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Kovalenko Victoria
Doctor of Science in Economics, Professor
Odesa National Economics University
Ukraine
ORCID: 0000-0003-2783-186X

Azarenkov Serhii
Ph. D. Student of the Department of Banking
Odesa National Economics University
Ukraine
ORCID: 0000-0002-1159-8699

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FINANCIAL SECURITY OF BANKS AND THEIR SENSITIVITY TO ACCELERATING ECONOMIC CYCLICALITY

Abstract. *The modern economy is characterized by accelerating cyclicality, which increases risks for the banking sector, which is the key to macroeconomic stability. For Ukraine, in the context of constant economic turmoil and martial law, the issue of financial security of banks and their sensitivity to cyclical fluctuations is particularly acute. Studies linking the financial security of banks to the dynamics of the economic cycle are fragmentary, which necessitates a comprehensive analysis.*

The study uses linear VAR modeling, Granger causality test, Kilian bootstrap method, and GIRF impulse response decomposition. Quarterly statistical data for the period 2009q1–2025q1 were used for the modeling, including the financial cycle indicator, the share of loans to GDP, profitability, the share of non-performing assets, and the loan-to-deposit ratio.

The modeling showed that the direct impact of the acceleration of cyclicality on the safety and efficiency of banking activities is mixed. In the short term (up to one year), financial cycle shocks depress bank profitability, while in the long term (after one and a half years) they contribute to its recovery. An increase in the share of loans in GDP temporarily worsens the liquidity of the banking system. The most sensitive to cyclical fluctuations were the return on assets and capital, as well as the share of non-performing assets.

The scientific novelty lies in the construction and empirical modeling of a system of relationships between the financial cycle and financial security indicators of Ukrainian banks, which allowed to quantify their sensitivity to macroeconomic fluctuations and identify the nonlinear nature of their impact.

The results of the study can be used by the NBU to improve its macroprudential policy, in particular to calibrate the countercyclical capital buffer. Banking institutions can apply the findings to develop more effective risk management strategies and increase their resilience to cyclical shocks. Prospects for further research include the development of an integrated stress-testing model taking into account macroeconomic cycles, analysis of the impact of FinTech and ESG factors on the cyclical stability of banks, as well as a comparative analysis of strategies to improve financial security in countries with different levels of development.

Keywords: *financial security, banking sector, economic cyclicality, VAR modeling, macroprudential policy, stress testing, bank sensitivity, financial cycle.*

1. Introduction

The banking sector is critical to the functioning of any economy. Its financial security is key to macroeconomic stability, ensuring the smooth functioning of financial markets and supporting economic growth. Today's global economy is characterized by accelerating and intensifying economic cycles, which makes banks, as the main financial intermediaries, particularly vulnerable.

Global experience (e.g., the 2008 crisis or the effects of COVID-19) has clearly shown that problems in the banking sector can quickly transform into systemic crises with devastating consequences for the real economy and households' welfare. In response to previous crises, international and national regulators have continuously reviewed and tightened capital, liquidity and risk management requirements for banks.

For Ukraine, as an emerging economy with a history of periodic economic shocks, exacerbated by the prolonged martial law, the issue of financial security of banks in the context of cyclicality is particularly acute and requires constant monitoring and analysis.

The purpose of the article is to substantiate the mechanisms for enhancing the financial security of banks in the context of accelerating economic cyclicality by assessing their sensitivity to macroeconomic fluctuations and developing recommendations for adaptation.

Modeling the assessment of the level of financial security of banks and determining their sensitivity to the acceleration of economic cyclicality is not a widespread topic in modern scientific research. sources. The scientific community pays more attention to the methodology of integrated assessment of the financial security of the state through the influence of the monetary system, macroprudential analysis and forecasting, assessment of financial stability indicators, formation of algorithms for determining the level of financial security of individual banking institutions, etc. However, their scientific works are appropriate for the realization of the goal in the presented study.

Thus, the scientific work of Arefiev *et al.,* [1], by calculating key financial stability ratios, investigates how financial stability and the ability to innovate can be integrated into the security and development strategies of banking institutions. The authors prove how the application of a security-oriented business model allows banks not only to maintain their sustainability in a competitive environment, but also to effectively integrate innovative development strategies. Noteworthy is the study conducted by Guzman-Garzon, *et al.,* [2], which presents the CAMEL Partial Triad Analysis (CPTA) model, which combines the CAMEL methodology with the Partial Triad Analysis (PTA) to assess financial indicators to determine the levels of risk of losing a safe level of banking business. Guzman-Garzon, *et al.,* [2], on the example of Ecuador, evaluated banking scenarios in the context of financial turbulence. The presented model revealed significant fluctuations in three key periods: pre-pandemic, pandemic, and the territorial crisis between russia and Ukraine. Gungoraydinoglu and Öztekin, [3], measuring "financial cyclicality", proved that countercyclicality occurs in debt, and procyclicality in securities issuance and debt maturity. The authors emphasize that financial countercyclicality due to debt is more pronounced in countries with weaker banking regulation. Kovalenko, *et al.,* [4], considered the impact of economic cyclicality on the financial security of the state through the impulses of changes in monetary policy. The authors proposed to determine this impact based on the calculation of the financial stress index. Based on the results of the economic and mathematical modeling, it was found that the most influential indicators of the monetary component on the financial stress index are the consumer price index; producer price index; gross domestic product to monetary aggregate M2; cash to GDP; share of foreign currency in monetary aggregate M3; NBU discount rate (average annual); NPL level.

If we consider publications that relate specifically to the assessment of financial security of banks, we should note the scientific work of Zhyvko *et al*., [5], who proposed a model of integrated assessment of the level of financial security of banks based on a value-based approach, which takes into account five groups of indicators — capital and resource, credit and investment, financial and productive, currency and monetary security of the bank. The authors propose to form a value-oriented bank strategy based on the level of its financial security. To this end, the authors used the GAP method to identify the causes of deviations in the level of financial security, which allowed them to identify the components that have the greatest impact on the level of security and the value of the bank. Romanovska and Parshyvliuk, [5], proposed an integral assessment of the financial security of banks based on the use of two groups of indicators — indicators that characterize the efficiency of the bank's activities; indicators that characterize the level of its security and ability to withstand crisis phenomena. Karcheva, [6], to assess the financial security potential of banks, developed a generalized indicator that is calculated on the basis of risk assessment and the existing strength potential of the bank. The author also proposed a mechanism for using early warning signals that take into account the dynamics and variability of liquidity and performance of banks. Baranovskyy *et al*., [7], based on the use of the taxonomy method, proposed a methodology for assessing the level of financial security of a bank based on the analysis of indicators-stimulators/destimulators of a solvent bank and comparison with the indicators of a "reference" bankrupt bank. The presented methodology makes it possible to clean up statistical data using the interquartile range.

Regarding the cyclicality of the economy itself, attention should be paid to the scientific work of Akaev and Sadovnichii, [8], who use the example of the US economy to show how the COVID-19 pandemic changed its short-term dynamics, causing a deep crisis recession in 2020, rather than the expected short-term

and shallow recession in 2022 caused by the inflating of a financial bubble during credit expansion. To predict the scenario of further economic development, the authors developed a model based on the Hyman Minsky theory of financial instability, which can serve to manage the processes of credit expansion and contraction in an unstable economy. Kakar Shayan Khan, [9], studied the relationship between the circular economy, sustainable infrastructure, and green financial technologies using the method of time-specific heterogeneous factor analysis for 39 European countries. Gallegati, [10], using data on global GDP growth rates for the period 1871–2016, developed a system for dating long wave phases based on a systematic temporal relationship between cyclical representations in growth rates and levels. The proposed methodology allows for an objective periodization of long waves, which is much more relevant than the one based on the phase-growth approach.

In general, the critical analysis of scientific developments on the issues raised suggests that they are characterized by a certain fragmentation in terms of assessing the level of financial security of banks and their response to the acceleration of economic cyclicality. Nevertheless, the authors of the article use some of the methodological approaches of the above-mentioned scientific works.

2. Materials and Methods

The variety of approaches to assessing the level of financial security of banks gives grounds to hypothesize that such an assessment should be based on the definition of a financial stress indicator. To assess the sensitivity of banks to the acceleration of economic cyclicality, the authors used the linear VAR method, Granger causality test, the Kilian boost method, and GIRF impulse response decomposition.

The sensitivity of bank performance indicators to the acceleration of economic cyclicality should be measured empirically, considering the dynamics of the financial cycle and the performance of the banking system as an interconnected system of endogenous factors. Considering the purpose of this study, the sample of variables should be selected taking into account the availability of relevant information and the specifics of the data used to generate time series. The selected indicators and their characteristics are presented in Table 1.

Table 1 shows that the sample is formed on the principle of representing the impact of cyclicality (FCI, CGDP), bank performance indicators (NIM, ROA, ROE), and indicators of financial security of banks (NPL, LTD). Since the sample period includes the time of the full-scale invasion of Ukraine, to account for the exogenous effects of this event, we introduce a dummy variable that takes the value “1.0” in the period 2022q1–2025q1.

To study the dynamics of these indicators, we used quarterly statistical data for the retrospective period 2009q1–2025q1. The values of the indicators during the retrospective period are shown in Table 2.

The main descriptive statistics of the variable series are presented in Table 3.

Table 3 suggests that ROA and ROE series have the least normal distribution, which are also characterized by high variability and a significant number of negative extremes. This is explained by the specifics of the formation of the indicators, since the net financial position involved in their calculation is determined at the end of the year and tends to pendulum dynamics in the intervening quarters. In addition, due to the specifics of taxation of the banking business (in particular, over the past two years), positive results that may appear within the year are significantly redistributed in the fourth quarters, which has a significant impact on descriptive statistics. At the same time, FCI and NPL are the most symmetrical and close to a normal distribution.

3. Results and Discussion

Given the relatively small sample size with a significant number of variables, for the primary estimation, a standard VAR (1 1) was built and the Granger Causality/Block Exogeneity Wald Test was implemented, the results of which allowed us to conceptualize the system of causal relationships between the variables (Fig. 1).

Table 1

Composition and characteristics of the sample for modeling

Indicator	Symbol	Frequency and sampling period	Series transformation	Order of integration of the transformed series
Financial cycle index	FCI	quarterly, 2009q1–2025q1	–	I(1)
Share of loans in GDP	CGDP		seasonal adjustment (TRAMO/SEATS)	I(1)
Net interest margin	NIM			I(1)
Return on assets	ROA			I(0)
Return on capital	ROE			I(0)
Share of non-performing assets	NPL		–	I(1)
Loan-to-deposit ratio	LTD		–	I(1)
Full-scale invasion period (fictitious variable)	WAR		–	–

Source: Combination of indicators proposed by the authors

Table 2

Dynamics of financial security indicators

Period	GDP	NIM	ROA	ROE	NPL	LTD	WAR
2009q1	0,9873	0,0161	-0,0081	-0,0600	0,0666	2,1952	0
2009q2	0,9071	0,0317	-0,0166	-0,1272	0,0902	2,1545	0
2009q3	0,9054	0,0470	-0,0235	-0,1775	0,0987	2,1348	0
2009q4	1,0647	0,0607	-0,0358	-0,2620	0,1410	2,2980	0
2010q1	1,1484	0,0138	-0,0051	-0,0349	0,1556	2,0310	0
2010q2	1,1936	0,0268	-0,0094	-0,0653	0,1650	1,8764	0
2010q3	1,2003	0,0422	-0,0109	-0,0753	0,1658	1,7857	0
2010q4	1,1784	0,0558	-0,0138	-0,0892	0,1704	1,8204	0
2011q1	1,1913	0,0142	-0,0002	-0,0015	0,1711	1,6229	0
2011q2	1,2142	0,0261	-0,0010	-0,0072	0,1705	1,5796	0
2011q3	1,2265	0,0392	-0,0055	-0,0371	0,1758	1,6085	0
2011q4	1,1840	0,0517	-0,0073	-0,0496	0,1765	1,6761	0
2012q1	1,1304	0,0116	0,0019	0,0129	0,1837	1,2528	0
2012q2	1,1151	0,0228	0,0014	0,0095	0,1752	1,2473	0
2012q3	1,0505	0,0350	0,0025	0,0167	0,1758	1,2200	0
2012q4	1,0458	0,0346	0,0043	0,0288	0,1941	1,4391	0
2013q1	1,0391	0,0103	0,0032	0,0212	0,1936	1,1341	0
2013q2	1,0255	0,0211	0,0010	0,0067	0,1930	1,1056	0
2013q3	1,0281	0,0311	0,0014	0,0097	0,1752	1,1025	0
2013q4	1,0775	0,0410	0,0011	0,0075	0,1639	1,3630	0
2014q1	1,0433	0,0119	-0,0015	-0,0109	0,1543	1,2321	0
2014q2	1,0777	0,0226	0,0010	0,0070	0,1607	1,2480	0
2014q3	1,1067	0,0334	-0,0081	-0,0583	0,1831	1,2251	0
2014q4	1,0942	0,0435	-0,0399	-0,3544	0,2207	1,4849	0
2015q1	1,1864	0,0101	-0,0562	-0,5928	0,2443	1,2167	0
2015q2	1,1944	0,0203	-0,0245	-0,2189	0,2501	1,1367	0
2015q3	1,2872	0,0341	-0,0433	-0,4058	0,2925	1,0656	0
2015q4	1,3169	0,0352	-0,0589	-0,7675	0,3177	0,9314	0
2016q1	1,2109	0,0093	-0,0066	-0,0639	0,3289	0,9043	0
2016q2	1,1729	0,0187	-0,0073	-0,0636	0,3385	0,8264	0
2016q3	1,1842	0,0371	-0,1275	-1,2813	0,3313	0,6457	0
2016q4	1,2277	0,0371	-0,1582	-1,6852	0,4951	0,6355	0
2017q1	1,2997	0,0095	0,0033	0,0274	0,5448	0,6060	0
2017q2	1,2401	0,0198	-0,0014	-0,0127	0,5616	0,5842	0
2017q3	1,2415	0,0300	0,0011	0,0083	0,5346	0,6039	0
2017q4	1,2332	0,0175	-0,0131	-0,1552	0,5223	0,6036	0
2018q1	1,1933	0,0089	0,0047	0,0545	0,5369	0,5860	0
2018q2	1,2192	0,0177	0,0045	0,0579	0,5234	0,5599	0
2018q3	1,1932	0,0266	0,0056	0,0758	0,5060	0,5928	0
2018q4	1,1772	0,0379	0,0117	0,1442	0,4894	0,6124	0
2019q1	1,1612	0,0103	0,0068	0,0753	0,4751	0,5949	0
2019q2	1,1513	0,0208	0,0164	0,1864	0,4689	0,5832	0
2019q3	1,1179	0,0316	0,0258	0,2599	0,4534	0,5670	0
2019q4	1,0603	0,0409	0,0294	0,2919	0,4576	0,5124	0
2020q1	1,0468	0,0102	0,0077	0,0783	0,4615	0,5043	0
2020q2	0,9437	0,0196	0,0114	0,1208	0,4558	0,7741	0
2020q3	1,0550	0,0291	0,0173	0,1807	0,4293	0,4479	0

Continuation of the table 2

2020q4	1,1778	0,0388	0,0180	0,1897	0,3783	0,4326	0
2021q1	1,1879	0,0115	0,0049	0,0505	0,3671	0,4351	0
2021q2	1,3437	0,0240	0,0134	0,1440	0,3400	0,4540	0
2021q3	1,2896	0,0372	0,0227	0,2230	0,3023	0,4948	0
2021q4	1,3246	0,0509	0,0328	0,3028	0,2726	0,4981	0
2022q1	1,0686	0,0142	-0,0001	-0,0007	0,2721	0,5291	1
2022q2	0,8686	0,0289	-0,0020	-0,0201	0,2979	0,4712	1
2022q3	0,9579	0,0432	0,0029	0,0348	0,3366	0,4278	1
2022q4	0,9362	0,0578	0,0081	0,1016	0,3814	0,3557	1
2023q1	1,2739	0,0168	0,0123	0,1376	0,3880	0,3241	1
2023q2	1,4443	0,0327	0,0231	0,2527	0,3895	0,2979	1
2023q3	1,2473	0,0494	0,0366	0,3534	0,3786	0,3028	1
2023q4	1,1992	0,0638	0,0251	0,2805	0,3734	0,2819	1
2024q1	1,1738	0,0167	0,0119	0,1176	0,3606	0,2861	1
2024q2	1,1749	0,0330	0,0226	0,2226	0,3455	0,2905	1
2024q3	1,1575	0,0490	0,0330	0,2991	0,3232	0,3077	1
2024q4	1,1259	0,0641	0,0241	0,2468	0,3027	0,2919	1
2025q1	1,1803	0,0168	0,0105	0,0974	0,2857	0,3095	1

Source: calculated by the authors using https://bank.gov.ua/

Table 3

Descriptive statistics of variable series

Indicator	FCI	CGDP	NIM	ROA	ROE	NPL	LTD
Arithmetic mean	0,022	1,370	0,030	-0,003	-0,030	0,308	0,934
Median	-0,100	0,758	0,028	0,002	0,019	0,303	0,635
Maximum	0,607	3,457	0,041	0,027	0,265	0,562	2,298
Minimum	-0,366	0,387	0,004	-0,156	-1,626	0,067	0,282
Standard deviation	0,246	0,963	0,007	0,030	0,294	0,135	0,576
Asymmetry coefficient	0,260	0,592	-0,377	-3,030	-3,085	0,212	0,771
Excess coefficient	1,906	1,896	3,994	14,712	15,953	1,887	2,462
Harkey-Bera test	3,970	7,103**	4,217	470,995***	557,495***	3,841	7,226**
Number of observations	65	65	65	65	65	65	65

Note: *, **, *** — significance at 10%, 5% and 1% respectively

Source: calculated by the authors

In Figure 1, the NIM variable is not labeled, as it is completely exogenous to the model. The two cyclicality indicators are interrelated and influence each other. The share of loans in GDP determines the ratio of loans to deposits in the system, and this is the only connection between the latter variable and the others, which also indicates its almost exogenous nature, which is explained by the regulatory nature of its formation due to consistent long-term supervision of the level of bank liquidity and tightening of requirements for it. The financial cycle index transmits its influence through three channels simultaneously: through the share of non-performing assets and further to profitability indicators, directly to ROA with the transition to NPL, and directly to ROE. This confirms the key, integral nature of this variable for the model.

In view of the above, the model was re-estimated by transferring the NIM variable to exogenous components. This allowed us to improve the determinacy of the model and reduce the risk of overfitting. A further study of the quality of the reestimated model showed its stationarity, but the previously identified non-normal distribution of some variables justifies the need to use bootstrap methods to build confidence intervals for impulse functions. Therefore, we used a neutral bootstrap according to Kilian with 999 single and 300 double replications. The problems with the distribution of residuals also dictate the need to use a generalized method of decomposition of impulses (instead of the ordered Cholesky decomposition). The impulse functions were estimated cumulatively over a horizon of 12 periods (3 years).

For the sake of clarity, it is advisable to consider the responses on the medium (1–6 periods) and long-term (7–12 periods) horizons separately for each variable (Fig. 2).

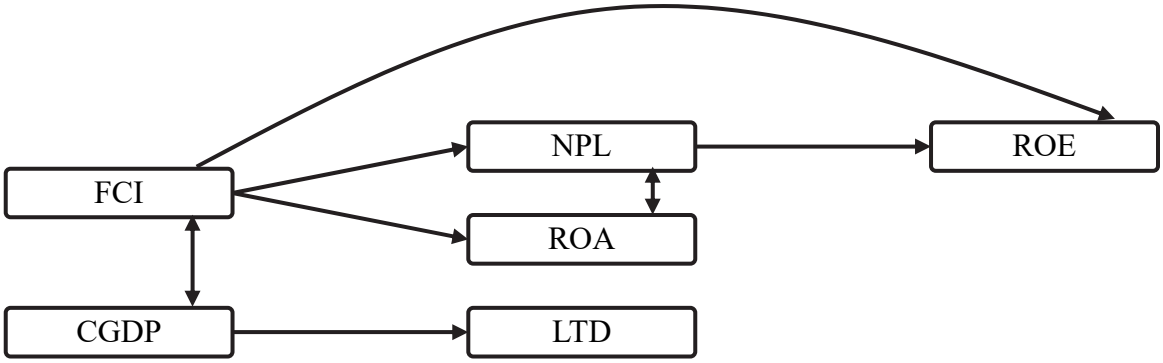

Figure 1. System of relationships between variables in the VAR model

Source: calculated by the authors

Decomposing the responses of the variables into impulses by duration, as shown in Figure 2, allows us to identify commonalities and differences in shocks over time. For example, an increase in the share of loans in GDP during the first half of the year causes a temporary deterioration in liquidity, but starting in Q3, due to the catch-up of savings, the ratio gradually levels off (albeit over time).

The acceleration of the financial cycle also has a negative impact on the level of non-performing assets, leading to an increase in their share during the first three quarters, but subsequently contributes to their steady decline. At the same time, the growth in return on assets has a positive impact on the quality of the loan portfolio only in the first six months, and then gradually rolls back the positive effect.

The acceleration of the financial cycle also has a rather contradictory effect on profitability indicators, immediately worsening them: in relation to assets — by six months, in relation to equity — by 3 quarters. Subsequently, profitability levels off and even starts to grow in Q6, a year and a half after the first shock. The

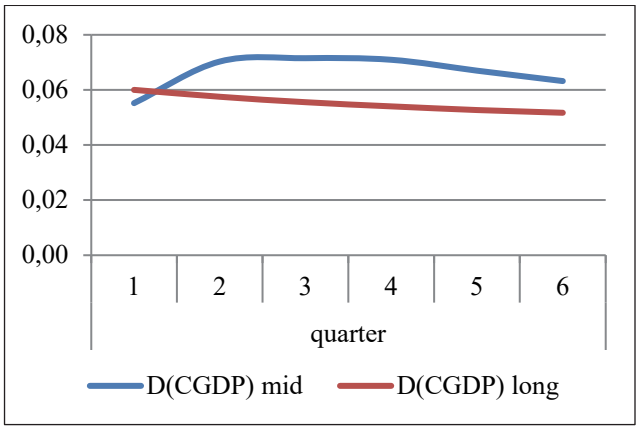

Figure 2.1. Loan-to-deposit ratio

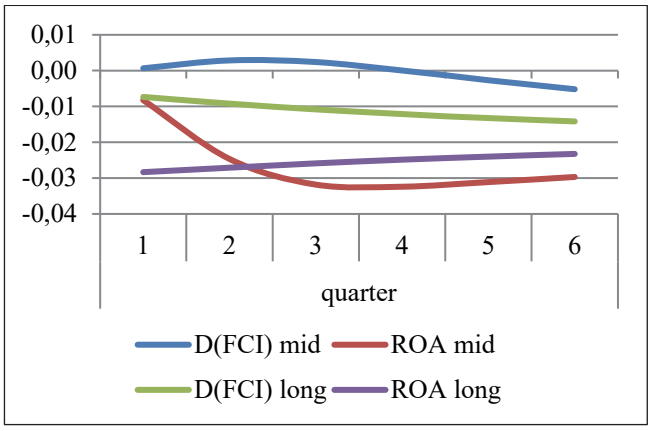

Figure 2.2. Share of non-performing assets

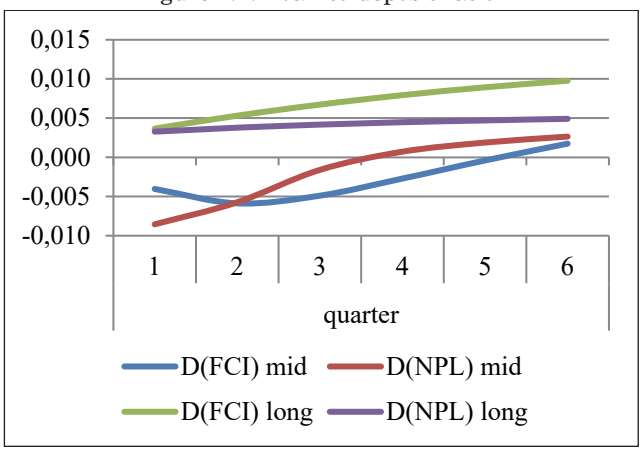

Figure 2.3. Return on assets

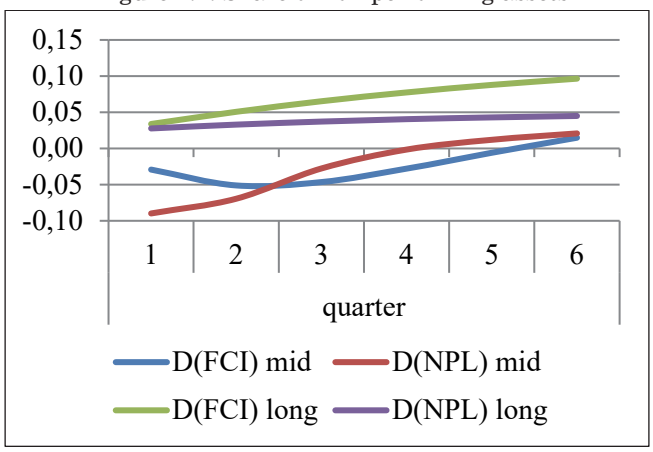

Figure 2.4. Return on capital

Figure 2. Impulse functions of the revalued model variables

Source: calculated by the authors

impact of the share of NPLs on profitability is non-linear, as the deterioration in banking performance is observed in a relatively short period of time — up to 1 year — and then the increase in NPLs statistically contributes to higher profitability. This can be explained by the immediate realization and short-term consequences of credit risk, which is fully offset by banks within a year and subsequently becomes a normal part of their financial model until the withdrawal of bad assets.

In general, the modeling showed a direct impact of the cyclical acceleration on the safety and efficiency of banking activities, which has a mixed nature and complex dynamics. In particular, in the short run, financial cycle shocks depress profitability, but in the long run they stimulate a recovery in capital productivity. The strengthening of lending in the national economy has a rather threatening effect on the banking system, as it stimulates active lending policy, but on the other hand, gradually leads financial institutions to credit expansion and liquidity loss.

Today, to overcome the negative impact of economic cyclicality on the banking business, there is a need to find new approaches to develop integrated stress testing models that consider the interaction of macroeconomic shocks, specific banking risks, and financial market reactions. Such models will allow forecasting the impact of different scenarios of the economic cycle (e.g., a sharp downturn, a prolonged recession, a rapid recovery) on key indicators of financial security of banks (capital adequacy, liquidity, loan portfolio quality, profitability). The model should take into account the interrelationships between the real sector, financial markets, and the banking sector. From this point of view, the macroeconomic model proposed by Djeundje and Crookthan, [11], is of interest, which is based on modeling both behavioral and macroeconomic variables in the future, while maintaining the correlation structure between them, to obtain a more comprehensive modeling methodology for loan portfolio stress testing. Cibák, *et al*., [12], substantiated the interaction of banking risks in crisis periods on the basis of empirical evaluation of data from post-Soviet countries. The proposed methodological approach is useful for regulators in justifying micro- and macroprudential policy instruments. When developing stress testing models, one should be guided by the fundamental document of the Basel Committee on Banking Supervision (BCBS) "Principles for sound stress testing practices and supervision", [13], although it is from 2009, the principles remain relevant, and further recommendations are based on it.

A controversial issue among the scientific community and practitioners is the impact of the latest financial technologies (FinTech, AI, Blockchain) on the cyclical stability and financial security of banks. Teslyuk, *et al*., [14], emphasize the need to create a separate structural unit in banking institutions that is able to manage network risks associated with the introduction of digital banking technologies. The authors of Sytnyk and Polovchak, [15], emphasize the importance of introducing measures based on advanced digital technologies that guarantee information security to banks to maintain stability and protect the banking system under martial law. Azarenkov, [16], identified the key areas for the formation of an effective cyber defense system — the use of a holistic approach to cyber defense, integrating risk management with technological innovations and the development of professional competencies of bank employees.

The modern cycle of national economies is linked by the latest concept of sustainable development. Therefore, there is a need to further analyze the integration of ESG factors into banks' business models and their impact on cyclical sustainability and financial security. Garrido-Merch, *et al*., [17], based on the use of Bayesian optimization, formed a model for building ESG portfolios based on a combination of risk-return analysis and ESG constraints. Lannone, *et al*., [18], investigated the sustainability of investments in environmental, social and governance aspects in times of financial instability. It was proved that ESG portfolios dominate traditional ones during market turmoil and are necessary in the formation of long-term investment strategies of financial institutions. Interesting from this point of view is the study conducted by Savluk, *et al*., [18], who empirically proved that investment lending by banks affects the reduction of greenhouse gas emissions. This was confirmed by the example of France and Poland in 2001–2014. Changes in trends in 2015–2018 are explained by an increase in CO2 emissions. The authors conclude that countries that have made the transition from administrative to market economies pay less attention to the environmental aspect of investment lending, as they focus on commercializing the economy.

In order to formulate strategic directions in Ukraine, it is advisable to conduct a comparative analysis of strategies for improving the financial security of banks in the context of cyclicality in countries with different levels of economic development (Table 3).

Ukraine, as an emerging market country, faces many challenges typical of EMDEs (capital volatility, dependence on commodities, geopolitical risks). Therefore, it needs to further implement Basel III; effectively use countercyclical instruments (calibration of CCyB, LTV/DTI instruments taking into account the specifics of the Ukrainian credit cycle); strengthen currency risk management; improve the mechanisms of rehabilitation and liquidation; and enable the NBU to make complex decisions independently.

4. Conclusions

Based on the study, the author substantiates the mechanisms for improving the financial security of banks in the context of accelerating economic cyclicality by assessing their sensitivity to macroeconomic fluctuations. The modeled system of interrelations between the financial cycle and banking performance indicators allows us to draw the following conclusions.

First, the study confirms that the acceleration of the financial cycle has a direct and mixed impact on

Table 3

Comparative analysis of strategies for improving the financial security of banks in cyclical conditions in countries with different levels of economic development

Comparison aspect	Developed economies (DEs)	Developing countries and emerging markets (EMDEs)
Economic and market characteristics	Mature, diversified financial markets; high institutional development; developed regulation; more stable capital flows.	Less developed but rapidly growing markets; lower institutional development; greater dependence on raw materials/external factors; volatile capital flows.
Key cyclical challenges	Systemic risks (too-big-to-fail); low interest rate risks (search for yield); digital/cyber risks; global interdependence.	Volatility of capital flows; dependence on raw materials; "twin deficits"; underdeveloped financial markets; dollarization; political and institutional instability.
Macroprudential policy		
Countercyclical capital buffer (CCyB)	Well-developed mechanisms, calibration based on credit cycle indicators.	More complex implementation due to data volatility, may be less flexible.
LTV/DTI restrictions	Widely used to cool real estate markets.	Very effective for countries with rapid growth in real estate lending.
Capital flow management (CFMs)	Not typically used (preference for free movement of capital).	Often used to mitigate sudden inflows/outflows (taxes, restrictions).
Currency position limits	Less critical, foreign currency liquidity markets are well developed.	An extremely important tool for combating currency risk and dollarization.
Microprudential regulation and supervision		
Basel III requirements (Capital, Liquidity)	Adequate CET1 level; strict compliance with LCR, NSFR.	Continuous capital strengthening; adaptation of LCR/NSFR requirements to local conditions and data.
Stress testing	Complex models, significant resources, and experience.	Limited resources and data, requiring adaptation of methodologies.
Credit risk management	Focus on complex models, ratings, securitization.	Greater focus on sectoral risks (raw materials), collateral adequacy, and credit concentration.
Institutional development and policy		
Central bank/regulator independence	A high level of independence allows for complex decisions to be made.	May be limited by political interference.
Effectiveness of bank resolution systems	Developed mechanisms (bail-in, Resolution Funds) for quick and effective resolution.	Implementation challenges due to weak legal system, limited resources.
International cooperation	Active participation in the development of global standards.	Growing participation, emphasis on adapting standards and addressing specific issues.

Source: systematized by authors, Öztekin [3]; Savluk, et al., [18]; IMF [20]; Suhail [21]; BIS [22]

the financial security and efficiency of the Ukrainian banking system. In particular, in the short term (up to a year), financial cycle shocks depress banks' profitability (ROA, ROE), which is manifested in a temporary deterioration in financial performance. However, in the long run (after a year and a half), these same shocks contribute to the recovery of capital productivity. This non-linear relationship emphasizes the difficulty of banks adapting to the dynamics of economic fluctuations.

Second, the study found that increased lending in the national economy is a source of both opportunities and risks for the banking system. Active lending policy stimulates economic growth, but at the same time it can lead financial institutions to credit expansion and, as a result, to a loss of liquidity and an increase in the share of non-performing assets (NPL). The modeling showed that an increase in the share of loans to GDP temporarily worsens liquidity, but that the loan-to-deposit (LTD) ratio gradually levels off, albeit over time.

Third, the empirical analysis showed that profitability and the share of non-performing assets are the most sensitive to cyclical fluctuations. The financial cycle index turned out to be a key integral variable that affects the financial security of banks through three channels: directly on ROA and ROE, as well as through NPL. This confirms that these indicators are the most vulnerable indicators in times of macroeconomic shocks and require special attention from banks and the regulator.

Based on the analysis and comparison of international practices, the following recommendations can be formulated to improve the financial security of Ukrainian banks:

Further implementation and adaptation of macroprudential policy instruments, such as the countercyclical capital buffer (CCyB) and LTV/DTI limits, taking into account the specifics of the Ukrainian credit cycle and the volatility of economic indicators.

Developing integrated stress testing models that consider the interaction of macroeconomic shocks, specific banking risks, and financial market reactions. This will allow for more effective forecasting of the impact of different economic development scenarios on key financial security indicators.

Strengthening currency risk management by tightly controlling the currency position of banks, which is especially important in the context of volatile capital flows and significant dependence on external factors typical for developing economies.

Establishing an effective system for resolving banks' problems and strengthening the institutional independence of the National Bank of Ukraine, which is the key to making timely and informed decisions in times of instability.

Thus, the results of the study indicate that in order to ensure the stability of the banking sector in the context of accelerated economic cyclicality, a comprehensive approach is needed that combines the improvement of internal risk management mechanisms in banks with adaptive macroprudential regulation.

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Коваленко Вікторія
доктор економічних наук, професор,
Одеський національний економічний університет,
Україна
ORCID: 0000-0003-2783-186X

Азаренков Сергій
аспірант кафедри банківської справи
Одеський національний економічний університет,
Україна
ORCID: 0000-0002-1159-8699

https://doi.org/10.60022/sis.3.(02).2

ФІНАНСОВА БЕЗПЕКА БАНКІВ ТА ЇХ ЧУТЛИВІСТЬ ДО АКСЕЛЕРАЦІЇ ЦИКЛІЧНОСТІ ЕКОНОМІКИ

Анотація. *Сучасна економіка характеризується прискоренням циклічності, що посилює ризики для банківського сектору, який є запорукою макроекономічної стабільності. Для України, в умовах постійних економічних потрясінь та воєнного стану, питання фінансової безпеки банків та їх чутливості до циклічних коливань є особливо гострим. Дослідження, що пов'язують фінансову безпеку банків з динамікою економічного циклу, є фрагментарними, що обумовлює необхідність комплексного аналізу.*

У дослідженні використано методи лінійного VAR-моделювання, тест на причинність за Грейнджером, бутстреп-метод за Кіліаном та GIRF-декомпозицію імпульсного відгуку. Для моделювання використовувались щоквартальні статистичні дані за період 2009q1–2025q1, включаючи індикатор фінансового циклу, частку кредитів у ВВП, показники рентабельності, частку непрацюючих активів та співвідношення кредитів до депозитів.

Моделювання засвідчило прямий вплив акселерації циклічності на безпеку та ефективність банківської діяльності, який має змішаний характер. У короткостроковому періоді (до одного року) шоки фінансового циклу пригнічують прибутковість банків, тоді як у довгостроковій перспективі (після півтора року) сприяють її відновленню. Зростання частки кредитів у ВВП тимчасово погіршує ліквідність банківської системи. Найбільш чутливими до циклічних коливань виявилися показники рентабельності активів та капіталу, а також частка непрацюючих активів.

Наукова новизна полягає у побудові та емпіричному моделюванні системи взаємозв'язків між фінансовим циклом та індикаторами фінансової безпеки українських банків, що дозволило кількісно оцінити їхню чутливість до макроекономічних коливань та виявити нелінійний характер їхнього впливу.

Результати дослідження можуть бути використані НБУ для вдосконалення макропруденційної політики, зокрема для калібрування контрциклічного буфера капіталу. Банківські установи можуть застосовувати отримані висновки для розробки більш ефективних стратегій управління ризиками та підвищення стійкості до циклічних шоків. Перспективи подальших досліджень включають розробку інтегрованої моделі стрес-тестування з урахуванням макроекономічних циклів, аналіз впливу FinTech та ESG-факторів на циклічну стійкість банків, а також порівняльний аналіз стратегій підвищення фінансової безпеки в країнах з різним рівнем розвитку.

Ключові слова*: фінансова безпека, банківський сектор, циклічність економіки, VAR-моделювання, макропруденційна політика, стрес-тестування, чутливість банків, фінансовий цикл.*