

Econometric Analysis of Factors Affecting the Efficiency of Credit Organizations Providing Microfinancial Services in the Republic of Uzbekistan

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Abstract

This article provides an econometric analysis of factors influencing the efficiency of credit institutions providing microfinance services operating in Uzbekistan. Indicators of economic efficiency of credit institutions providing microfinance services were selected and observations were made on them.

Keywords: *non-bank credit organizations, profitability, econometric analysis, model, efficiency, microfinance organizations, asset, capital, liquidity.*

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Introduction

Non-bank credit institutions have their own place in each country. Their role in reducing poverty in the country and improving the social activities of the population is recognized. At the same time, non-bank credit organizations must also ensure their financial stability.

We took the size of the credit portfolio and their percentage as indicators of the social efficiency of credit organizations providing microfinance services. Because, in order to determine the level of financial assistance to the poor segment of the population by credit organizations providing microfinance services, it is necessary to study the volume of loans allocated by them and their percentage. Factors affecting the social efficiency of credit organizations providing microfinance services are mainly external factors. On the one hand, these external factors affect the purchasing power of the population, and on the other hand, they affect the volume and percentage of loans of credit organizations providing microfinance services.

In our scientific research, we conduct econometric analyzes in two models. That is, we use the least square model and structural vector autoregression models to determine the power of internal and external factors affecting the economic and social efficiency of credit organizations providing microfinance services.

Analysis of literature on the topic

The role of non-bank financial organizations in the economy, factors influencing the activities of these organizations, he has conducted many scientific studies in local and foreign literature. Let's take a closer look at some of these studies.

Scientists such as R. Mersland and R. Strøm studied the relationship between the efficiency of microfinance organizations and their corporate governance. They analyzed the characteristics of the board of directors, type of ownership, competition and regulatory methods in the microfinance organization, the working of microfinance organizations with the poor client base and its effect on efficiency. The analysis showed that the duties of the chairman of the board and the chairman of the board in microfinance organizations are clearly separated from each other, the presence of a woman as the chairman of the board, and the competitive environment in the country have a large impact on the efficiency of microfinance organizations and the conditions of the poor in the country. In particular, the number of board members in the microfinance organization decreased the volume of lending in this organization. Also, the form of ownership of microfinance organizations, that is, whether it is a non-governmental organization or a joint-stock company, has no effect on performance indicators.¹

B. Gutierrez-Nieto and others analyzed the effectiveness of microfinance organizations. According to them, microfinance organizations are not only social organizations, but also financial organizations specializing in making profits. The above economists used the Data Envelopment Analysis (DEA) model of the efficiency of 30 microfinance organizations located in Latin America. According to the results of the analysis, four indicators affect the efficiency of microfinance organizations, and among them, they found that the influence of the reforms carried out by the state, as well as the organizational status of microfinance organizations, such as non-state commercial organization and non-governmental and non-profit organization, is high.²

¹ Mersland, R., & Strøm, R. Ø. (2009). Performance and governance in microfinance institutions. *Journal of Banking & Finance*, 33(4), 662-669.

² Gutierrez-Nieto, B., Serrano-Cinca, C., & Molinero, C. M. (2007). Microfinance institutions and efficiency. *Omega*, 35(2), 131-142.

Economists such as N. Hermes, R. Lensink, and A. Meesters have analyzed the relationship between microfinance organizations' allocation of loans and their effectiveness in reducing poverty. The stochastic frontier analysis (SFA) model was used in the analysis using statistical data of 435 microfinance organizations from 1997-2007. According to the results of the analysis, from more than 1300 observations, it was determined that there is an inverse proportionality between lending to the poor and the efficiency of microfinance organizations.³ In fact, loans from microfinance organizations to the poor segment of the population are, firstly, high-cost, and secondly, high-risk. Because these customers are financially unstable customers.

Research methodology

Methods such as induction, deduction, and synthesis were used in the implementation of scientific research. Also, statistical data of the Central Bank of the Republic of Uzbekistan and the Statistics Committee were used to analyze the activities of microfinance organizations.

Analysis and results

Internal factors as endogenous factors affecting economic performance indicators of credit organizations providing microfinancial services to liquidity ($Liquidity_t$), profitability of assets (ROA_t) and return on capital (ROE_t) volume of loans of credit organizations providing microfinancial services ($Loan_t$), percentage of loans ($LoanRatet$), as well as indicative interest rate (INR_t), money supply ($M2_t$), inflation rate in the economy (CPI_t) and national currency devaluation levels (DEV_t) are selected.

From indicators of social efficiency of credit organizations providing microfinance services, indicative interest rate (INR_t), money supply ($M2_t$) inflation rate in the economy (CPI_t) and national currency devaluation levels (DEV_t) were selected.

The statistical data of the selected indicators for the period 2017M1-2022M12 were obtained in the cross-section of months and in growth. All data are natural logarithmized because the statistical data under analysis vary in size. As a result, the data is aligned and comes to the same unit of measurement.

³ Hermes, N., Lensink, R., & Meesters, A. (2011). Outreach and efficiency of microfinance institutions. *World development*, 39(6), 938-948.

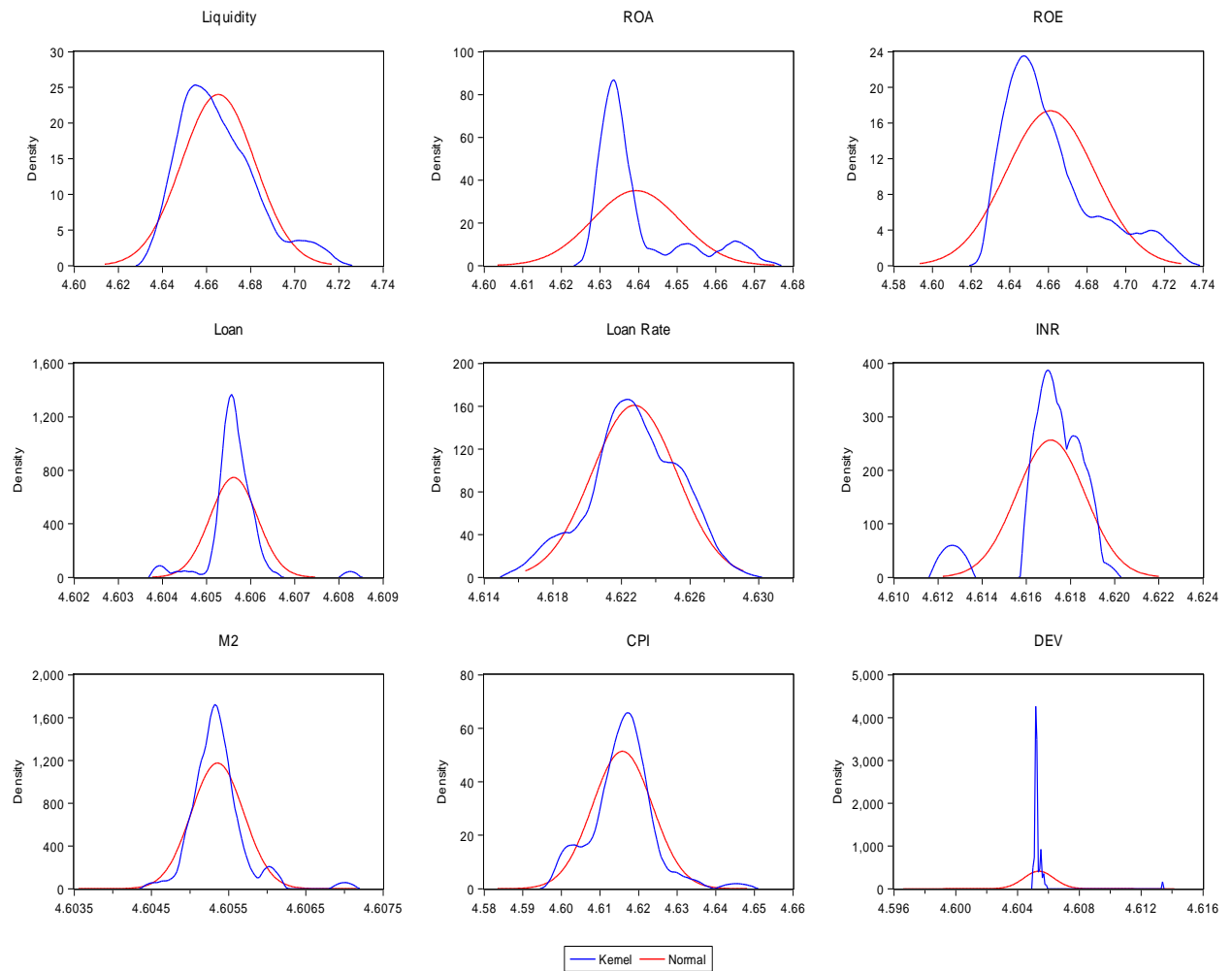


Figure 1. Normal distribution of selected indicators⁴

At the initial stage of the econometric analysis, we performed a number of statistical calculations. These are descriptive statistics of the selected data, i.e., it mainly analyzes the data's average, maximum and minimum values, deviation from the mean (standard deviation). We also analyzed the normal distribution of selected indicators in our scientific work.

The Jacques Bera coefficient was used to test the normal distribution of the data. The analysis shows that the indicators of economic efficiency of credit organizations providing microfinance services, i.e., all the selected indicators, except for indicators of liquidity, assets and return on capital, have a normal distribution. Because the Jacques-Bera coefficient calculated for all the selected indicators was found to be reliable and their probability is less than 0.05.

72 observations were made using the selected indicators. Below we will analyze descriptive statistics of 9 selected indicators.

⁴ Prepared by the author based on selected statistics.

Table 1. Descriptive statistics of indicators⁵

	INR	M2	CPI	DEV	Loan	LoanRate	Liquidity	ROA	ROE
Mean	4.6171	4.6053	4.6157	4.6053	4.6056	4.6228	4.6654	4.6394	4.6613
Median	4.6167	4.6053	4.6161	4.6052	4.6056	4.6224	4.6611	4.6348	4.6541
Maximum	4.6192	4.6070	4.6453	4.6133	4.6082	4.6280	4.7123	4.6720	4.7228
Minimum	4.6126	4.6045	4.6001	4.6049	4.6039	4.6169	4.6418	4.6281	4.6346
Std. Dev.	0.0014	0.0003	0.0077	0.0009	0.0005	0.0024	0.0167	0.0114	0.0229
Skewness	-1.7810	1.6639	0.5413	7.9582	0.6977	-0.2430	0.8922	1.5009	1.1271
Kurtosis	6.7229	9.6691	5.1799	66.156	12.123	2.8349	3.3518	3.9676	3.3368
Jarque-Bera	79.647	166.65	17.772	12726	255.54	0.7907	9.9257	29.841	15.585
Probability	0.0000	0.0000	0.0001	0.0000	0.0000	0.6734	0.0069	0.0000	0.0004
Sum	332.43	331.58	332.33	331.58	331.60	332.84	335.9100	334.03	335.61
Sum Sq. Dev.	0.0001	8.18E-06	0.0042	6.69E-05	2.03E-05	0.000425	0.019833	0.0092	0.0375
Observations	72	72	72	72	72	72	72	72	72

According to the monitoring results, the average indicator of the liquidity of credit organizations providing microfinance services, which is considered as an exogenous variable, is 4.6654, and this indicator was the maximum of 4.7123 and the minimum of 4.6418 during the observed period. The standard deviation of this indicator was equal to 0.0167.

Also, the logarithmic average of the profitability indicators of the assets of credit organizations providing microfinance services is equal to 4.6348, and this indicator was the maximum of 4.6720 and the minimum of 4.6281 during the observed period. The standard deviation of this indicator was equal to 0.0114.

The average indicator of return on capital of credit organizations providing microfinance services is 4.6541 in natural logarithm, and this indicator was 4.7228 maximum and 4.6346 minimum during the observed period. The degree of deviation from the average of this indicator was equal to 0.0229.

It was found that the standard deviation of the indicator of capital profitability of credit organizations providing microfinance services is larger than the rest of the performance indicators.

Table 2. Correlation matrix between selected indicators⁶

	INR	M2	CPI	DEV	Loan	LoanRate	Liquidity	ROA	ROE
INR	1								
M2	-0.0073	1							
CPI	0.0124	-0.0449	1						
DEV	-0.0812	0.5777	0.0742	1					
Loan	0.0376	-0.0990	0.2182	0.0578	1				
LoanRate	0.8048	-0.0993	-0.0297	-0.2299	-0.0695	1			
Liquidity	0.0114	-0.0477	-0.2346	-0.1726	-0.2423	-0.0199	1		
ROA	0.0450	-0.0415	-0.1579	-0.0912	-0.2448	0.0049	0.8605	1	
ROE	0.1170	-0.0047	-0.2172	-0.1197	-0.3103	0.07838	0.8963	0.9674	1

Above, the correlation of the liquidity, lending capacity and interest policies of the selected commercial banks with endogenous indicators was analyzed.

The correlation of the liquidity level with the volume of loans and their percentage from the indicators of economic efficiency of credit organizations providing microfinance services was

⁵ Prepared by the author based on selected statistics.

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equal to -0.24 and -0.02, respectively. That is, if the increase in the volume of loans of credit organizations providing microfinance services had an adverse effect on their liquidity, the effect of the loan interest rate on liquidity was not felt.

From the indicators of economic performance of credit organizations providing microfinance services, the correlation of the level of liquidity with the indicative interest rate was equal to 0.01, with the mass of money in circulation -0.05, with the level of inflation -0.23 and with devaluation -0.17. That is, the influence of the liquidity of microfinance organizations on the money supply with the indicative interest rate was not felt. On the contrary, there was an inverse correlation with the levels of inflation and devaluation.

Correlation of the profitability of assets with the volume of loans and their percentage from economic efficiency indicators of credit organizations providing microfinance services was equal to -0.24 and -0.01, respectively. That is, if the increase in the volume of loans of credit organizations providing microfinance services had the opposite effect on the profitability of their assets, the impact of the loan interest rate on the profitability of their assets was not felt.

The correlation of the return on assets of credit organizations providing microfinance services with the indicative interest rate was equal to 0.04, with the money supply in circulation -0.04, with the inflation rate -0.16 and with devaluation -0.09. That is, the influence of the money supply with the indicative interest rate on the profitability of the assets of credit organizations providing microfinance services was not noticed. On the contrary, the rate of return on equity, which is weakly inversely related to the rate of inflation and devaluation, has the same correlation as the rate of return on assets.

The correlation of the volume of loans of credit organizations providing microfinance services with the indicative interest rate and the mass of money in circulation was equal to 0.04 and -0.10, respectively. That is, if the increase in the indicative interest rate increases the volume of loans, on the contrary, the increase in the money supply in circulation decreases the volume of loans.

At the same time, the correlation of the volume of loans of credit organizations providing microfinance services with inflation and devaluation levels was equal to 0.21 and 0.06, respectively. That is, the impact of inflation and devaluation levels on the volume of loans was positive.

Another indicator of the social efficiency of credit organizations providing microfinance services is the correlation of the percentage of loans with the indicative interest rate and the mass of money in circulation equal to 0.80 and -0.10, respectively. That is, if the increase in the indicative interest rate had a significant impact on the percentage of loans, on the contrary, the increase in the money supply in circulation decreases the volume of loans, and this relationship is logically built.

At the same time, the correlation of the percentage of loans of microfinance credit organizations with inflation and devaluation levels was -0.03 and -0.23, respectively. That is, if the effect of inflation levels on the percentage of loans was insignificant, the effect of devaluation of the national currency on the percentage of loans was opposite and it was significant..

Table 3. Least-squares model of loan parameters affecting the return on capital of microfinance institutions⁷

Dependent Variable: ROE Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOAN	-12.61486	5.148947	-2.449989	0.0170
STLR	-1.867781	1.902436	-0.981784	0.3298
INR	4.381224	3.091854	1.417022	0.1613
M2	0.791212	9.630839	0.082154	0.9348
CPI	-0.453083	0.347308	-1.304555	0.1966
DEV	-2.867816	3.448343	-0.831651	0.4087
C	62.82094	46.99667	1.336710	0.1860
R-squared	0.155899	Mean dependent var		4.661318
Adjusted R-squared	0.077982	S.D. dependent var		0.022992
S.E. of regression	0.022078	Akaike info criterion		-4.696342
Sum squared resid	0.031682	Schwarz criterion		-4.474999
Log likelihood	176.0683	Hannan-Quinn criter.		-4.608225
F-statistic	2.000841	Durbin-Watson stat		0.295245
Prob(F-statistic)	0.078219			

According to the results of the analysis, when checking with a probability of 5%, only the volume of loans has an effect on the capital profitability of credit organizations providing microfinance services. In particular, an increase in the volume of loans by one percent of the rate increases the capital profitability of credit organizations providing microfinance services by 5.15 percent. Through this model, the influence of the remaining indicators on the profitability of microfinance credit institutions with a probability of 5% was not observed.

From the next stage of our analysis, we need to choose the optimal "lag" for the SVAR model. For this, we use the Lag Length Criteria method. The analysis shows that the optimal number of "lags" for the SVAR model of factors affecting the economic efficiency of credit organizations providing microfinance services is 2.

Table 4. The optimal "lag" selection (Lag Length Criteria) method for the SVAR model of factors affecting the economic efficiency of credit organizations providing microfinance services⁸

Lag	LogL	LR	FPE	AIC	SC	HQ
0	2961.033	NA	5.58e-49	-85.56617	-85.27477	-85.45056
1	3261.624	514.0549	9.79e-52	-91.93114	-89.01709	-90.77504
2	3326.214	93.60832	1.76e-51*	-91.45548*	-85.91878*	-89.25889*
3	3410.587	100.2695	2.19e-51	-91.55325	-83.39391	-88.31617

The increase in the money supply and the increase in the return on capital had a positive effect on the return on assets of credit organizations providing microfinance services. Also, the increase in the money supply and the increase in the level of liquidity have a negative effect on the profitability of the capital of credit organizations providing microfinance services. But through

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autocorrelation, an increase in the return on capital in the previous period also increases the return on capital in the next period.

From the next stage of our analysis, we need to choose the optimal "lag" for the SVAR model. For this, we use the Lag Length Criteria method. As can be seen from the analysis data, the optimal number of "lags" for the SVAR model of factors affecting the social efficiency of credit organizations providing microfinance services is 2.

According to the results of the model, the influence of indicative interest rate, circulating interest rate, and inflation levels in the domestic economy among the selected indicators affecting the volume and percentage of loans indicating the social efficiency of credit organizations providing microfinance services was not determined. On the contrary, it was found that the devaluation of the national currency has a strong effect on the effectiveness of social activities of microfinance organizations.

Conclusions and suggestions

As a conclusion, we can say that the ratio of the assets and loans of microfinance organizations and pawnshops to the country's GDP and to the assets and loans of commercial banks is not even one percent, which indicates the low importance of these non-bank credit organizations in the economy. But the rapid development of microfinance organizations and pawnshops in the last six years leads to confidence in their future.

According to the results of the SVAR model, the indicative interest rate, the percentage of loans, the levels of profitability of assets, and the level of liquidity in the previous period, taking into account the autocorrelation, had a positive effect on the indicators of liquidity indicating the economic efficiency of loans of credit organizations providing microfinance services.

The increase in the money supply and the increase in the return on capital had a positive effect on the profitability of the loans of credit organizations providing microfinance services. Also, the growth of the money supply and the increase in the level of liquidity have a negative impact on the profitability of loans of microfinance service providers.

According to the results of the model, the indicative interest rate, interest rate in circulation, and inflation levels in the domestic economy were not identified among the selected indicators that affect the volume and percentage of loans indicating the social effectiveness of loans of microfinance service organizations.

On the contrary, it was found that the devaluation of the national currency has a strong effect on the effectiveness of social activities of loans of these organizations.

References:

1. Gutierrez-Nieto, B., Serrano-Cinca, C., & Molinero, C. M. (2007). Microfinance institutions and efficiency. *Omega*, 35(2), 131-142.
2. Mersland, R., & Strøm, R. Ø. (2009). Performance and governance in microfinance institutions. *Journal of Banking & Finance*, 33(4), 662-669.
3. Hermes, N., Lensink, R., & Meesters, A. (2011). Outreach and efficiency of microfinance institutions. *World development*, 39(6), 938-948.
4. Gutiérrez-Nieto, B., Serrano-Cinca, C., & Mar Molinero, C. (2009). Social efficiency in microfinance institutions. *Journal of the operational research society*, 60(1), 104-119.

5. Official information of the Central Bank of the Republic of Uzbekistan
6. Annual official report of Imkon Finans microfinance organization.
7. <https://www.worldbank.org> information
8. Formanova S. B. Application of Pedagogical Technologies to the Topics of the Metals Department //Annals of the Romanian Society for Cell Biology. – 2021. – C. 5499-5509.
9. Shomurotova, S. X., Farmonova, S. B., Kamolova, N. I., & Movlonova, S. A. (2020). Improving the Methodology of Teaching the role of metals in Biochemical Processes using Pedagogical Texnologies. *Engineering a Management Test*, 83.
10. Bobonazarovna F. S., Abduhamidovich N. A. Development of Mathematical Literacy in Chemistry Lessons //European Scholar Journal. – 2021. – T. 2. – №. 3. – C. 97-99.