Analytical Review of Investment Processes in the Small Business Sector of Namangan

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Abstract: The importance of small business and its investment opportunities in contributing to global economic development through employment creation and income generation is growing worldwide. Investment processes in the small business sector are critical drivers of regional economic development, particularly in emerging economies like Uzbekistan. This research examines the investment dynamics within the small business sector of Namangan region, focusing on identifying key factors that influence investment efficiency. The study employs statistical analysis of regional investment data and econometric modeling to evaluate the effectiveness of real investments across different scenarios. The findings reveal significant correlations between regulatory environment, infrastructure development, and investment outcomes in small businesses. Factors affecting investment efficiency include access to financial resources, technological capacity, market conditions, and human capital development. Based on the econometric assessment, the study proposes strategic recommendations for enhancing investment processes: diversification of financial instruments, improvement of institutional frameworks, regional specialization initiatives, and targeted policy interventions. The research contributes to both theoretical understanding and practical implementation of investment strategies in regional small business development, with particular relevance to transitional economies.

Keywords: Small Business, Investment Processes, Investment Efficiency, Econometric Assessment, Scenario Analysis, Namangan Region, Regional Development

Introduction

In the contemporary global economic landscape, the strategic importance of small businesses as drivers of sustainable economic development has received increasing recognition from scholars and policymakers alike. Small enterprises play a pivotal role in fostering innovation, enhancing competitiveness, generating employment opportunities, and contributing to regional economic diversification[1]. This is particularly significant in developing economies that are undergoing structural transformation towards more inclusive and resilient economic systems.

The financing challenges facing small enterprises represent a substantial barrier to their growth potential and economic contribution. According to recent data from the International Finance Corporation[2], approximately 65 million formal micro, small, and medium-sized enterprises (MSMEs) in developing countries—representing around 40% of all such firms—face an annual financing gap of USD 5.2 trillion. This staggering figure equals 1.4 times the current global level of MSME financing, with the largest gaps observed in East Asia and the Pacific (46%), Latin America and the Caribbean (23%), and Europe and Central Asia (15%). This persistent financing deficit underscores the critical need for effective investment mechanisms and institutional frameworks that can facilitate capital flows to the small business sector.

Real investments in fixed capital within the small business sector constitute a fundamental component of economic strengthening, enabling the efficient utilization of available natural, material, intangible, and human resources. These investments directly contribute to the modernization of production processes, the expansion and diversification of goods and services, and the enhancement of local economic resilience in the face of global market fluctuations. Small businesses demonstrate remarkable adaptability in response to changing market conditions, making them essential partners in achieving sustainable development goals and fostering inclusive growth[3].

Uzbekistan's economic reform agenda, framed within the "New Uzbekistan" national development strategy, has placed significant emphasis on expanding private sector activity and enhancing the role of small businesses in the national economy. The government has prioritized real investment growth as a critical instrument for increasing employment, improving living standards, and expanding the middle class. Within this framework, small businesses are expected to play a central role in manufacturing export-oriented products, generating foreign exchange income, and addressing regional socio-economic imbalances[4].

Recent economic data highlights the tangible impact of these investment initiatives. In the first six months of the current year alone, investments totaling USD 3.6 billion were utilized across various sectors of the Uzbek economy, resulting in the creation of approximately 50,000 new jobs and generating over 1 trillion soums in additional revenue. Nevertheless, several regions and sectors continue to demonstrate weak investment performance and low efficiency, due to an underdeveloped investment climate and insufficient institutional coordination. Recognizing these challenges, the government has outlined an ambitious program to accelerate the implementation of more than 1,500 investment projects and attract over USD 12 billion in foreign capital[5].

The Namangan region represents a particularly interesting case study for examining investment processes in the small business sector. Located in the eastern part of the Fergana Valley, Namangan has demonstrated growing entrepreneurial activity in recent years, with small businesses operating across agricultural processing, textile manufacturing, and service sectors. The region's strategic location, with proximity to neighboring countries including Kyrgyzstan and Tajikistan, provides potential for cross-border trade and investment opportunities. However, like many regions outside the capital, Namangan faces challenges related to infrastructure development, access to financing, and integration into national and international value chains.

Despite the recognized importance of small business investment for regional economic development, there remains a significant research gap regarding the effectiveness of investment processes in specific regional contexts like Namangan. While macroeconomic analyses of investment trends in Uzbekistan exist[6], detailed studies that examine the specific mechanisms, constraints, and outcomes of real investment processes in the small business sector at the

regional level are relatively scarce. This knowledge gap hinders the development of targeted policies that could enhance investment efficiency and maximize economic returns.

This study addresses this research gap by conducting a comprehensive analytical review of investment processes in the small business sector of the Namangan region. The research employs an integrated methodological approach that combines quantitative analysis of financial indicators with qualitative assessment of institutional factors influencing investment decisions. By examining the patterns, determinants, and outcomes of real investments in small enterprises across different sectors, this study aims to generate evidence-based recommendations for enhancing investment efficiency and strengthening the contribution of small businesses to regional economic development.

The study's significance extends beyond academic inquiry, as its findings have practical implications for multiple stakeholders, including policymakers at national and regional levels, financial institutions, business associations, and entrepreneurs themselves. By identifying specific constraints to effective investment and proposing targeted interventions, this research contributes to the broader objectives of Uzbekistan's economic modernization agenda and supports the integration of regional economies into global value chains.

The remainder of this paper is structured as follows: Section 2 reviews the theoretical and empirical literature on small business investment and regional economic development; Section 3 outlines the research methodology and data sources; Section 4 presents the analytical findings regarding investment patterns and determinants in the Namangan region's small business sector; Section 5 discusses the implications of these findings for policy and practice; and Section 6 concludes with recommendations for enhancing investment efficiency and directions for future research.

Literature Review
Theoretical Perspectives on Investment in Small Business
The study of investments, particularly in the context of small business, draws from classical and neoclassical economic theories. Smith (1776) posited that wealth accumulation through productive capital forms the backbone of national prosperity. Keynes (1936) reoriented the discourse by emphasizing uncertainty, liquidity preference, and the psychological behavior of investors, highlighting that investment decisions are highly influenced by expectations and interest rates. Schumpeter (1934), meanwhile, underscored the role of innovation and entrepreneurship in fostering economic growth, viewing investment as a response to technological shifts and creative destruction. While these classical foundations remain theoretically relevant, contemporary scholarship stresses the need to recontextualize these ideas within current technological and socio-political realities.

Contemporary Perspectives: Innovation, Digitalization, and Crisis Response
Recent research underscores innovation and digital transformation as core determinants of investment effectiveness in small businesses. For instance, Santisteban and Mauricio (2020) examined technology-based startups, identifying strategic orientation, innovation culture, and access to financing as critical success factors. In the post-COVID context, Alvarado et al. (2021) analyzed how digital tools influenced SMEs' resilience and investment agility. Moreover, Khan et al. (2022) found that sustainability-oriented innovation significantly boosts investor trust in small businesses, especially in developing countries. These insights highlight the shift from static investment models to dynamic, capability-based frameworks.

Institutional and Comparative Investment Climates

The institutional environment and regional dynamics continue to play a critical role in shaping investment flows. Meyer and Pind (1999) noted that post-Soviet economies, including Uzbekistan, suffer from investor hesitation due to weak institutions and opaque legal frameworks. However, more recent analyses (e.g., Mamatkulov & Tadjibayeva, 2021) demonstrate how governance reforms and e-governance tools have improved regional investment climates. Krkosa (2001) and Tomann (2004) discussed FDI challenges in Central and Eastern Europe, while Tanaka (2020) compared institutional readiness in ASEAN and Central Asia, showing how regulatory predictability boosts SME-level investment. These studies collectively emphasize the importance of transparency, legal assurance, and institutional capacity.

Empirical Evidence from Uzbekistan and Namangan Region

Uzbek scholars have contextualized global investment models within national economic realities. Abdullayev and Karimov (2010) explored regulatory and institutional reforms targeting small business development. Boltabayev et al. (2010) assessed capital access mechanisms, identifying excessive bureaucracy and regional disparities. Gafurov (2017) applied panel regression models to analyze investment return ratios across Uzbekistan's regions, revealing that industrial diversification positively correlates with investment efficiency. Baykhonov (2019) proposed an inter-sectoral econometric framework showing that financial flows to underfunded sectors yielded higher marginal returns. While Eshov (2017) investigated Namangan's small business landscape, the study primarily offered qualitative assessments, lacking quantifiable investment performance indicators. Other localized studies remain sparse, underscoring the need for a focused, data-driven examination of investment behavior in Namangan.

Research Gap and Methodological Proposition

The literature reviewed highlights both foundational theories and modern advancements but reveals critical gaps. First, many Uzbek studies are descriptive, lacking in robust quantitative analysis and methodological rigor. Second, few existing works integrate institutional, innovation, and regional dimensions into a unified econometric framework. Third, there is minimal engagement with comparative perspectives—across regions or in relation to international practices. Moreover, recent global challenges such as digitalization, climate change, and COVID-19 disruptions remain underexplored in the context of Namangan's small business investment dynamics. This study aims to address these shortcomings by constructing a localized investment efficiency model using multi-variable regression, supported by expert interviews and institutional diagnostics.

Methodology

This study examines investment efficiency in the small business sector of Namangan region using quantitative econometric analysis. Data spanning 2010-2022 was obtained from the State Statistics Committee of Uzbekistan and the Namangan Regional Statistics Department.

To investigate the relationship between investment and production output, we constructed two econometric models with different combinations of explanatory variables. The first model analyzes how production costs (Pcost), fixed capital investment (FCI), and production capacity utilization (PCU) influence production volume (Q). The second model examines the impact of net revenue (NR), fixed capital investment (FCI), and total employment (TE) on production output. For both models, we employed logarithmic transformation to address heteroscedasticity and to enable elasticity interpretation:

Model 1: $LnQ = \beta_0 + \beta_1 LnPcost + \beta_2 LnFCI + \beta_3 LnPCU + \varepsilon$

Model 2: $LnQ = \beta_0 + \beta_1 LnNR + \beta_2 LnFCI + \beta_3 LnTE + \varepsilon$

Pearson correlation coefficients were calculated to verify the absence of multicollinearity (threshold r < 0.8). Parameter significance was tested using t-statistics at α = 0.05 significance level. Model validity was confirmed through F-statistics and Durbin-Watson tests for autocorrelation. Additionally, retrospective forecast quality was assessed using Mean Absolute Percentage Error (MAPE) and Theil's Inequality Coefficient (TIC).

For future projections (2023-2028), we developed time-dependent trend equations for each explanatory variable and incorporated them into the econometric models. This approach allowed us to generate comparative forecasts under different scenarios to identify optimal policy strategies for small business development in the region.

Analysis And Results

The role of the state in regulating and supporting entrepreneurial development has gained renewed importance in emerging market economies. In Uzbekistan, the legal and institutional framework for entrepreneurship has undergone significant transformation, particularly following the adoption of the Law "On Guarantees of Freedom of Entrepreneurial Activity." This law, especially Section V, outlines the mechanisms through which the government ensures equitable access to resources, legal protection, and institutional support for business entities, with an emphasis on fostering a competitive and innovation-driven private sector.

While large enterprises continue to serve as the structural backbone of the economy, small and medium-sized enterprises (SMEs) have emerged as key catalysts for economic diversification, employment creation, and technological innovation. SMEs are often more agile in responding to market shifts and are better positioned to absorb and implement scientific advancements in production processes. However, their capacity for sustainable development remains largely dependent on targeted state support and the availability of investment capital.

In practice, SMEs not only complement large-scale industries—particularly in supply chain linkages—but also contribute independently to structural changes by pioneering new product markets and initiating flexible forms of employment. This dual role becomes especially critical during periods of economic transition or crisis, where large enterprises may face closure or reorganization, and SMEs serve as shock absorbers through rapid job creation and decentralized production.

Despite the state's declared commitment to entrepreneurship, the legacy of centralized planning and public skepticism towards government intervention has, at times, hindered policy implementation. Misconceptions that equate state support with favoritism or monopolistic enrichment continue to affect public perception. Moreover, a number of entrenched entrepreneurs—especially those with established monopolistic positions—have little incentive to encourage new market entrants, which weakens overall market dynamism.

Nevertheless, when assessed through the lens of national economic priorities rather than individual or monopolistic interests, the imperative for sustained public investment in the SME sector becomes clear. Real investments—particularly those aimed at enhancing fixed capital formation, production capacity, and infrastructure—represent a strategic tool for accelerating structural transformation and ensuring long-term economic resilience.

In this context, the current study seeks to assess the effectiveness of real investments in small business development in the Namangan region of Uzbekistan. This is approached through a scenario-based econometric model that captures both temporal and structural variables. The empirical analysis begins by evaluating changes in the number of newly established small

business entities across sectors, followed by a regression-based investigation of investment efficiency using data from 2010 to 2022, as provided by the State Statistics Committee (Table 1).

Table 1 Number of newly established small businesses by economic sector (in units **)**

Networks	2010	2015	2020	2021	2022	Change in 2022 compared to 2010 (+,-)
Total	**18556**	**26896**	**93214**	**98886**	**90177**	71621
agriculture, forestry and fisheries	2405	2351	14969	11710	12018	9613
Industry	3044	5841	18596	19285	16191	13147
construction	1681	2850	6009	6330	4795	3114
Trade	4934	7136	35213	38459	34384	29450
transportation and storage	1485	1293	2397	2642	3355	1870
accommodation and food services	2082	2403	5637	6621	5812	3730
information and communication	754	806	1917	2521	2617	1863
health and social services	320	486	1450	1760	1498	1178
other types	1852	3730	7026	9558	9507	7655

According to Table 1, between 2010 and 2022, the most significant increase in the number of newly established small business entities occurred in the trade sector, which grew by 29,450 units to reach 34,384. The industrial sector also experienced substantial growth, with an increase of 13,147 units, totaling 16,191 in 2022. As a result of these expansions, the overall number of newly registered small businesses across the republic reached 90,177 in 2022, representing an increase of 71,621 units compared to 2010.

However, a year-on-year comparison reveals that in 2022, the number of newly established small businesses decreased by 8,709 units relative to 2021. The most significant declines were observed in the trade (−4,075), industry (−3,094), and construction (−1,535) sectors. This trend may be attributed to increased market competition and a strategic shift in policy focus from quantity to quality, leading to the natural attrition of less competitive enterprises.

In line with the objective of this study, an econometric analysis is carried out to assess the efficiency of investments utilized by small business entities operating in the Namangan region. The analysis focuses on evaluating the impact of investment-related factors on the volume of output produced by these entities under two scenarios. In Scenario 1, data from the Namangan Regional Statistics Department for the period 2010–2022 is used, incorporating the following explanatory variables: production costs (P_{cost}) incurred by small businesses, the volume of fixed capital investment (FCI), and the rate.

To conduct an econometric analysis of the change in the production volume by small businesses in the Namangan region, the correlation coefficient of the selected factors and the degree of interdependence between the factors are initially determined relative to the resulting factor (Table 2).

Table 2. Correlation coefficient of factors affecting the change in the production volume by small businesses in Namangan region under scenario 1

	Q	P_{cost}	FCI	PSU
Q	1			
P_{cost}	0.997796	1		
FCI	0.91203	0.705778	1	
PCU	-0,86606	-0,74799	-0,56382	1

As presented in Table 2, the production volume (Q) by small business entities in the Namangan region exhibits a strong positive correlation with production costs (P_{cost}; r = 0.998) and fixed capital investment (FCI; r = 0.912). Conversely, production capacity utilization (PCU) demonstrates a strong negative correlation with Q (r = −0.866). Moreover, the pairwise correlation coefficients among the independent variables are all below the critical threshold of 0.8, indicating the absence of multicollinearity and confirming the suitability of the selected explanatory variables for further regression analysis.

To standardize the variables with differing units of measurement and to mitigate potential heteroscedasticity, a natural logarithmic transformation was applied. This enabled the construction of a log-linear regression model to estimate the relationship between the selected independent variables and the volume of output produced by small business entities using the EViews software (Table 3).

Table 3. Multifactor regression equation of the production volume by small businesses in Namangan region under scenario 1

Dependent Variable: LNQ

Method: Least Squares

Date: 06/16/23 Time: 21:41

Sample: 2010 2022

Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_{PCOST}	-0.020709	0.141812	-0.146032	0.0471
LNFCI	0.711760	0.098435	7.230746	0.0000
LNPCU	0.665498	0.426142	1.561682	0.0528
C	0.51435	1.830126	0.28105	0.0219
			$t_{jad}=1,8331129$	

|			
R-squared	0.920557	Mean dependent var	7.703428
Adjusted R-squared	0.894076	S.D. dependent var	0.992357
S.E. of regression	0.322973	Akaike info criterion	0.825162
Sum squared resid	0.938803	Schwarz criterion	0.998993
Log likelihood	-1.363555	Hannan-Quinn criter.	0.789432
F-statistic	34.76276	Durbin-Watson stat	1.820813
Test(F-statistic)	0.000028	$F_{jad} = 0.258896435$	

According to the calculation results, the following equation is derived based on the values in the coefficient column of Table 3:

$$LnQ = 0.7LnFCI + 0.67Ln\text{PCU} - 0.02LnPcost + 0.51435 \qquad (1)$$

Based on the results of the estimated regression model (1), the statistical significance of the parameters was evaluated using the t-statistic at a 5% significance level (α = 0.05) with degrees of freedom df = 9. The critical value of the t-statistic was determined to be t_{Jad} = 1.8331. Among the independent variables, only the coefficient for fixed capital investment (FCI) was found to be statistically significant (t = 7.2307 > 1.8331). The remaining variables—production costs (P_{cost}) and production capacity utilization (PCU) — did not meet the threshold for statistical significance.

However, to confirm the overall validity and predictive quality of the regression model, retrospective forecast evaluation metrics were employed. Specifically, the Mean Absolute Percentage Error (MAPE) and Theil's Inequality Coefficient (TIC) were used. As shown in Figure 1, MAPE was calculated at 0.312 (i.e., less than the acceptable threshold of 10%), and TIC was 0.002 (close to zero), both indicating a high level of forecast accuracy and supporting the inclusion of all model parameters.
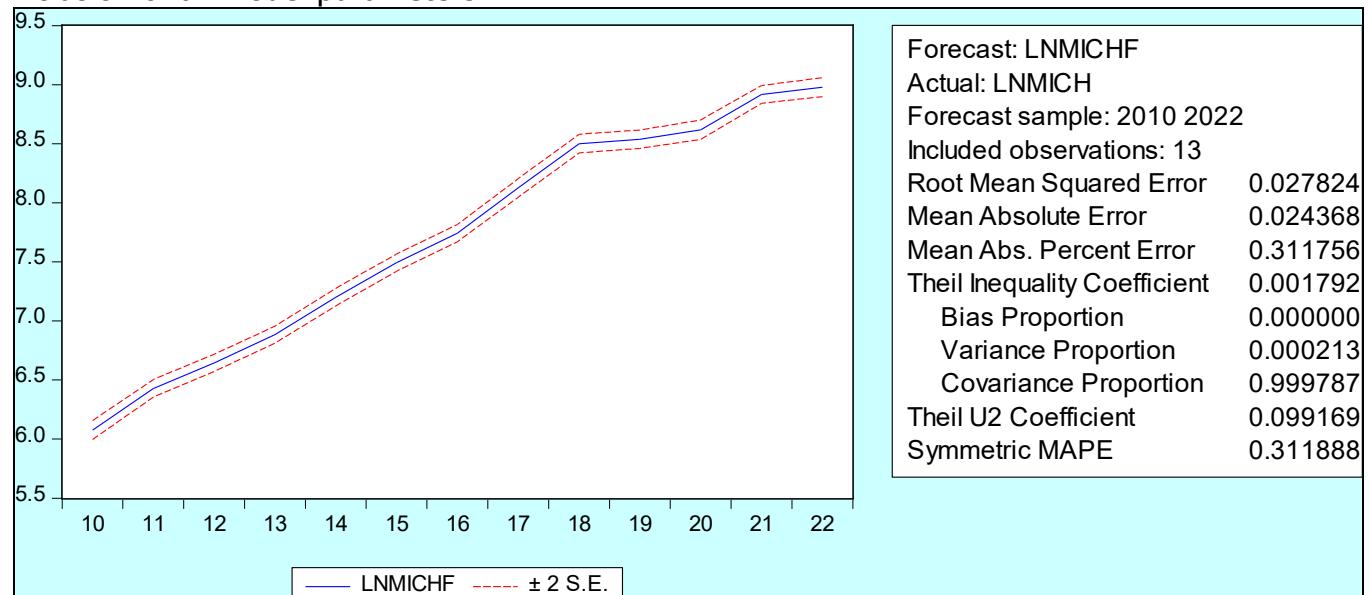
Figure 1. Result of retrospective quality criteria for regression parameters 1

As presented in Figure 1, the Mean Absolute Percentage Error (MAPE) is 0.312, indicating a high level of forecast accuracy since MAPE < 10%. Additionally, the Theil Inequality Coefficient (TIC) is 0.002, which is significantly below the threshold of 1. This suggests that the model has a strong predictive capability and that all parameters in the first regression equation are statistically significant. Based on these findings, and applying the properties of logarithms, the log-linear regression model is exponentiated to obtain the following multiplicative form:

$$Q = \frac{FCI^{0,7} * PCU^{0,67} * e^{0,51435}}{Pcost^{0,02}} \qquad (1^*)$$

Furthermore, to assess the adequacy of the model represented by equation (1*), the F-statistic was evaluated under the significance level $a = 0.05$ with degrees of freedom $k_1 = 4$ and $k_2 = 16$. The calculated F-value ($F_{his} = 299.02$) exceeds the critical F-value ($F_{jad} = 0.258896$), indicating that the regression equation is statistically significant. The Durbin-Watson statistic (DW = 2.19) also confirms the absence of autocorrelation, further supporting the reliability and robustness of the model.

Based on regression equation (1*), the production output of small business entities in the Namangan region is primarily driven by investments in fixed capital and the utilization rate of production capacities. Specifically, a 1% increase in fixed capital investment is associated with a 0.7% increase in output, while a 1% rise in production capacity utilization contributes to a 0.67% increase in output. In contrast, production costs exhibit a marginal negative elasticity of −0.02%, indicating that a 1% reduction in production costs leads to only a 0.02% increase in output.

Given the baseline production volume of 8,902.5 billion soums in 2023, these elasticities imply that a 1% increase in fixed capital investment would raise output by approximately 62.3 billion soums, whereas a 1% improvement in capacity utilization would generate an additional 59.7 billion soums. Although the impact of cost reduction is relatively limited, optimizing expenditure structures remains important for enhancing overall efficiency.

These findings underscore the strategic necessity of revising cost structures, expanding access to capital investment, and most critically eliminating infrastructural bottlenecks to improve capacity utilization. Empirical studies on production capacity utilization in the region further reveal that electricity shortages represent the most significant constraint. Consequently, it is recommended that enterprises invest in alternative energy sources and replace outdated capital assets with modern, energy-efficient technologies.

Under Scenario 2, an econometric analysis is carried out to assess the impact of three key variables on the production volume of small businesses in the Namangan region: net income (NR) from sales, investment in fixed capital (FCI), and the total number of employees (TE). As a first step, correlation coefficients between these independent variables and the dependent variable (Q) are computed to validate the appropriateness of the factor selection. The results are presented in Table 4.

Table 4. Correlation coefficient of factors affecting the change in the production volume by small businesses in Namangan region under scenario 2

	Q	NR	FCI	TE
Q	1			
NR	0.967269	1		
FCI	0.91203	0.576726	1	
TE	0.872195	0.702438	0.763992	1

According to the correlation analysis results presented in Table 4, the production volume of small business entities (Q) shows a strong and positive relationship with all selected explanatory variables. In particular, the net revenue from sales (NR) is highly correlated with production volume, with a correlation coefficient of $r_{Q,NR}$=0.9673. Similarly, fixed capital investment (FCI) and total employment (TE) also demonstrate strong positive correlations with Q, at $r_{Q,FCI}$=0.9120 and $r_{Q,TE}$=0.8722, respectively.

Furthermore, the pairwise correlation coefficients between the independent variables are all below the critical multicollinearity threshold of 0.8. This satisfies the condition $r_{x1,x2}$<0.8, indicating that multicollinearity is not present among the selected factors. As a result, the variables are statistically appropriate for use in the subsequent regression modeling stage.

Empirical evidence highlights that small businesses and private entrepreneurial entities play a pivotal role as engines of economic growth in Uzbekistan. The development patterns of these entities can be modeled using various functional forms—including linear, logarithmic, exponential, power, and binomial equations—depending on the structure of the data and the nature of variable relationships. In this context, due to the heterogeneous nature of the variables, all factors were transformed using natural logarithms to achieve homogeneity and enable a more robust econometric estimation. The regression analysis was subsequently conducted using the EViews software package, and the results are presented in Table 5.

Table 5. Results of the multifactor regression equation of the production volume by small businesses in Namangan region under scenario 2

Dependent Variable: LNQ

Method: Least Squares

Date: 06/16/23   Time: 21:21

Sample: 2010 2022

Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNNR	0.959212	0.299158	3.206369	0.0107
LNFCI	0.083403	0.080091	1.041359	0.0249
LNTE	5.017879	0.640944	7.828887	0.0000
C	-35.47071	4.155035	-8.536801	0.0000
			t_{jad}=1,8331129	
R-squared	0.990067	Mean dependent var		7.703428

Adjusted R-squared	0.986756	S.D. dependent var	0.992357
S.E. of regression	0.114203	Akaike info criterion	-1.254010
Sum squared resid	0.117382	Schwarz criterion	-1.080179
Log likelihood	12.15106	Hannan-Quinn criter.	-1.289740
F-statistic	299.0207	Durbin-Watson stat	2.193714
Test(F-statistic)	0.000000	$F_{jad} = 0.258896435$	

Based on the estimated coefficients presented in Table 5, the following log-linear regression equation is derived:

$$LnQ = 0{,}96LnNR + 0{,}08LnFCI + 5{,}02LnTE - 35{,}47071 \qquad (2)$$

To assess the statistical significance of the regression parameters in Equation (2), the t-statistics are evaluated at a 5% significance level ($\alpha = 0.05$) with 9 degrees of freedom. The critical t-value is $t_{Jad} = 1.8331$. The t-statistic for the net income (NR) from sales is 3.2064 and for the total number of jobs (TE) is 7.8289, both exceeding the critical threshold. This indicates that these variables are statistically significant predictors of production volume. In contrast, the investment in fixed capital (FCI), with a t-statistic of 1.0414, does not meet the significance threshold based on t-statistics alone.

However, to further evaluate the model's forecasting reliability and parameter robustness, retrospective quality metrics are employed. The Mean Absolute Percentage Error (MAPE) is below 10%, and the Theil Inequality Coefficient (TIC) is less than 1, as shown in Figure 2. These metrics confirm the overall significance and predictive strength of all model parameters, including FCI.

Forecast: LNMICHF	
Actual: LNMICH	
Forecast sample: 2010 2022	
Included observations: 13	
Root Mean Squared Error	0.095023
Mean Absolute Error	0.072542
Mean Abs. Percent Error	0.928601
Theil Inequality Coefficient	0.006121
Bias Proportion	0.000000
Variance Proportion	0.002496
Covariance Proportion	0.997504
Theil U2 Coefficient	0.341014
Symmetric MAPE	0.930036
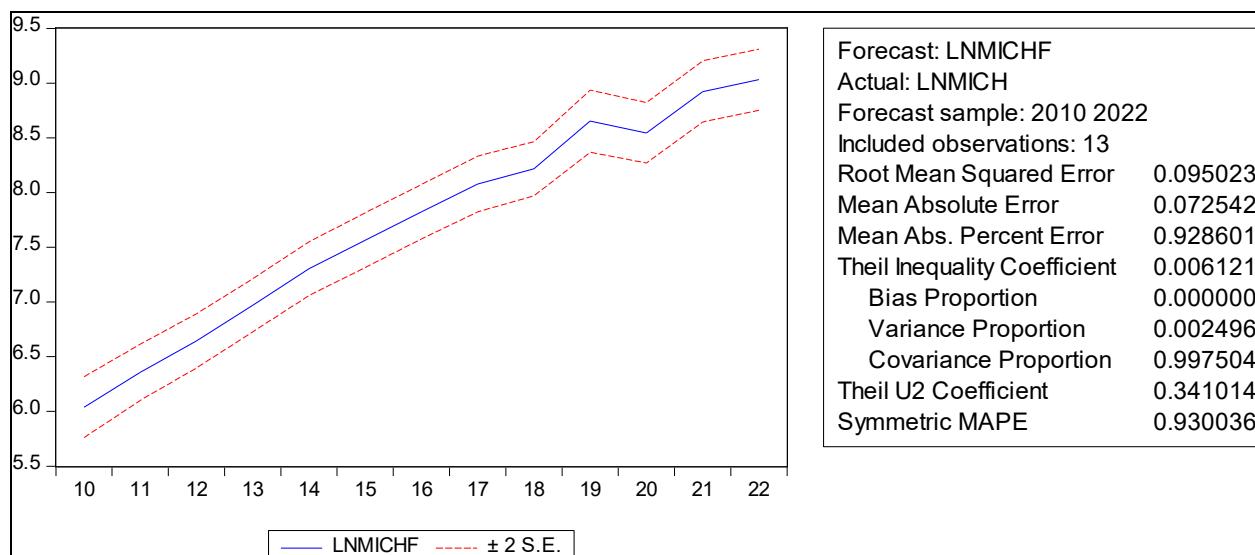
Figure 2. Result of retrospective quality criteria for regression parameters 2

As illustrated in Figure 2, the Mean Absolute Percentage Error (MAPE) for the model is 0.93%, which is well below the commonly accepted threshold of 10%, indicating a high level of forecast accuracy. Additionally, the Theil Inequality Coefficient (TIC) is 0.0061, which is significantly less than 1 and close to zero—further confirming the strong predictive performance and overall reliability of the model. These results validate the statistical significance of all parameters included in regression equation (2).

Accordingly, by applying the exponential transformation to the logarithmic model, the regression equation (2) is converted into the following multiplicative form:

$$Q = \frac{NR^{0,96} * \text{FCI}^{0.08} * TE^{5,02}}{e^{35,47071}} \qquad (2^*)$$

Given that the adjusted F-statistic for regression equation (2*) is $F_{Jad}=0.2589$ at a 5% significance level ($\alpha=0.05$) with degrees of freedom k1=4 and k2=16, and the calculated F-value is $F_{his}=299.02$, the condition $F_{Jad}<F_{his}$ confirms the statistical significance of the model. Moreover, the Durbin-Watson statistic (DW = 2.19) indicates the absence of autocorrelation among residuals, further affirming the reliability and adequacy of the regression equation.

According to the results of regression equation (2*), a 1% increase in net sales revenue is projected to result in an increase of approximately 96.5 billion soums in output, while a 1% rise in fixed capital investment is expected to contribute an additional 8.0 billion soums. Furthermore, increasing the number of employees by 9,000 individuals could potentially raise the output of small business entities in the Namangan region by 501.3 billion soums.

The findings from the econometric analysis also reinforce the conclusion drawn in Scenario 1—namely, the critical importance of optimizing production capacity utilization. In particular, increased energy-related expenditures are shown to significantly boost the production volume of small businesses, indicating that energy infrastructure plays a pivotal role in the sector's productivity.

In summary, across all analyzed scenarios, investments in fixed capital emerge as the most impactful lever for driving growth in small business output, enhancing employment, maximizing production capacity utilization, and—most importantly—improving energy efficiency in the Namangan region.

Based on the analysis above, the following conclusions can be drawn:
1. The data confirm a positive trend in the number of active business entities per 10,000 individuals in the population. However, the persistently low employment levels within small business entities from 2010 to 2022 highlight a structural weakness. This decline is indicative of insufficient economic growth and limited expansion capacity within these entities during the period under review.
2. The development of small business and private entrepreneurship in Uzbekistan has been positioned as a key driver of job creation and income generation. Reforms at both the national and regional levels—particularly in the Namangan region—have facilitated consistent growth in the number of operating small enterprises, contributing to economic diversification and local development across the country.
3. In 2022, small businesses in the Namangan region achieved exports totaling USD 311.7 million (accounting for 39.5% of total regional exports) and imports amounting to USD 572.8 million (73.7% of total imports). These figures represent a substantial increase compared to 2010 levels (USD 20.3 million for both exports and imports), underscoring the growing role of small businesses in international trade. Additionally, the upward trend

in product sales between 2010 and 2022 is consistent across various sectors of economic activity.
4. The formation of the financial potential of small enterprises to engage in investment activities is largely determined by their level of financial stability. The process of making investment decisions constitutes a fundamental component of a firm's long-term economic strategy and has a direct impact on its capacity for sustainable development, growth, and innovation.
5. The study categorizes small business and private entrepreneurship entities into five distinct groups based on their level of investment activity. This classification is derived from the ratio of investment volume in 2022 to the average total asset value within the same year. Based on survey and statistical data, the following qualitative gradation was established:
   - Very Low Investment Activity: IF < 0.02
   - Low Investment Activity: $0.02 \leq IF \leq 0.04$
   - Moderate Investment Activity: $0.04 \leq IF \leq 0.08$
   - High Investment Activity: $0.08 \leq IF \leq 0.12$
   - Very High Investment Activity: IF > 0.12

Institutional quality plays a critical role beyond the mere existence of legal frameworks. Government attitudes toward market freedom, administrative efficiency, and accountability are key factors. Excessive bureaucracy, overregulation, corruption, lack of transparency in public procurement, weak enforcement of property rights, and political interference in the judiciary contribute to significant economic inefficiencies and hinder private sector development.

To this end, the analysis is based on the regression equations developed under two separate scenarios, each modeling the dynamics of the production volume of small business entities in the Namangan region. The first of these is the multiplicative regression equation (1*) derived under Scenario 1:

$$Q = \frac{\text{FCI}^{0,7} * \text{PCU}^{0,67} * e^{0,51435}}{\text{Pcost}^{0,02}} \qquad (1^*)$$

Each of the explanatory variables included in regression equation (1*) is modeled using time-dependent trend equations, where t=14 corresponds to the forecast year 2023. These equations are as follows:

- **Production costs**: $Pcost = -492,1 + 492,9 * t$;
- **Investment in fixed capital**: $FCI = -1772,1 + 861,7 * t$;
- **Production capacity utilization**: $PCU = 26,2 + 0,3 * t$.

By substituting the projected values from these trend equations into regression equation (1*), the forecasted dynamics of the production volume of small business entities in the Namangan region under Scenario 1 are estimated. The results are summarized in Table 6.

Table 6. Forecast result of the dynamics of the production volume by small businesses in Namangan region under scenario 1

Years	Product production volume, billion soums	Production costs, billion soums	Investment in fixed capital, billion soums	Production capacity utilization, %
2023	8902.5	6408.5	10291.7	30.4
2024	9466.0	6901.4	11153.4	30.7
2025	10023.6	7394.3	12015.1	31.0
2026	10576.0	7887.2	12876.8	31.3
2027	11124.0	8380.1	13738.5	31.6
2028	11668.3	8873,0	14600,2	31,9

According to the forecast results shown in Table 6, the total production volume of small businesses and private entrepreneurship in Namangan region is projected to reach 11,668.3 billion soums by 2028 — a 28.3% increase compared to the baseline year of 2023. Over the same period, production costs are expected to rise by 38.5%, fixed capital investment by 41.9%, and the rate of production capacity utilization by 0.5 percentage points. These dynamics suggest that investment-driven growth, rather than cost-efficiency alone, will remain the primary engine of production expansion. Thus, targeted investment policies and measures to increase the efficiency of capital use and capacity engagement will be crucial for sustaining this projected growth.

The forecast of the production volume dynamics for small business entities in the Namangan region under Scenario 2 is derived from the multiplicative form of the regression equation (2*):

$$Q = \frac{NR^{0,96} * \text{FCI}^{0.08} * TE^{5,02}}{e^{35,47071}} \qquad (2*)$$

To obtain the forecast values, each explanatory variable is expressed as a time-dependent function, where t=14t = 14t=14 represents the year 2023. The trend equations for the independent variables are as follows:

- **Net income from sales (NR)**: $NR = 5335.8 + 1214.1 \cdot t$
- **Investment in fixed capital (FCI)**: $FCI = -1772.1 + 861.7 \cdot t$
- **Total employment in small businesses (TE)**: $TE = 607.7 + 23.3 \cdot t$

By substituting the forecasted values from these equations into regression equation (2*), the projected production volumes are calculated. The results are presented in Table 7.

Table 7. Forecast result of the dynamics of the production volume by small businesses in Namangan region under scenario 2

Years	Product production volume, billion soums	Net sales revenue, billion soums	Investment in fixed capital, billion soums	Total number of positions, thousand people
2023	10050.0	22333.2	10291.7	934
2024	12043.6	23547.3	11153.4	957
2025	14346.2	24761.4	12015.1	981
2026	16994.2	25975,5	12876,8	1004
2027	20027,4	27189,6	13738,5	1027
2028	23488,5	28403,7	14600,2	1050

According to the multi-factor forecast of production dynamics in the Namangan region, the number of employees engaged in small business and private entrepreneurship is projected to increase by 13% by 2028 compared to 2022, reaching approximately 1,050 thousand people. Over the same period, investments in fixed capital are expected to grow by 40%, totaling 14,600.2 billion soums, while net income from the sale of goods and services is forecasted to rise by 30%, reaching 28,403.7 billion soums.

Furthermore, compared to the baseline year of 2010, the total production volume of small business entities in the Namangan region is projected to increase by a factor of 2.34, reaching 23,488.5 billion soums by 2028. These projections underscore the persistent effect of investment-driven growth and employment expansion within the small business sector. The findings highlight the critical importance of ensuring sustained capital inflows and targeted human capital development in order to maintain and accelerate this positive trajectory.

The study also presents a multifactor forecast of the production dynamics under Scenario 3, which incorporates a different set of explanatory variables affecting output levels in the small business sector in the Namangan region. The scenario is based on the following trend equations:

$$Q = \frac{\text{ECC}^{3,04} * \text{FCI}^{0,11} * \text{TPC}^{0,17}}{e^{9,22064}} \qquad (3^*)$$

Each of the explanatory variables included in the regression equation under Scenario 3 is modeled using time-dependent trend equations, with t=14t = 14t=14 representing the base forecast year of 2023. The corresponding equations are as follows:

- the energy consumption cost in small businesses -$\text{ECC} = 77,1 + 8,8 * t$;
- fixed capital investment of small businesses $-FCI = -1772,1 + 861,7 * t$;
- the total amount of expenses incurred on the production of products in small businesses -$\text{TPC} = 512,7 + 93,2 * t$;

By substituting the values from the trend equations into the regression model, a multifactor forecast of the production volume of small business entities in the Namangan region under Scenario 3 is obtained. A comparative analysis of the results across all three scenarios reveals that Scenario 2 yields the highest projected output:

- Scenario 1: 11,668.3 billion soums
- Scenario 2: 23,488.5 billion soums

This clearly demonstrates that Scenario 2 offers the most favorable growth trajectory, largely due to the significant influence of employment growth. Specifically, a 1% increase in the number of jobs within small business entities is projected to contribute approximately 501.3 billion soums to the total production volume.

These findings emphasize the importance of targeted investment in human capital, infrastructure, and fixed assets. Implementing the recommendations derived from Scenario 2 will enable more effective development of small businesses and private entrepreneurship in the Namangan region, ultimately enhancing regional economic resilience and inclusive growth.

The analysis revealed Uzbekistan's current position in several global indices, including the Business Environment Index, Economic Freedom Index, Global Competitiveness Index, and Global Digital Competitiveness Index. The deterioration in these rankings signals an urgent need to reform and modernize the national regulatory and legal frameworks. This includes formulating a new strategy for attracting investment and leveraging more effective policy instruments to stimulate economic growth.

The study concludes that the shortage of internal economic resources in Uzbekistan necessitates the mobilization of alternative financing sources. Under the current economic conditions, investment must serve as the principal driver for overcoming long-term stagnation, achieving structural transformation, enabling technological modernization, enhancing economic efficiency, and improving the population's standard of living. In particular, foreign direct investment (FDI) represents the most viable and impactful source of capital in the near term, capable of improving enterprise productivity and strengthening the broader economy. Local authorities, therefore, must intensify their efforts to promote and facilitate investment activity at the regional level.

Selecting the most effective investment solution requires the application of rigorous and reliable evaluation methodologies. Therefore, the investment decision-making process must be supported by comprehensive cost-benefit analyses and quantitative modeling. These tools provide a solid basis for making informed decisions and for assessing the economic viability and strategic relevance of the proposed investment project.

Conclusion

This analytical review of investment processes in the small business sector of Namangan region has revealed several significant findings that contribute to the understanding of investment dynamics in regional economic development. The comprehensive analysis of theoretical frameworks and empirical studies has demonstrated that investment processes in small businesses have distinctive characteristics that require tailored approaches for their effective management and stimulation.

The research has established that small business investments in Namangan region have unique patterns influenced by both internal factors (entrepreneurial capacity, financial literacy, business model sustainability) and external factors (regulatory environment, infrastructure development, access to financial resources, market conditions). These findings align with international research while highlighting region-specific nuances that must be considered when developing investment policies.

Our analysis indicates that improving the investment climate for small businesses in Namangan requires a multi-faceted approach that addresses several critical areas:

- Financial infrastructure development: Expanding access to diverse financing instruments beyond traditional banking loans, including venture capital, microfinance, and public-private partnership mechanisms tailored to the needs of small businesses.
- Institutional framework enhancement: Strengthening legal protections for investors, streamlining regulatory procedures, and establishing transparent governance practices that reduce transaction costs and uncertainty.
- Human capital development: Investing in entrepreneurial education, technical skills training, and management capacity building to improve investment readiness and absorption capacity of small businesses.
- Technology adoption support: Creating mechanisms that facilitate technology transfer and innovation adoption among small businesses to enhance their productivity and competitiveness.
- Regional specialization and clustering: Promoting investment in sectors where Namangan has comparative advantages, encouraging industrial clusters that can generate positive externalities through knowledge spillovers and shared infrastructure.

The study also identified gaps in current research, particularly regarding the quantification of social returns on investment in small businesses and the long-term sustainability of various investment models. Future research should address these gaps through longitudinal studies and more sophisticated econometric modeling approaches.

In conclusion, enhancing investment processes in the small business sector of Namangan requires coordinated efforts from government authorities, financial institutions, educational establishments, and business associations. By implementing targeted policies that address the specific challenges identified in this analysis, stakeholders can create an enabling environment that not only attracts more investment to the small business sector but also ensures that these investments generate sustainable economic and social returns for the region.

The findings of this research contribute to the broader understanding of investment dynamics in transitional economies and provide practical insights for policymakers seeking to stimulate economic development through small business growth. The proposed framework for analyzing investment processes can be adapted for application in similar regional contexts, particularly in other regions of Uzbekistan and Central Asian countries with comparable economic structures and development challenges [1-54].

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Foot Notes

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