



Information Technology to Increase the Capitalization of Commercial Banks: An in-Depth Empirical Analysis

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Abstract: This article explores the relationship between capitalization and profitability in commercial banks in Uzbekistan by conducting a large-scale econometric analysis of a complex degree. The ways and main directions of increasing the capitalization of banks are considered. An analysis was carried out using a number of indicators that affect both capitalization and macroeconomic indicators in general. In the analysis, a number of specific banking and macroeconomic indicators were selected as independent variables, which are considered necessary for econometric observation of the dynamics of profits and capitalization of 11 commercial banks in Uzbekistan in 2010-2018. A comprehensive econometric analysis has shown that an increase in the profits of individual commercial banks stimulates capitalization at a significant level. In addition, special attention is paid to modern types of banking services such as the introduction of artificial intelligence in the activities of the bank, its role, significance and impact on the profits of commercial banks. The issues of the influence of the profits of commercial banks on the level of capitalization of banks have been studied. Because of the study, conclusions are given regarding the topic and proposals for improving the level of capitalization of banks and its impact on the economy of the state as a whole.

Keywords: commercial banks, capitalization, profit, generalized method of moments, Uzbekistan.

I. INTRODUCTION

Being one of the central institutional elements of modern financial architecture, banks are not only the regulator of the monetary environment; as well as being a lever for restructuring the economy and ensuring long-term sustainable macroeconomic stability. Having played such an important role in the development of the domestic financial environment, the banking sector should establish effective interaction with all structures of the national economy. At the same time, the current stage of economic relations shows the need for a more thorough and in-depth approach to the factors that determine the profitability of banks in conditions of low capitalization.

At the moment, information and communication technologies are capable of radically changing the way various institutions and the state as a whole function. The combination of information and communication technologies leads to the improvement of traditional sectors of the economy, the development of new industries, services and products, as well as the satisfaction of the constantly emerging needs of society. Such technologies are a tool for creating new ways of business management that yield high-quality results both at the company level and at the level of the market economy as a whole.

At this stage of economic development, information technologies play an important role. one of the main directions of the information economy is the network economy or the Internet economy.



Thanks to the development of information technology, the banking services sector is expanding every year and embracing new horizons. Now even the most distant client of the bank can carry out banking operations using information technology (Internet). The main reason for the development of remote banking is the distribution of smart phones and other mobile gadgets. Ensuring continuous access to a bank account via the Internet is an indispensable element for the quality service of individuals and legal entities. Mobile Banking is a new segment of the banking business that is developing rapidly and becoming the sphere of using advanced schemes and technologies for the provision and promotion of services. A key component in this technology is the application, which is located on the SIM card, it allows you to use a mobile phone not only as a means of making payments, but also as a device for generating dynamic passwords. This means that passwords can change and create complete protection against unauthorized access, remaining known only to the owner of the mobile phone.

Large banks can save if their customers actively pay bills in real time. Fast and easy to use online bill payment services are very beneficial for banks, as customers have a higher level of satisfaction with services and a greater degree of loyalty to the banks serving them. It is necessary to transfer this operation to a bar-code basis, when information will be entered in the current form in the issued invoice, which is convenient for the organization that provided the citizen with a service and for the bank. Barcode technology for invoice processing allows you to achieve important results in working with clients:

- reduce customer service time by automating the input of all necessary information from payment documents;
- radically reduce the number of errors when entering payment information;
- accelerate the process of transferring money to the account of the recipient organization;
- use electronic communication channels to interact with payees;
- increase the productivity growth of employees of departments and branches;
- Overall improve customer service.

Banks can develop and introduce new types of services based on information technology, using the latest data encoding techniques, smart networks and other security tools. The introduction of such services will require the creation of partnerships between banks providing services, telecommunication organizations and entrepreneurs themselves. Such services include, but are not limited to:

Round-the-clock money transfer systems, which are installed at points of sale. Such systems can reduce the transaction time to about 10-15 seconds even during peak hours. The result of their use should be a reduction in queues, an increase in customer satisfaction of trading enterprises and, accordingly, an increase in their loyalty;

Services characterized by a large amount of data transferred, such as electronic signature capabilities, the creation of electronic graphic images, receipts, the creation of data backups, etc.

Every day, bank customers are becoming more and more demanding of the banks they use. Banks want to distinguish themselves favorably from competitors by the presence of progressive technical solutions in order to attract new customers. One of these solutions is remote biometric customer identification, a mechanism that will allow individual customers to receive financial services remotely by confirming their identity using biometric data, facial images and voice in any bank. In the era of digital technologies, a computer with a camera and a microphone, a smartphone, a tablet, etc. can become an identification device, there are no problems with this, it only remained to decide



where the collected data will be stored, as well as how the solution of issues related to the security of this storage will be ensured, data availability for banks of project participants.

The biometric algorithms used in the system are so perfect that they can distinguish twins from each other, and due to the fact that face and voice are compared at the same time - two types of biometric data at once, an impressive recognition accuracy of 10^{-3} is achieved, that is, only one authorization error is allowed per 10 million uses ... Also, changing the hairstyle, growing a beard, or wearing glasses will not affect the recognition accuracy of a person in any way. Nevertheless, biometric data must be updated at least once every three years, more often only in the case of a cardinal change in appearance in the event of injury, plastic surgery, etc. You can update the data again in the branches of the banks of the system participants.

The demand for wireless services is enormous. Banks can take advantage of this high demand by expanding the existing network infrastructure needed to provide wireless services.

In the last decade, banks have faced the grave challenges of the global financial crisis and its long-term consequences. Despite the efforts and support of governments and international financial institutions, the recovery process is slow and unpromising. Having lost the confidence of depositors and investors, banks are still faced with the need to mitigate market and systemic risks by strengthening capitalization levels and creating stable sources of income.

In order to avoid the negative cyclical effects of the crisis, international financial institutions have developed large-scale systems for preliminary detection of threats, the optimal amount of buffer capital, a safety net, etc. However, the implementation and effective application of these initiatives remains open, especially in terms of capitalization and profitability of banks. A number of strategies for regulating the banking system of individual states, that is, their central banks, have lost relevance due to the discrepancy with the nature and specific aspects of the relationship between capital and bank profitability.

It should be recognized that the CAMEL and CAMEL indicators developed by the Bank for International Settlements remain the unified system of regulation and monitoring the stability of the banking sector due to the fact that they are focused on capitalization as a prerequisite for ensuring stability. In this regard, it is considered important and appropriate to study the effect of profitability on capitalization.

The banking sector of Uzbekistan is relatively young and in the stage of progressive development. In the sector, there are 32 commercial banks with different financial and market profiles. According to the requirements of CAMEL, the general condition of the sector is assessed as stable, dynamic and promising. The income base of banks is based on the universal activity of banks, which includes all banking products.

II. ANALYSIS OF THEORETICAL VIEWS ON THE TOPIC

This article selected 11 commercial banks (National Bank of the Republic of Uzbekistan for Foreign Economic Affairs, Joint-Stock Commercial Bank (hereinafter - JSCB) "Asaka", JSCB Ipoteka Bank, JSCB Uzpromstroybank, JSCB Agrobank, JSCB Qishloq Qurilish Bank, Microcreditbank, Ipak Yuli Bank, Capital Bank, Alokabank and Turonbank) and the state of the relationship between their capitalization and profit is analyzed using economic modeling.

The econometric analysis employs a two-stage generalized method of moments for dynamic panel data for 2010-2018, collected from published statistical data of the Central Bank of the Republic of Uzbekistan, an open portal of corporate data and the State Committee for Statistics of the Republic of Uzbekistan. The number of observations was 352 intervals.



Given the complexity of dynamic panel data analysis, the structure

An econometric model has collected data in three categories (Table 1). The first category included profitability indicators included in the financial statements of commercial banks. The second category included indicators of the stability of commercial banks according to the CAMEL indicators of the requirements of the Basel Committee on Banking Supervision. The third category included macroeconomic indicators that have a high level of sensitivity to the stability of the banking system.

Table 1 Category of indicators

Profitability indicators	Return on equity
	Profit total assets
	Net interest income of the bank
Stability Indicators ("CAMEL")	Capital adequacy ratio
	Liquidity ratio
	Credit ratio
Macroeconomic indicators	Inflation rate
	Real GDP growth

This article analyzes the proposed models using the generalized method of moments (GMM - Generalized Method of Moments) for dynamic panel data. The two-step generalized method of moments (2SGMM - Two Step GMM) of dynamic panel data gives more plausible and probable results than the one-step method.

In addition, this method is considered the most effective in the presence of few time periods and many objects, as well as linear functional relationships. Based on the classical theory of the relationship between profit and capitalization of banks, as well as the specifics of the banking system of the Republic of Uzbekistan, the following functional dependence has been compiled:

$$CAP_{i,t} = \alpha CAP_{i,t-1} + \beta_1 PRE_{i,t} + \beta_2 PTA_{i,t} + \beta_3 ITA_{i,t} + \beta_4 CAR_{i,t} + \beta_5 LIQ_{i,t} + \beta_6 LOR_{i,t} + \beta_7 GDP_t + \beta_8 INF_t + \zeta_i + \varepsilon_{i,t}$$

Here, $CAP_{i,t}$ is the capitalization of i bank in t period, $PRE_{i,t}$ is the ratio of profit and share capital of i bank in t period, $ROA_{i,t}$ is the ratio of profit and total assets of bank i in period t , $ITA_{i,t}$ is net interest income of i bank in the t period, $CAR_{i,t}$ - capital adequacy level of the i bank in the t period, $LIQ_{i,t}$ - i bank liquidity ratio in the t period, $LOR_{i,t}$ - i bank credit activity ratio in the t period, GDP_t is the growth of real GDP in the t period, INF_t is the inflation rate in the t period, $\varepsilon_{i,t}$ is the remaining term.

Before conducting the 2SGMM test, it is necessary to check the stationarity of the variables. In case of stationarity, the relation does not exist between variables. To solve the problem of non-stationarity, it is necessary to conduct a unit root test, with which the stability of each variable is determined. And non-stationary variables are excluded from the analysis.

In the analysis of dynamic panel data with a limited number of observations, the Harris – Tsavaliz unit root test is used (Table 2). The Harris-Tsavaliz method differs in that the test recognizes the variables as stationary when there is no correlation and there is a common autoregressive variable.



Table 2 Harris-Cavalise Unit Root Test Results

Variables	Z statistics	Stationary
CAP	-3,9971**	Stationary
PRE	-6,9867***	Stationary
PTA	-9,6648**	Stationary
ITA	-5,9936***	Stationary
CAR	-4,9943***	Stationary
LIQ	-2,9788***	Stationary
LOR	-4,5895**	Stationary
GDP	-13,8179***	Stationary
INF	-7,2364***	Stationary

The results of the Harris- Cavalise unit root test show that all variables are stationary at the initial level; it seems that there is no need to test the unit root of the primary and secondary differences. If all variables are stationary at the initial level, the prerequisite of the GMM test is satisfied.

After the unit root test, with the stationary of all variables, it is allowed to conduct the 2SGMM test (Table 3).

Table 3 2SGMM Test Results

Models	CAP	PRE	PTA	ITA
CAP (-1)	0,481**	-	-	-
PRE (-1)	-	0,347***	-	-
PTA (-1)	-	-	0,192***	-
ITA (-1)	-	-	-	0,626*
CAR	-0,027***	-0,018***	-0,031***	-0,022**
LIQ	-0,116***	-0,103**	-0,084***	-0,097***
LOR	0,019*	0,037***	0,181***	0,012**
GDP	-0,129**	-0,146***	-0,097**	-0,115***
INF	-0,033***	-0,049***	-0,018**	-0,026***

According to Table 3, the lag values of all dependent variables are positive and significant. The positive dynamics of volumes arrived has stimulated the capitalization of selected banks. In particular, interest income has a strong influence on capitalization. Profitability indicators also play an important role in strengthening capitalization. In addition, among the indicators CAMEL, credit activity ratio are a factor in increasing the capitalization of selected Uzbek banks.

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However, the reliability and plausibility of the results are not defined. In practice, the reliability of the results of dynamic panel data is evaluated using three auxiliary diagnostic tests (Table 3). The Sargan test determines the adequacy of instrumental variables. Significant consistent correlation means that our estimated coefficients have been biased. The second diagnostic method is the Arellano-Bond test, in which the primary difference of the regression equation eliminates the fixed effects and the deep lags of the dependent variable are used as tools for differentiated lags of the



dependent variables. Wald's test is used to check for the true value of a parameter by evaluating sample dynamic panel data.

Vald test results show that all models have a common value. The Arellano-Bond test coefficient confirmed the absence of autocorrelation. Sargan's criterion proved the reliability of variables. And the relevance of the null hypothesis promoting tools without serial correlation. Diagnostic tests confirmed the validity and plausibility of the 2SGMM test results.

III. CONCLUSIONS AND OFFERS

Conducted econometric analysis confirmed the relevance of the classical theory of the interconnectedness of profit and capitalization on the example of commercial banks of the Republic of Uzbekistan. The stimulating effect of profitability indicators on capitalization is noted commercial banks in the selected period. Based on the foregoing, in order to further strengthen capital formation and ensure stable sources of bank income, the following scientific and theoretical recommendations are proposed:

1. Taking into account that in the analysis interest income is defined as a key factor in increasing the capitalization of selected banks, it is necessary to promote diversified banking products on the domestic financial services market.

Taking advantage of the large-scale effect, introduce a system of low-interest lending within the key rate (refinancing rate) of the Central Bank.

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