретировать с осторожностью ввиду неопределённости, присущей калиброванным региональным показателям.

Ключевые слова: молодёжное предпринимательство; финансовая интенсивность; целевое кредитование молодёжи; региональные панельные данные; двусторонние фиксированные эффекты; плотность студентов; Узбекистан.

Abstract. The relationship between financial intensity and youth entrepreneurship in Uzbekistan is examined using regional panel data covering 14 regions over the 2020–2025 period. Because complete official regional data on youth entrepreneurship were unavailable, regional estimates were constructed using a calibration procedure and reconciled with official national totals. Youth entrepreneurship intensity was measured as the estimated number of self-employed individuals and individual entrepreneurs aged 15–29 per 10,000 young people. A two-way fixed-effects panel model was estimated for 2021–2025, with explanatory variables lagged by one year and internet coverage, unemployment, and higher-education student density included as control variables. The results indicate a negative association between lagged

general financial intensity and subsequent youth entrepreneurship intensity (coefficient = -0.116686 ; $p = 0.004$). In the log-log specification, a 10% increase in financial intensity is associated with an approximately 1.1% lower level of youth entrepreneurship intensity in the following year. Higher-education student density is positively associated with youth entrepreneurship (coefficient = 0.564796 ; $p = 0.004$), whereas internet coverage and unemployment are not statistically significant. The negative sign of the financial intensity coefficient remains stable across alternative specifications and in 99.4% of 500 Monte Carlo replications. However, when uncertainty arising from the calibration procedure and regression estimation is combined using Rubin's rules, the coefficient remains negative but becomes statistically insignificant (-0.117622 ; $p = 0.150$). A separate cross-sectional analysis of targeted youth credit in 2019 reveals a positive but statistically insignificant association with subsequent growth in youth entrepreneurship (coefficient = 0.466245 ; $p = 0.178$). The findings suggest that general investment financing and targeted youth credit may influence youth entrepreneurship through different mechanisms, while the higher-education environment is positively associated with youth entrepreneurial activity. Nevertheless, the relationship with financial intensity should be interpreted cautiously because of the uncertainty inherent in the calibrated regional estimates.

Keywords: youth entrepreneurship; financial intensity; targeted youth credit; regional panel data; two-way fixed effects; higher-education student density; Uzbekistan.

INTRODUCTION

Youth entrepreneurship is increasingly recognized as an important source of employment, income generation, and local economic development. However, entrepreneurial activity among young people varies substantially across regions due to differences in access to finance, digital infrastructure, labor-market conditions, and knowledge environments. Identifying these regional differences is particularly important for designing policies that effectively support sustainable youth entrepreneurship.

In Uzbekistan, the expansion of self-employment and individual entrepreneurship has significantly increased the number of young people engaged in entrepreneurial activity. At the same time, comprehensive and consistent regional data on youth entrepreneurship are not available for all years and indicators. This creates a methodological challenge in comparing entrepreneurial intensity across regions and over time. In addition, the relationship between financial conditions and youth entrepreneurship may vary depending on whether financing represents general investment activity or targeted youth-oriented credit.

This study addresses these issues by constructing a calibrated regional measure of youth entrepreneurship intensity for 2020–2025 and examining its relationship with financial and socioeconomic factors. The analysis focuses on financial intensity, internet coverage, unemployment, and the density of higher-education students. To account for unobserved regional characteristics and common annual shocks, a two-way fixed-effects panel model is employed using data from 14 regions and 70 observations in the main specification. Explanatory variables are lagged by one year to examine whether changes in regional conditions are associated with subsequent changes in youth entrepreneurship intensity.

The study makes three main contributions. First, it develops a calibration procedure for estimating regional youth entrepreneurship counts when direct age-specific regional data are incomplete. Second, it distinguishes between general financial investment intensity and targeted youth credit, allowing these two forms of financing to be examined separately. Third, it evaluates the robustness of the estimated financial relationship using alternative specifications, a clustered bootstrap, Driscoll–Kraay standard errors, the exclusion of Tashkent, and Monte Carlo simulations that incorporate uncertainty in the calibrated regional distribution.

The results show a statistically significant negative association between lagged general financial intensity and subsequent youth entrepreneurship intensity in the two-way fixed-effects model, while higher-education student density demonstrates a positive and statistically significant association. Internet coverage and unemployment do not demonstrate statistically significant independent relationships. The negative sign of the financial-intensity coefficient remains stable across alternative specifications and Monte Carlo simulations, although jointly accounting for calibration and regression uncertainty reduces its statistical precision. Targeted youth credit in 2019 demonstrates a positive, although statistically insignificant, relationship with subsequent growth in youth entrepreneurship.

LITERATURE REVIEW

Previous studies and international reports identify access to finance, human capital, digitalization, and labor-market conditions as important factors shaping entrepreneurship among young people and SMEs

(OECD, 2023; OECD, 2026; ILO, 2024). Access to finance can facilitate business creation by relaxing liquidity constraints and enabling investment in productive assets. However, the relationship between finance and entrepreneurship may depend on the type, allocation, and intended beneficiaries of financial resources. Financing directed toward established firms and large fixed-capital projects may operate through mechanisms that differ from those directly supporting entrepreneurial activity among young people.

Human capital and knowledge environments may also influence youth entrepreneurship. Higher-education institutions can provide skills, knowledge, networks, and opportunities that support entrepreneurial activity. Similarly, digital connectivity may reduce information and market-access barriers for young entrepreneurs. Labor-market conditions may also shape entrepreneurial entry, although the relationship can vary because unemployment may encourage self-employment while also reflecting broader local economic conditions. These factors suggest that youth entrepreneurship can be more comprehensively examined within a broader regional economic and institutional environment rather than through financial access alone.

In Uzbekistan, regional financing conditions can be assessed using official data on fixed-capital investment financed by bank loans and other borrowed funds, while the *Yoshlar — kelajagimiz* program provides evidence on targeted financial support for young entrepreneurs. The National Statistics Committee provides regional data on the population aged 14–30, self-employed persons, and individual entrepreneurs by age group. However, complete age-specific regional data on youth entrepreneurship are not consistently available across all years. Moreover, empirical evidence on the regional determinants of youth entrepreneurship in Uzbekistan provides opportunities for further investigation. This study contributes to this area by constructing a calibrated regional measure of youth entrepreneurship intensity and examining its association with financial intensity, internet coverage, unemployment, and higher-education student density using a two-way fixed-effects panel model. General financial intensity and targeted youth credit are analyzed separately because they represent different forms of financial support.

RESEARCH METHODOLOGY

Measurement of Youth Entrepreneurship Intensity

The analysis covers 14 regions of Uzbekistan for 2020–2025. Because complete age-specific regional data on youth entrepreneurship were not available for all years, a calibration procedure was used to estimate the regional distribution of youth entrepreneurship.

For the construction of the youth entrepreneurship measure, the 15–19, 20–24, and 25–29 age groups were combined to obtain the number of young self-employed persons and individual entrepreneurs aged 15–29. However, regional population data are publicly available for the broader 14–30 age range. This difference in age coverage was taken into account when interpreting the resulting indicator. Accordingly, the final measure is defined as estimated youth entrepreneurship intensity per 10,000 residents aged 14–30, rather than as a strict entrepreneurship participation rate among the 15–29 age group.

The initial regional measure was constructed as the relative logarithmic intensity of youth entrepreneurship:

$$q_{it} = \ln \left[\frac{\frac{A_{it}}{P_{it}}}{\frac{\sum_i A_{it}}{\sum_i P_{it}}} \right]$$

where A_{it} denotes the official number of relevant entrepreneurs in region i and year t , while P_{it} represents the population aged 14–30. This relative measure reduces the effect of differences in regional population size and allows entrepreneurial intensity to be compared across regions.

The resulting regional intensity measure was calibrated using two explanatory indicators: the relative logarithmic intensity of self-employed persons and the relative logarithmic intensity of individual entrepreneurs. The calibration equation was specified as:

$$q_{it} = a + b_1 \cdot X_{1,it} + b_2 \cdot X_{2,it} + u_{it}$$

The estimated calibration coefficients were -0.0198 for the constant, 1.1594 for self-employed persons, and -0.6189 for individual entrepreneurs.

The predicted regional intensities were then converted into regional weights and adjusted so that the sum of the estimated regional counts exactly matched the official national total of self-employed persons and individual entrepreneurs aged 15–29:

$$N_t = O'B_t^{15-29} + YaTT_t^{15-29}$$

$$w_{it} = \frac{P_{it} \exp(\hat{q}_{it})}{\sum_j P_{jt} \exp(\hat{q}_{jt})}$$

$$\hat{Y}_{it} = N_t w_{it}$$

where N_t is the official national total in year t . This procedure ensures consistency between the estimated regional distribution and the official national totals.

The calibrated number of young entrepreneurs was subsequently normalized by the population aged 14–30:

$$YT_{it} = 10\,000 \cdot \frac{\hat{Y}_{it}}{P_{it}}, y_{it} = \ln(YT_{it})$$

Thus, YT_{it} measures the estimated youth entrepreneurship intensity per 10,000 people aged 14–30, while y_{it} is its natural logarithm.

Financial and Control Variables

The main financial variable was financial intensity, defined as the amount of fixed-capital investment financed through bank loans and other borrowed funds per 10,000 young people:

$$MI_{it} = \frac{BKI_{it} \cdot 10}{P_{it}}$$

where BKI_{it} denotes fixed-capital investment financed through bank loans and other borrowed funds, measured in million UZS. The resulting financial-intensity measure is expressed in billion UZS per 10,000 young people.

The main model uses the natural logarithm of financial intensity. As robustness measures, the standardized share of bank loans and other borrowed funds in total fixed-capital investment and a financial-environment index were also considered.

Three control variables were included. Internet coverage was measured as the number of internet subscribers per 100 people. Unemployment was measured as the unemployment rate in percent. Higher-education student density was measured as the number of university students per 1,000 young people. These variables represent, respectively, market access and digital connectivity, labor-market conditions, and the knowledge and cooperation environment.

Two-Way Fixed-Effects Panel Model

The main empirical specification was a two-way fixed-effects panel model:

$$y_{it} = \beta_1 \ln(MI_{i,t-1}) + \beta_2 \ln(IQ_{i,t-1}) + \beta_3 ID_{i,t-1} + \beta_4 \ln(OTZ_{i,t-1}) + \alpha_i + \tau_t + \varepsilon_{it}$$

The explanatory variables were lagged by one year. This specification examines whether changes in regional financial and socioeconomic conditions are associated with changes in youth entrepreneurship intensity in the following year.

The term α_i captures time-invariant regional characteristics, including geographical conditions, historical production structures, and other persistent differences between regions. The year effects τ_t capture shocks and changes common to all regions, including nationwide economic developments and changes in registration or self-employment arrangements.

The main model contains 70 observations covering 14 regions. Standard errors were clustered at the regional level. Model selection was based on comparisons among pooled ordinary least squares, two-way fixed-

effects, and random-effects specifications. The statistical significance of regional effects was also assessed using an F-test.

Robustness and Sensitivity Analysis

Several procedures were applied to assess the robustness of the main findings. First, a 9,999-repetition cluster bootstrap was used to account for the relatively small number of regional clusters. Second, Driscoll–Kraay standard errors were employed to examine sensitivity to possible cross-sectional dependence. Third, the model was re-estimated after excluding Tashkent to assess the extent to which the results were influenced by this region.

Alternative financial measures were also examined, including the standardized share of bank loans and other borrowed funds and the financial-environment index. In addition, 500 Monte Carlo replications were conducted to assess the sensitivity of the estimated coefficient to uncertainty in the calibrated regional distribution. The resulting calibration and regression uncertainty was subsequently combined using Rubin's rules.

Finally, the economic role of targeted youth credit was examined separately from general financial intensity. Using data for 13 regions, a cross-sectional regression related the 2019 intensity of targeted youth credit to the logarithmic growth of youth entrepreneurship intensity during 2020–2025:

$$\Delta y_{i,2020-2025} = \eta_0 + \eta_1 \ln(MK_{i,2019}) + v_i$$

In the cross-sectional regression:

$\Delta y_{i,2020-2025}$ — the logarithmic growth of youth entrepreneurship intensity in region i over 2020–2025.

$MK_{i,2019}$ — targeted youth credit intensity in 2019, measured in billion soums per 10,000 young people.

η_0 — the constant term of the cross-sectional regression.

η_1 — the coefficient of targeted youth credit intensity in 2019.

v_i — the random error term of the cross-sectional regression.

HC3 heteroskedasticity-consistent standard errors were used for this cross-sectional specification.

ANALYSIS AND RESULTS

Descriptive Results and Temporal Patterns

The calibrated regional estimates reveal substantial changes in youth entrepreneurship over the 2020–2025 period. The official national total of self-employed individuals and individual entrepreneurs aged 15–29 was 242,726 in 2020 and 426,652 in 2021. It decreased to 262,089 in 2022 before increasing to 513,453 in 2023, 1,020,580 in 2024, and 1,469,476 in 2025. In each year, the sum of the calibrated regional estimates exactly matched the corresponding official national total. This confirms that the calibration procedure preserved the official annual aggregate while estimating its regional distribution.

Average youth entrepreneurship intensity increased from 245.3 per 10,000 young people in 2020 to 1,543.4 in 2025. The increase was particularly pronounced in 2024 and 2025 and corresponded with the substantial rise in the official national number of young self-employed individuals and individual entrepreneurs. The observed changes therefore reflect not only regional differences but also broader changes in the national registration and self-employment environment during the study period.

The final panel dataset contained 84 region-year observations for the main variables. Youth entrepreneurship intensity averaged 683.46 per 10,000 persons aged 14–30, with values ranging from 168.77 to 1,927.10. The calibrated number of young entrepreneurs averaged 46,844.95 persons and ranged from 5,871.35 to 157,319.46. Financial intensity averaged 16.27 billion soums per 10,000 young people, with a minimum of 0.85 and a maximum of 77.11 billion soums. Internet coverage averaged 77.51 subscribers per 100 inhabitants, while the unemployment rate averaged 7.70%. Higher-education student density, available for 2021–2025, covered 70 observations and averaged 111.34 students per 1,000 young people.

The financial environment index was standardized to have a mean of 0.00 and a standard deviation of 1.00 across the panel. Its values ranged from –2.22 to 3.17. At the aggregate regional level, the average financial environment index decreased from 0.660 in 2020 to –0.807 in 2025, whereas average youth entrepreneurship intensity increased from 245.3 to 1,543.4 per 10,000 young people. This contrasting movement provides descriptive motivation for examining the relationship between financial conditions and youth entrepreneurship using a panel specification that controls for both regional and year-specific effects.

Table 1. Descriptive Statistics of Panel Variables, 2020–2025¹

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
Calibrated regional number of youth entrepreneurs, persons	84	46,844.95	39,337.71	5,871.35	157,319.46
Estimated youth entrepreneurship intensity per 10,000 population aged 14–30	84	683.46	490.00	168.77	1,927.10
Financial environment index	84	0.00	1.00	–2.22	3.17
Financial intensity, billion UZS per 10,000 youth	84	16.27	15.40	0.85	77.11
Internet coverage, subscribers per 100 population	84	77.51	37.69	42.50	262.60
Unemployment rate, %	84	7.70	2.24	4.00	11.10
Real per capita income, thousand UZS	84	17,871.45	8,107.20	7,982.90	55,769.20
Higher-education student density, students per 1,000 youth	70	111.34	130.93	27.67	748.70

Main Panel Regression Results

The main empirical analysis examines whether changes in regional financial conditions are associated with subsequent changes in youth entrepreneurship intensity. A two-way fixed-effects panel model was estimated using 70 observations across 14 regions for 2021–2025. The model includes region fixed effects and year fixed effects, while financial intensity, internet coverage, unemployment, and higher-education student density enter the model with a one-year lag.

The results indicate a statistically significant negative association between lagged financial intensity and youth entrepreneurship intensity. The coefficient on the natural logarithm of financial intensity is -0.116686 , with a standard error of 0.033856 and a p-value of 0.004 . The 95% confidence interval ranges from -0.1898 to -0.0435 . Holding the other variables, regional fixed effects, and year effects constant, a 10% increase in financial intensity is associated with an approximately 1.1% lower level of youth entrepreneurship intensity in the following year.

Importantly, this financial variable measures bank loans and other borrowed funds used to finance total fixed-capital investment at the regional level. It therefore does not represent targeted loans specifically directed toward young entrepreneurs. Accordingly, the negative coefficient should be interpreted as an association between the dynamics of general investment financing and subsequent youth entrepreneurship intensity, rather than as evidence that targeted youth credit reduces entrepreneurship.

Higher-education student density shows the strongest positive association among the explanatory variables. Its coefficient is 0.564796 , with a standard error of 0.164052 and a p-value of 0.004 . The 95% confidence interval is $[0.2104; 0.9192]$. Given the logarithmic specification, a 10% higher level of student density is associated with approximately 5.5% higher youth entrepreneurship intensity in the following year. This indicator does not directly measure knowledge exchange, mentoring, project teams, or collaboration networks; rather, it captures the regional scale of the higher-education environment. The positive association is therefore consistent with the potential role of higher-education ecosystems in supporting youth entrepreneurship.

The coefficient on lagged internet coverage is -0.152385 , with a p-value of 0.584 , while the coefficient on lagged unemployment is 0.062694 , with a p-value of 0.213 . Thus, after accounting for regional and year fixed effects and the other explanatory variables, neither internet coverage nor unemployment demonstrates an independently statistically significant association with youth entrepreneurship intensity in the main specification.

The estimated year effects indicate substantial common temporal shifts. Relative to 2021, the coefficient for 2022 is -0.557440 ($p < 0.001$), while the coefficients for 2024 and 2025 are 0.677703 ($p = 0.019$) and 1.085039 ($p = 0.003$), respectively. The 2023 coefficient is close to zero and statistically insignificant (0.002143 ; $p = 0.990$). These year effects capture changes common across regions, including broader shifts in registration and self-employment patterns.

Overall, the two-way fixed-effects model provides evidence of a negative and statistically significant association between lagged general financial investment intensity and subsequent youth entrepreneurship intensity, while higher-education student density is positively and significantly associated with the outcome.

¹ Author's elaboration

Internet coverage and unemployment do not demonstrate statistically significant independent associations in the main specification. The within-region R^2 is 0.9638, indicating that the model explains a large share of the variation in youth entrepreneurship intensity within regions over time.

Table 2. Coefficients and 95% Confidence Intervals of the Main Two-Way Fixed-Effects Model²

Variable	Coefficient	Clustered standard error	t-statistic	p-value	95% confidence interval
One-year lagged natural logarithm of financial intensity	-0.116686	0.033856	-3.447	0.004	[-0.1898; -0.0435]
One-year lagged natural logarithm of internet coverage	-0.152385	0.271131	-0.562	0.584	[-0.7381; 0.4334]
One-year lagged unemployment rate	0.062694	0.047891	1.309	0.213	[-0.0408; 0.1662]
One-year lagged natural logarithm of higher-education student density	0.564796	0.164052	3.443	0.004	[0.2104; 0.9192]
2022	-0.557440	0.106412	-5.239	<0.001	[-0.7873; -0.3276]
2023	0.002143	0.174959	0.012	0.990	[-0.3758; 0.3801]
2024	0.677703	0.253069	2.678	0.019	[0.1310; 1.2244]
2025	1.085039	0.300089	3.616	0.003	[0.4367; 1.7333]

The coefficient on one-year lagged financial intensity is -0.1167, with a p-value of 0.0043 and a 95% confidence interval ranging from -0.1898 to -0.0435. Statistical significance was also maintained in the 9,999-replication clustered bootstrap test, with a p-value of 0.0171. Holding the remaining factors, regional fixed effects, and year effects constant, a 10% increase in financial intensity is associated with an approximately 1.1% lower level of youth entrepreneurship intensity in the following year.

This coefficient does not measure targeted youth credit. Instead, it captures the regional dynamics of total fixed-capital investment financed through bank loans and other borrowed funds. The result therefore indicates that the volume of financing used for general investment and the targeted allocation of financial resources to the youth segment represent economically distinct dimensions of financing.

Robustness and Sensitivity Analysis

Several robustness checks were conducted to assess whether the estimated negative association between financial intensity and subsequent youth entrepreneurship intensity depends on the estimation procedure, sample composition, or the definition of the financial variable. The results are summarized in Table 3.

Table 3. Robustness Checks for the Financial Intensity Coefficient³

Specification	Financial factor coefficient	Standard error	p-value	Observations	95% confidence interval
Driscoll–Kraay standard errors	-0.116686	0.021698	<0.001	70	[-0.1603; -0.0731]
Excluding Tashkent city	-0.096781	0.033746	0.014	65	[-0.1703; -0.0233]
One-year lagged standardized share of bank loans and other borrowed funds	-0.056881	0.026593	0.052	70	[-0.1143; 0.0006]
One-year lagged financial environment index	-0.075741	0.028006	0.018	70	[-0.1362; -0.0152]
Current financial environment index	-0.030227	0.027144	0.286	84	[-0.0889; 0.0284]

² Author's elaboration

³ Author's elaboration.

The negative sign of the financial coefficient is preserved across all alternative specifications. The coefficient remains statistically significant when Driscoll–Kraay standard errors are used and when Tashkent city observations are excluded. A similar negative direction is obtained when the standardized share of bank loans and other borrowed funds and the financial environment index are used as alternative measures, although statistical significance varies across specifications. These results indicate that the direction of the estimated relationship is relatively stable, while its statistical precision depends on the definition and timing of the financial measure.

The findings provide a differentiated picture of the relationship between financial conditions and youth entrepreneurship across regions. The main two-way fixed-effects model shows a negative and statistically significant association between one-year lagged general financial intensity and subsequent youth entrepreneurship intensity. At the same time, higher-education student density is positively and significantly associated with youth entrepreneurship, whereas internet coverage and unemployment do not demonstrate statistically significant independent effects after controlling for regional and year-specific factors.

The negative coefficient on general financial intensity should be interpreted carefully. The measure captures bank loans and other borrowed funds used to finance total fixed-capital investment rather than credit specifically targeted at young entrepreneurs. Therefore, the result should not be interpreted as evidence that access to finance generally discourages youth entrepreneurship. One possible interpretation is that general investment financing reflects broader capital-intensive economic activity whose effects may operate through channels other than youth-led entrepreneurial activity. The distinction between general investment financing and targeted youth credit is therefore important for interpreting the empirical relationship.

This distinction is also consistent with the separate analysis of the 2019 targeted youth credit program. The coefficient on targeted youth credit intensity was positive (0.466245), indicating that a 10% higher level of targeted credit intensity was associated with approximately 4.5% higher subsequent log growth in youth entrepreneurship intensity. However, the relationship was statistically insignificant ($p = 0.178$). Thus, the evidence indicates a positive direction for targeted youth financing, although the estimated relationship does not reach conventional levels of statistical significance.

The positive and statistically significant coefficient on higher-education student density provides a second important finding. A 10% higher student density was associated with approximately 5.5% higher youth entrepreneurship intensity in the following year. Although the indicator does not directly measure entrepreneurial education, mentoring, knowledge exchange, or collaboration networks, it may capture the broader scale of the higher-education ecosystem within a region. This finding suggests that youth entrepreneurship may depend not only on financial resources but also on the availability of human capital and knowledge-related environments.

The absence of statistically significant independent associations for internet coverage and unemployment also provides useful evidence. Internet access may facilitate market participation and information exchange, while its independent effect may become less distinguishable once persistent regional characteristics, common year shocks, financial conditions, and higher-education environments are controlled for. Similarly, the positive coefficient on unemployment is statistically insignificant, indicating that the observed data do not provide sufficiently strong statistical evidence to identify a systematic relationship between unemployment and youth entrepreneurship during the study period.

The robustness analysis strengthens the interpretation of the main financial result. The negative coefficient remained stable under alternative standard-error procedures, after excluding Tashkent city, and when alternative measures of financial conditions were introduced. However, incorporating uncertainty arising from the calibration of regional youth entrepreneurship estimates widened the confidence interval and reduced statistical precision. This indicates that the direction of the relationship is relatively stable, while the strength of the statistical evidence should be interpreted carefully.

Overall, the findings suggest that youth entrepreneurship is shaped by a broader set of factors than the volume of general investment financing alone. The distinction between broad regional investment flows and targeted youth-oriented financial support is therefore important. The positive association with higher-education student density further indicates that the entrepreneurial environment may involve complementary institutional and human-capital factors. From a policy perspective, the results support a broader approach that combines targeted financial instruments with measures that strengthen higher-education ecosystems and entrepreneurial capabilities.

CONCLUSION AND SUGGESTIONS

This study examined regional variation in youth entrepreneurship in Uzbekistan using a two-way fixed-effects panel model covering 14 regions. The results indicate a negative association between lagged general financial intensity and subsequent youth entrepreneurship intensity, while higher-education student density is

positively associated with youth entrepreneurship. Internet coverage and unemployment do not demonstrate statistically significant associations in the main specification.

The findings also indicate that general investment financing and targeted youth credit may operate through different mechanisms. While general investment financing is negatively associated with subsequent youth entrepreneurship in the main model, targeted youth credit demonstrates a positive, although statistically insignificant, association with youth entrepreneurship growth.

These findings should be interpreted in light of the fact that regional youth entrepreneurship indicators are based on calibrated estimates and that the statistical significance of the financial coefficient becomes less pronounced when calibration and regression uncertainty are jointly considered. Overall, the results suggest that supporting youth entrepreneurship may benefit from a combination of targeted financial instruments and stronger higher-education entrepreneurial environments.

REFERENCES

1. OECD. Strengthening SMEs and Entrepreneurs: Key to a Strong, Resilient Economy. – OECD, 2023. – 28 June 2023.
2. OECD. Financing SMEs and Entrepreneurs 2026: An OECD Scoreboard. – Paris: OECD Publishing, 2026. – 31 March 2026.
3. International Labour Organization (ILO). Global Employment Trends for Youth 2024. – Geneva: International Labour Organization, 2024.
4. National Statistics Committee of the Republic of Uzbekistan. 14–30-Year-Old Resident Population. – SIAT Statistical Database. – 2026.
5. National Statistics Committee of the Republic of Uzbekistan. Number of Self-Employed Persons by Age Groups. – SIAT Statistical Database. – 2026.
6. National Statistics Committee of the Republic of Uzbekistan. Number of Individual Entrepreneurs by Age Groups. – SIAT Statistical Database. – 2026.
7. National Statistics Committee of the Republic of Uzbekistan. Investments in Fixed Capital Financed by Bank Loans and Other Borrowed Funds. – SIAT Statistical Database. – 2026.
8. National Statistics Committee of the Republic of Uzbekistan. Share of Bank Loans and Borrowed Funds in Investments in Fixed Capital. – SIAT Statistical Database. – 2026.
9. National Statistics Committee of the Republic of Uzbekistan. Unemployment Rate. – SIAT Statistical Database. – 2026.
10. National Statistics Committee of the Republic of Uzbekistan. Number of Operating Small Business Entities. – SIAT Statistical Database. – 2026.
11. National Statistics Committee of the Republic of Uzbekistan. Number of Employed Persons in Small Business Entities. – SIAT Statistical Database. – 2026.
12. Central Bank of the Republic of Uzbekistan. Annual Reports of the Central Bank of the Republic of Uzbekistan for 2020–2025. – Tashkent: Central Bank of the Republic of Uzbekistan, 2021–2026.
13. Youth – Future Foundation. Programme Implementation as of 1 October 2019. – 2019.
14. Author's Survey. Youth Entrepreneurship and Financial Opportunities: Survey Results.
15. Cameron A. C., Miller D. L. A Practitioner's Guide to Cluster-Robust Inference // Journal of Human Resources. – 2015. – Vol. 50, No. 2. – P. 317–372.
16. Wooldridge J. M. Econometric Analysis of Cross Section and Panel Data. – 2nd ed. – Cambridge, MA: MIT Press, 2010.
17. StataCorp. Stata 18 Longitudinal-Data/Panel-Data Reference Manual. – College Station, TX: Stata Press, 2023.

Proofreader: Xondamir Ismoilov
Layout and Designer: Hasan Maqsudov

2026. № 9

© When materials are reproduced, the ECONOSCITECH-INTEGRATION journal must be cited as the source. Authors are responsible for the accuracy of the information in materials and advertisements published in the journal. Editorial opinions may not always align with those of the authors. Submitted materials will not be returned to the editorial office.

To publish articles in this journal, you may submit articles, advertisements, stories, and other creative materials through the following links. Materials and advertisements are published on a paid basis.

You may subscribe to the journal at any time using the following details. Once subscribed, please send a screenshot or photo of your payment confirmation to our Telegram page @iqtisodiyot_77. Based on this, we will send the latest issue of the journal to your address each month.

Our address: Tashkent city, Yunusobod district, 19th block, House 17.

