

УДК 336.71(477):[339.37:330.341.1]
DOI: 10.37128/2411-4413-2025-1-1

**MULTIDIMENSIONAL
ASSESSMENT OF
INVESTMENT
BANKING
EFFICIENCY:
INTEGRATING
QUANTITATIVE AND
QUALITATIVE
APPROACHES**

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It is substantiated that assessing the effectiveness of banks' investment activities requires a nuanced understanding of both quantitative indicators and qualitative variables that influence strategic and operational decisions. A key challenge lies in the inherent disconnect between the complexity of investment processes often shaped by behavioral and institutional factors and the rigid structure of traditional quantitative models. Most conventional methods prioritize short-term performance and fail to adequately reflect the dynamics of the economic environment or the specificities of financial institutions. This underscores the need for a more balanced analytical framework that integrates quantitative modeling with qualitative assessments and captures the multidimensional nature of bank operations in conditions of increased economic turbulence.

This research aims to establish a theoretical foundation for developing a universal methodology for evaluating the effectiveness of banks' investment activities. The study seeks to enhance the methodological tools for such analysis by accounting for multidimensionality, risk exposure, and the specific characteristics of the banking sector amid financial and macroeconomic instability.

A critical review of existing approaches to assessing the effectiveness of banks' investment activities was conducted, their advantages and limitations were analyzed, relevant quantitative and qualitative parameters of effectiveness were identified, and an integrative methodology based on DEA, RAROC, and integral assessment was proposed. The study confirms that the effectiveness of investment strategies significantly depends on the accurate identification of relevant variables and the appropriateness of the analytical approach. Advanced modeling tools provide a higher degree of forecasting precision, support strategic risk analysis, and enhance decision-making quality.

The proposed theoretical and methodological approach allows for a more consistent treatment of risk profiles, behavioral factors, and institutional constraints. The integration of short-term and long-term perspectives within a unified evaluation model enhances adaptability to market volatility and improves the relevance of strategic recommendations. By reducing subjectivity and capturing systemic importance, the framework supports more resilient and informed investment decisions in the banking sector.

Key words: investment banking efficiency, DEA, RAROC, integral assessment, risk profile, economic volatility.

Fig.: 1. Ref.: 12.

**БАГАТОВИМІРНА МОДЕЛЬ ОЦІНЮВАННЯ ЕФЕКТИВНОСТІ
ІНВЕСТИЦІЙНОЇ ДІЯЛЬНОСТІ БАНКІВ: ПОЄДНАННЯ КІЛЬКІСНИХ І
ЯКІСНИХ ПІДХОДІВ**

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Обґрунтовано, що оцінка ефективності інвестиційної діяльності банків є складним аналітичним завданням, яке потребує врахування багатовимірності впливових факторів, а також високої волатильності економічного середовища. Традиційні підходи, як правило, обмежуються короткостроковою перспективою та не враховують специфіку банківських продуктів, поведінкові аспекти прийняття рішень і ризик-профіль фінансових установ. Це зумовлює необхідність формування нових підходів, які б поєднували кількісну строгість і якісну гнучкість аналізу.

Метою дослідження є розробка теоретичного підґрунтя для створення універсального методу оцінки ефективності інвестиційної діяльності банків за допомогою вдосконалення теоретико-методологічних засад аналізу, з урахуванням ризиків, багатовимірності впливових чинників і специфіки функціонування банківського сектору в умовах економічної турбулентності.

Проведено критичний огляд сучасних підходів до оцінювання ефективності інвестиційної діяльності банків, проаналізовано їхні переваги й обмеження, ідентифіковано релевантні кількісні та якісні параметри ефективності, запропоновано інтегративну методіку на базі DEA, RAROC й інтегральної оцінки. Дослідження підтвердило обмеженість традиційних методів у контексті стратегічного управління інвестиціями. Запропоновано концептуальні засади нового підходу до оцінювання ефективності, що дозволяє враховувати інституційний контекст, ризик-профіль банку й довгострокові тенденції. Обґрунтовано доцільність поєднання економіко-математичних моделей з якісними оцінками для підвищення об'єктивності аналітики.

Запропонований підхід забезпечує аналітичну цілісність, гнучкість адаптації до зовнішнього середовища й потенціал для ідентифікації еталонних стратегій інвестування. Визначено необхідність подальших досліджень щодо формалізації поведінкових чинників й інституційної динаміки в межах моделей оцінки ефективності.

Ключові слова: ефективність інвестиційної діяльності, DEA, RAROC, інтегральна оцінка, ризик-профіль, економічна волатильність.

Рис.: 1. Літ.: 12.

Formulation of the problem. The evaluation of investment activity (hereafter – IA) efficiency in the banking sector necessitates the precise identification and classification of pertinent influencing variables, which must be systematically incorporated into an appropriate methodological framework. A significant challenge lies in the inherent disconnect between the quantitative variables available for empirical modeling and the complex multidimensionality of investment processes, which frequently entail qualitative and behavioral dimensions.

Several traditional assessment methodologies prioritize short-term outcomes and, as a result, are inadequately responsive to the fluid nature of the macroeconomic environment. Moreover, while conventional economic-mathematical frameworks offer structured analytical tools, they often fail to adequately reflect the nuanced characteristics of banking products, institutional frameworks, and the idiosyncratic risk profiles of individual institutions.

Given the aforementioned methodological constraints, it is imperative to formulate a balanced methodological approach. Such an approach should integrate the methodological precision of quantitative methods with the contextual flexibility of qualitative assessments. This dual focus is essential for capturing the operational complexity characterizing financial institutions operating under conditions marked by elevated market volatility.

Analysis of recent research and publications. The issue of evaluating the

effectiveness of investment banking has been widely explored in both domestic and international research. Foreign scholars such as I. Ansoff, M. Porter, D. Strickland, and M. Frost have thoroughly examined the theoretical aspects of managing the investment process. Meanwhile, practical aspects of IB have been addressed by researchers like E. Altman, N. Apergis [1], A. Damodaran [4], A. H. Gilbert [2], E. Brack, R. Jimborean, F. H. Hays [2], H. Markowitz, and W. Sharpe. Domestic scholars, including Andriychuk V. [5]; A. Krykliy [11], N. Maslak, O. Pozhar [6]; O. Bezrodna [7]; O. Vovchak [12]; T. Maiorova have contributed to the development of theoretical foundations for IB, provided practical recommendations for its effective implementation, and proposed strategies for managing investment risks. Despite a substantial body of academic literature, several critical aspects of evaluating the effectiveness of banks' investment activities remain underexplored. Specifically:

1. The insufficient integration of qualitative and quantitative parameters into a unified analytical framework constitutes a persistent methodological gap.

2. The limited adaptability of existing models to periods of heightened economic volatility constrains their practical applicability.

3. Behavioral factors and institutional risk profiles remain inadequately formalized within current economic-mathematical modeling approaches.

This study proposes a theoretical foundation for a universal approach to evaluating investment efficiency in the banking sector, based on the synergistic application of integrated assessment tools, Data Envelopment Analysis (DEA), and Risk-Adjusted Return on Capital (RAROC). The proposed theoretical and methodological framework is intended to capture the complexities of the contemporary financial environment while minimizing subjectivity in investment analysis.

The ongoing significance of these issues has informed the focus, objectives, and research tasks of the present study.

Formulation of the goals of the article. The primary objective of this study is to develop a theoretical foundation for a universal methodology to assess the effectiveness of banks' investment activities. The research further aims to enhance the theoretical and methodological framework for investment analysis by incorporating multidimensionality, risk factors, and the specific operational characteristics of the banking sector under conditions of economic turbulence.

Presentation of the main research material. The selection of an appropriate methodology for evaluating the effectiveness of banks' investment activities necessitates a comprehensive identification of relevant influencing factors. Equally essential is an understanding of the specific objectives and anticipated time horizons of the analytical tools employed. These criteria should form the basis for determining the suitability of a particular methodology.

Standard methodological approaches generally focus on analyzing how the changes in operational conditions affect key performance indicators, primarily profitability and productivity. Economists are particularly interested in the capacity of these methods to reveal the extent to which operational adjustments influence the efficiency of transforming resources into financial services. Inefficient investment activity may suggest that banks are either underutilizing their resources or allocating high-cost inputs to generate average-yielding assets and services.

As emphasized by domestic scholars, notably I.H Britchenko et al. [8], the effectiveness of credit and investment activities is driven more by subjective factors such as operational efficiency, cost control, and the rational use of resources than by macroeconomic dynamics. Due to the heterogeneity of input resources, no academic consensus exists regarding a unified set of factors that influence investment efficiency. Moreover, conventional approaches often lack the capacity to generate quantitative recommendations, and their short-term focus reduces their relevance in a dynamic financial environment.

From a financial perspective, assessing the profitability of core active operations those contributing significantly to total bank income and the cost of building a resource base is fundamental. Passive operations, including resource attraction and borrowing, are also crucial in executing investment strategies. Therefore, an objective assessment of investment efficiency must incorporate both the returns from investment operations and the cost of capital mobilization.

Numerous methodological approaches based on mathematical modeling have been developed, each characterized by distinct features and conditions. To select the most appropriate method under current economic conditions, a comparative analysis of each approach's strengths and limitations is essential.

D. Wilcox and W. Wilson [9], in their study "Evaluating the Efficiency of Commercial Banks: Does Our View of What Banks Do Matter?", propose a methodology applicable to both short- and long-term analysis. Their approach emphasizes the development of performance indicators that serve as universal benchmarks, integrating present and future performance metrics while incorporating probabilistic estimates of default risk. The primary objective is to determine a bank's market position and its broader role in the financial sector. In this framework, the subject of evaluation is the bank itself, while the object is the effectiveness of its investment activity, measured in the value or utility of assets generated for the real sector using available resources. The methodology also accounts for market demand for such assets.

Empirical studies have demonstrated a causal link between investment efficiency and asset quality, suggesting that higher efficiency correlates with increased demand and a stronger market position. The proposed framework is scalable and applicable to both individual banks and the banking system as a whole. However, in our opinion, the methodology lacks the flexibility necessary to adapt to rapidly changing market conditions and fails to isolate the influence of exogenous factors. This may result in biased conclusions, such as attributing reduced efficiency to internal mismanagement instead of external shocks.

In "Efficiency in Banking: Theory, Practice, and Evidence," J. Hughes and L. Mester [10] argue that investment efficiency is influenced by ownership structures, regulatory frameworks, and inter-sectoral linkages. They further emphasize the role of accounting standards, government policy, and prevailing market conditions. Internal inefficiencies may arise from capital structure imbalances or weak management practices, whereas external challenges are linked to ineffective public policy, unstable capital markets, labor market competition, and constraints on dividend payouts.

Their long-term analysis method incorporates the interaction between banks and external stakeholders but relies heavily on surface-level economic data. The absence of a clear distinction between the effects of market factors and internal managerial decisions undermines the objectivity of the results. Moreover, the methodology's limited adaptability to real-time market conditions reduces the practical value of its recommendations.

Although the approach includes relevant indicators such as market status, capital structure, and cost of capital that can serve as input variables for other models, we believe it is not suitable for practical implementation. The difficulty in quantifying several key influencing variables further restricts its applicability.

The structural approach, which accounts for a broad spectrum of influencing factors and is oriented toward short-term analysis, has seen wide application. Based on structural modeling, it aims to calculate economic indicators that enable comparative assessment of investment returns. Here, the object of study is the effectiveness of IA, while the subject is the bank's management system. The primary objective is to identify the most promising capital allocation strategies and optimize the investment portfolio by eliminating low-yielding assets. The approach's principal advantage lies in its theoretical foundation.

Drawing from cost-minimization and profit-maximization principles, productivity is modeled using either cost or profit functions. The structural productivity equation is represented through a productivity function. International scholars primarily emphasize banks' economic efficiency, defined as the ability of managers to optimize input resources relative to their costs to maximize output. Additionally, they assess profit levels in relation to the risks undertaken by banks in various investment projects [10, p. 6].

According to J. Hughes and L. Mester, an alternative method involves the stochastic frontier approach, which identifies the most productive banks and compares other institutions to them. These top-performing banks form the efficiency frontier, serving as benchmarks for others. The deviation from this frontier is used as an indicator of inefficiency not to suggest that reference banks are perfectly efficient, but that they represent the best observed performance under given conditions. The deviation may also indicate managerial shortcomings in cost control or revenue generation [10, p. 7].

The authors further note that when scale effects are accounted for, a bank is deemed efficient if a 1% increase in service volume results in less than a 1% rise in costs. Economies of scope are achieved when offering bundled or complex banking services reduces unit costs compared to delivering them separately.

Applying this method within the structural approach yields improved results, enabling a more accurate assessment of a bank's competitive standing within specific market conditions. The methodology facilitates defining the optimal input-output ratio necessary for maximizing investment and lending efficiency.

Nevertheless, deviations of IA effectiveness from its potential maximum should not be interpreted as conclusive evidence of inefficiency especially if benchmark banks have not reached optimal outcomes themselves. Such deviations instead signal potential for improvement.

However, this approach does not explain the underlying causes of inefficiency. Results are sensitive to both internal bank characteristics and external conditions, and reliance on specific indicators may compromise objectivity. A notable limitation across the reviewed methodologies is the insufficient consideration of capital structure and risk exposure. Managers involved in high-risk strategies may increase profits or, alternatively, incur higher costs [10, p. 9-10].

In “Efficiency in Banking: Theory, Practice, and Evidence,” J. Hughes and L. Mester [10] contend that risk minimization involves not only selecting low-yield assets but also incurring additional costs for risk management activities. Another risk source lies in managerial decisions regarding the scale of the services offered. Since market demand and supply directly impact income levels, the success of expanding a bank’s market share affects the likelihood of profit shortfalls. Inadequate planning increases inefficiency and amplifies risk exposure.

These factors are critical to any robust analysis. Therefore, the methodology employed to evaluate the effectiveness of investment activity must be adapted to account for various types of risk.

Based on an analysis of existing methodological approaches, it is concluded that those grounded in economic and mathematical modeling, supported by a clearly defined set of impact factors, offer the greatest practical utility. When adjusted for the specific characteristics of regional banking operations, such methodologies become more broadly applicable.

Econometric modeling provides substantial value to managers, investors, and shareholders. Statistical analysis facilitates the identification of deviations from normative indicators, while forecasting techniques enable the estimation of the effects of corrective actions. The regulation of IA effectiveness entails modifications to the structure of a bank’s asset portfolio, which serves as a key determinant of income and remains a critical concern for investors and shareholders. Hence, the application of economic-mathematical methods substantiates adjustments to investment portfolios and the redefinition of IA priorities.

Given the adaptability and potential for refinement of analytical tools, it is concluded that future research should focus on methodological approaches grounded in economic-mathematical modeling. Accordingly, subsequent analysis will be confined to these methodologies.

Finally, the methodology for evaluating the effectiveness of investment activity, grounded in analytical approaches, is primarily centered on profit as the ultimate performance indicator. Profit reflects the cumulative outcomes of a bank’s policies and activities over a financial year. Sustained growth in profitability is regarded as the most reliable indicator of effective bank performance, both retrospectively and prospectively.

An examination of domestic and international literature reveals that all IA assessment tools can be broadly classified into two methodological categories:

1. Accounting-Based Approach, which assesses effectiveness through financial ratios, primarily focusing on business profitability;
2. Economic or Production-Based Approach, which evaluates operational optimality (in terms of profit, cost, and risk) through economic and mathematical modeling.

Within the accounting-based approach, effectiveness is interpreted as a relative, calculated measure. Key indicators include return on assets (ROA), return on equity (ROE), net interest margin, net spread, labor productivity, and cost-efficiency. For a comprehensive evaluation of the banking system's investment effectiveness, a system of indicators is applied (Fig. 1).

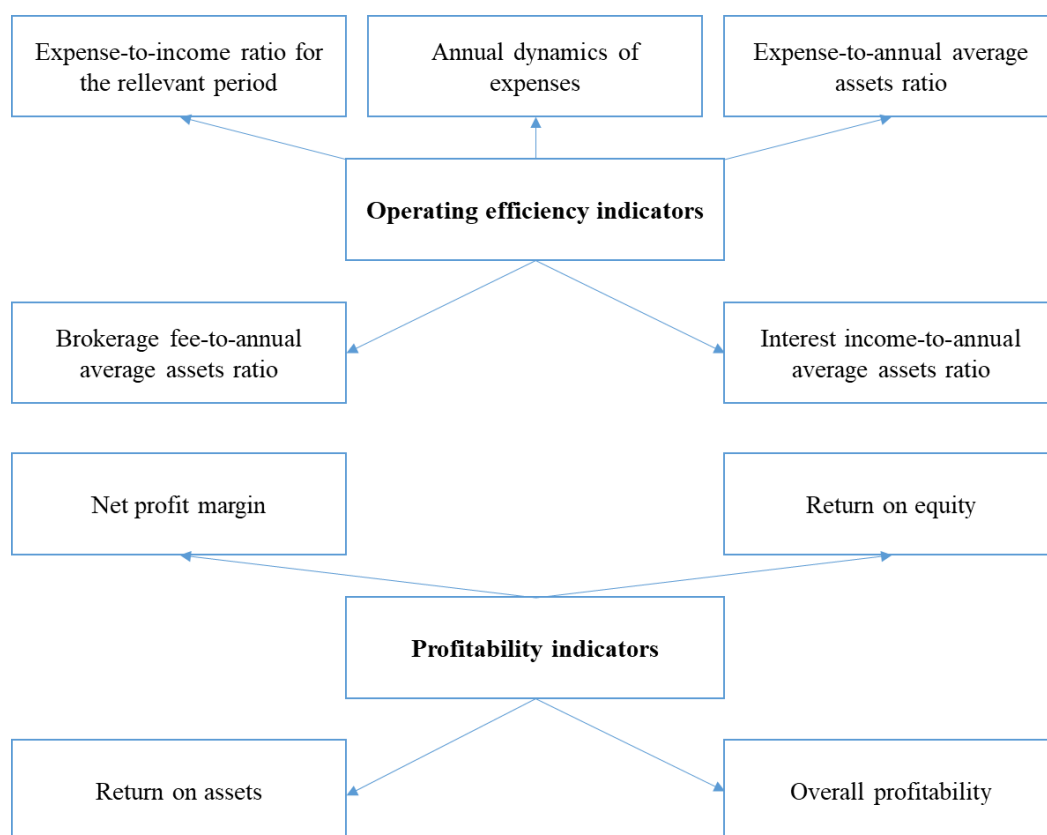


Fig. 1. Banking efficiency assessment ratios

Source: grouped by the author based on source [8]

Profitability and operational efficiency indicators are examined in conjunction with liquidity and reliability metrics within the framework of the “magic triangle,” which balances profitability, adequate liquidity, and institutional reliability. Technical indicators offer a quantitative perspective on bank performance. Importantly, profitability measures provide a more refined measure of outcomes than absolute profit, as they incorporate the economic return relative to both attracted and allocated resources.

To enhance the analytical evaluation, changes in the ratio of provisions to total assets should be examined. This metric indicates the level of risk inherent in profitable operations and serves as a proxy for the overall investment risk profile.

Operational efficiency ratios help to assess the efficiency with which a bank generates income. Benchmarking these indicators against industry norms facilitates comparison across individual institutions, peer groups categorized by asset size, and the broader banking system. Among such ratios, net interest margin is of particular importance. It offers insight into the efficiency of credit resource utilization and the relative cost of funding. The stability of net interest income is crucial, given that its dynamics reflect the effectiveness of the bank's intermediary function. Moreover, net

interest margin analysis captures the effects of interest rate fluctuations and, over time, illustrates the impact of monetary policy on systemic profitability. It also indicates the degree to which assets and liabilities are exposed to interest rate volatility an essential dimension of interest rate risk management.

Nevertheless, the methodology presents several limitations:

- challenges in isolating specific determinants of effectiveness;
- retrospective orientation;
- a narrow focus on short-term financial outcomes, which constrains its strategic applicability.

The DuPont analytical model, a decomposition approach for return on equity analysis, is also classified within the financial ratio-based methodology group. It is designed to identify the primary drivers of capital profitability and to inform resource allocation decisions.

The main limitation of this approach is that it defines effectiveness solely in terms of profitability, thereby reflecting only one dimension of investment activity. Ensuring overall effectiveness necessitates the optimization of the bank's asset and liability composition, since sustainable profitability is inherently tied to the accumulation of internal capital under controlled risk conditions. Due to its limited analytical scope and reliance on a narrow set of financial ratios, the method is considered unsuitable for formulating comprehensive investment portfolio optimization strategies.

The RAROC (Risk-Adjusted Return on Capital) approach introduces a risk-sensitive framework by defining IA effectiveness as the ratio of discounted economic profit to allocated capital. In practical contexts, a modified variant RAROC 2020 is typically employed. It incorporates Monte Carlo simulations to evaluate portfolio sensitivity to market fluctuations.

RAROC 2020 consists of multiple stages:

- compilation of relevant data;
- establishing variable relationships;
- modeling performance outcomes based on input fluctuations.

The methodology is grounded in a statistical model of market interdependencies, facilitating forward-looking data projections. At its core there is a correlation matrix comprising 500 risk factors and roughly 125,000 correlation parameters, based on three years of historical price and volatility data.

The methodology culminates in the development of recommendations for adjusting key IA-related standards in response to projected market conditions and the bank's sensitivity to external changes.

Advantages:

- objectivity in results;
- comprehensiveness via integrated risk assessments;
- broad applicability.

Disadvantages:

- limited efficacy in assessing returns from low-risk or risk-free investments;
- reduced applicability in the context of smaller or highly segmented operational structures [11, p. 78].

The DEA (Data Envelopment Analysis) methodology, originally developed in the late 1970s to evaluate the efficiency of non-profit organizations, has demonstrated utility in assessing the effectiveness of banks' investment activity.

The approach comprises the following stages:

- Data set formation;
- Classification by activity type;
- Assignment of ratio weights;
- Development of benchmark indicators;
- Bank ranking;
- Formulation of investment activity improvement recommendations;
- Specification of adjustment timeframes.

A distinctive feature of DEA is its capacity to support both short- and long-term analyses and strategic corrections. It enables comparative assessments across different time periods, thus facilitating evaluation of a bank's adaptability to changing market environments. The methodology operates by selecting a reference unit from the evaluated set, against which others are compared. This linear programming model yields an efficiency score between 0 and 1. The most efficient unit scores 1, while less efficient units receive proportionally lower values and must identify paths for performance enhancement.

Key advantages:

- automatic normalization of input and output data;
- flexibility in managing diverse resource sets;
- high adaptability across various banking contexts.

Main disadvantages:

- sensitivity to input/output specification, which can significantly influence results;
- inability to compare entities engaged in fundamentally different activities;
- possibility of identical efficiency scores among multiple units due to similar input-output combinations an issue mitigated through advanced DEA models [12, p. 17].

In conclusion, DEA enhances investment effectiveness analysis by adjusting a bank's IA indicators relative to a dynamic benchmark bank an advantage absent in static models, which often fail to capture evolving market realities.

The integral method for evaluating the performance of economic entities, particularly banks' investment activity, exhibits significant practical relevance, as evidenced by empirical findings. Its methodological flexibility permits implementation across multiplicative, ratio-based, and hybrid models, positioning it as a foundational approach for IA evaluation under diverse analytical paradigms. Its adaptability is grounded in the need for several preparatory and intermediate analytical stages, enabling methodological alignment with specific research objectives.

Key Advantages of the Integral Method:

1. Normative Flexibility:
 - integration of multiple normative groups related to bank IA;
 - inclusion of diverse economic indicators within each group;

- assignment of indicator weights based on investor priorities and methodological objectives.

2. Temporal and Comparative Adaptability:

- applicability across both short- and long-term evaluation horizons;
- benchmarking capabilities against ideal or reference institutions.

3. Analytical Objectives:

- identification of primary determinants of IA effectiveness;
- quantification of deviations from normative values and specification of required parameter adjustments.

Research Framework:

- Subject: The bank as the institutional unit under assessment.
- Object: The parameter system representing investment activity effectiveness.

- Mechanism: Effectiveness is achieved through comprehensive parameter regulation and optimal weighting coefficient calibration.

Methodological Basis: At the core of the integral method is the decomposition of absolute deviation (or growth) in an output indicator into its constituent factors, while accounting for their interdependencies. The exact calculation techniques are model-specific and adaptable to the structural complexity of the factor system. A prominent feature of this method is its ability to aggregate heterogeneous factors differing in nature, units of measurement, and importance into a unified index. This capability facilitates IA evaluations in project-specific settings and, under complex conditions, may be the only viable approach to deriving objective insights.

Applicability to Investment Attractiveness: The method is particularly effective in evaluating investment attractiveness. A bank's dynamic development can yield high attractiveness scores even when situated within a region experiencing broader economic stagnation. This characteristic aligns with the strategic investor's emphasis on institutional potential rather than regional performance.

Mathematical and Structural Advantages:

- the use of rank correlation principles allows each indicator to be treated as a component of a structured set, with dynamic boundary values adjusted to prevailing conditions;
- enables integration of indicators expressed in heterogeneous units;
- supports inter-bank and temporal comparative analyses, mitigating limitations of institution-specific or purely retrospective comparisons.

Limitations and Mitigation Strategies: A principal limitation arises from scale effects: systemically important banks may appear less efficient due to their asset volume, while smaller banks may display inflated efficiency metrics. This distortion is addressed through the incorporation of parameters that reflect a bank's systemic role. Moreover, disparities in investment portfolio sizes among banks are adjusted using weighting coefficients that reflect each institution's relative contribution to the overall banking system.

Application to Risk Assessment: For risk assessment, the method anchors to a risk-free activity baseline, with higher scores indicating lower risk. Special procedures are applied to reverse indicators (where lower values signify superior

performance), such as normalization via inversion or subtraction from unity both yielding comparably valid results.

Additional Methodological Strengths:

- capable of processing indicators with negative values by referencing the minimum observed value;
- enhances objectivity by removing the need for manually assigning weights, thereby minimizing subjective bias.

After a comprehensive evaluation of economic-mathematical methodologies for assessing banks' IA effectiveness, we believe the integral method delivers the most objective analytical outcomes. Its ability to circumvent challenges related to coefficient weighting and analyst subjectivity renders it particularly suitable for evaluating both the performance and risk associated with banks' investment activity.

Conclusions. The conducted study has confirmed the high complexity and multidimensional character of evaluating the effectiveness of banks' investment activity under conditions of contemporary economic instability. While no existing methodology has proven to be universally applicable, the integration of both quantitative and qualitative approaches enables a more comprehensive understanding of the performance of banking investment strategies.

The analysis has shown that the effectiveness of investment activity is significantly shaped by the accurate identification of relevant economic factors and the sound justification of the chosen analytical framework. The formalization of these variables within economic-mathematical models not only enhances assessment accuracy but also strengthens the predictive capacity of the evaluation process.

Traditional methodologies, however, are often constrained by their short-term focus and limited capacity to account for the fluidity and volatility of modern economic conditions. This significantly hampers their strategic relevance and applicability in dynamic market contexts. Conversely, approaches that incorporate macroeconomic dynamics and institutional environments offer a broader analytical scope, yet they frequently struggle with responsiveness and face challenges related to the quantification of key parameters.

Among the evaluated methodologies, those based on structural modeling, stochastic analysis, and productive frontiers particularly Data Envelopment Analysis (DEA) were identified as the most effective for conducting a comprehensive assessment. These tools enable the identification of benchmark institutions, facilitate the measurement of efficiency gaps, and are well-suited to capturing the specificities of banking products and services.

Importantly, investment efficiency cannot be considered independently of a bank's risk profile and the quality of its management decisions. Modern approaches such as RAROC 2020 demonstrate a high level of objectivity and adaptability by incorporating scenario analysis and robust risk assessment frameworks.

The integral evaluation methodology, which synthesizes quantitative and qualitative dimensions, has emerged as the most versatile and responsive to the realities of the current financial landscape. This approach reduces the impact of subjective judgment, accounts for economies of scale, and reflects the systemic role of financial institutions.

Despite these advancements, the development of a unified methodological framework remains a pressing objective. An optimal model should combine the flexibility of short-term analysis with the strategic depth of long-term evaluation, while also considering regional specificities and the volatility inherent to modern financial markets.

Further advancement in the theory and practice of evaluating the effectiveness of banks' investment activity should be grounded in an interdisciplinary approach that reflects current challenges in the financial sector. Promising research directions include:

1. Integration of risk management, behavioral factors, and digital indicators into IA assessment systems for banks.
2. Development of dynamic multifactor models to improve forecasting accuracy and enhance strategic adaptability in conditions of economic turbulence.
3. Formation of combined methodologies that merge RAROC, DEA, and integral evaluation approaches for comprehensive analysis.

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УДК 330.322

DOI: 10.37128/2411-4413-2025-1-2

**ІНВЕСТИЦІЙНІ
АСПЕКТИ
РАЦІОНАЛЬНОГО
ВИКОРИСТАННЯ
ЗЕМЕЛЬНИХ
РЕСУРСІВ У
КОНТЕКСТІ
ГЛОБАЛЬНОЇ
ПРОДОВОЛЬЧОЇ
БЕЗПЕКИ ТА
ЕКСПОРТУ
СІЛЬСЬКО-
ГОСПОДАРСЬКОЇ
ПРОДУКЦІЇ**

ЗАРЕМБА О.Є.,
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Збереження родючості ґрунтів є критично важливим завданням для забезпечення сталого розвитку аграрного сектору економіки України. Інтенсивне використання земельних ресурсів, ерозія, виснаження органічних речовин і негативний вплив кліматичних змін призводять до деградації ґрунтів, що знижує продуктивність сільськогосподарського виробництва й загрожує продовольчій безпеці країни. Виснаження ґрунтів спричиняє значні економічні втрати через зниження врожайності, збільшення витрат на агрохімічні засоби й необхідність упровадження додаткових заходів із відновлення агроландшафтів.

У статті розглянуто інвестиційні підходи до впровадження екологічно безпечних