

Interaction between Audit and Tax Control Systems in Ensuring State Financial Stability and Economic Security

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ABSTRACT:

The effectiveness of public financial control depends not only on the quality of audit inspections and tax procedures but also on their coordination, transparency, digitalization, and analytical coherence. Under current conditions, audit should perform strategic, preventive, and analytical functions, while tax control should focus on ensuring the completeness of tax revenues, minimizing tax evasion risks, and strengthening public trust in the state's fiscal policy. The article considers an integral approach to assessing the efficiency of interaction between audit and tax control based on the use of a multi-factor indicator system. This approach makes it possible to account not only for the quantitative results of inspections but also for qualitative aspects such as the level of implementation of audit recommendations, the degree of elimination of violations, the timeliness of tax revenues, and the influence of external factors, including the transparency of public finances, macroeconomic stability, and the scale of the shadow economy. According to the calculations conducted, the Integrated Efficiency Indicator of supervisory (IEC) amounted to 0.49 in 2023, which indicates a medium-low level of system effectiveness and highlights the need for deep structural reforms. The priority areas of reform include: establishing a unified information and analytical space for the exchange of inspection results among the State Services of Ukraine; strengthening the institutional independence of audit bodies; introducing risk-oriented approaches to inspection planning; enhancing the professional capacity of auditors and tax inspectors; and improving the regulatory framework in accordance with INTOSAI and IIA standards. This research contributes to the UN Sustainable Development Goals by confirming that the synergy between audit and tax control forms a stable foundation for fiscal policy, enhances the efficiency of public administration, reinforces macroeconomic balance, and ensures the economic resilience of the state under wartime and post-crisis challenges.

Keywords: audit; digitalization; economic security; fiscal resilience; financial stability; integral control efficiency index; public financial transparency; risk-oriented approach; state financial control; tax control

1. Introduction

The contemporary global economy is characterized by elevated levels of turbulence arising from a complex interplay of global and domestic risks, including financial crises, armed conflicts, the expanding scale of the informal economy sector, tax evasion, and the suboptimal allocation of public resources. Under these conditions, the development of an effective system of economic security becomes critically determinant. Audit and tax control constitute integral components of this system, as their coordinated functioning contributes to the transparency of financial flows, the stability of the budget

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framework, the reinforcement of institutional credibility, and the prevention of financial misconduct.

Audit extends beyond the verification of financial statement accuracy and operates as a strategic governance tool that facilitates the identification of tax-related risks, corruption practices, violations of budgetary discipline, and anomalies in financial data patterns. When combined with tax compliance enforcement mechanisms – aimed at ensuring legality, equity, and fairness in taxation – the audit function forms a comprehensive preventive framework for strengthening the state's economic security. This synergistic interaction enables not only the detection of emerging financial threats but also the timely design of mechanisms for their mitigation.

In Ukraine, the advancement of audit and tax control is unfolding amid profound institutional and administrative transformations, including the digitalization of public finance, reforms within the State Audit Service of Ukraine, modernization of the tax administration system, and the implementation of European transparency and accountability standards. At the same time, the architecture of public financial oversight retains structural weaknesses that directly constrain its preventive capacity. Oversight bodies operate with limited *de facto* independence and often narrow mandates; specialists with advanced analytical and digital competencies remain in short supply; regulatory provisions are fragmented and inconsistently applied; and audit and tax information systems are only partially interoperable. As a result, a considerable share of control resources is absorbed by routine, formalistic checks, while risk-based and forward-looking analysis remains underdeveloped. These limitations depress the overall efficiency of public financial oversight and, particularly in a high-risk environment of war and recovery, create systemic vulnerabilities for fiscal sustainability and economic security.

The significance of audit further increases under martial law and during post-war recovery. In such contexts, audit functions become central to monitoring the targeted use of budget expenditures, international assistance, investment projects, and public procurement. However, the preventive potential of audit is constrained by several institutional bottlenecks: limited staffing and growing workloads in supervisory bodies, fragmented and only partially interoperable information systems, incomplete digitalization of procedures, and persistent political and administrative pressures on audit planning and follow-up. These constraints weaken the *ex ante*, preventive role of audit, as a considerable share of control activities continues to focus on *ex post* verification of already committed expenditures rather than on early identification of fiscal and corruption risks.

Under wartime conditions, audit capacity is therefore unlikely to expand proportionally to the rapid increase in risk exposure. Instead, the effectiveness of public financial control depends on the ability of audit institutions to prioritize high-risk areas, to apply risk-based sampling and analytical tools, and to coordinate their activities with tax authorities and other control bodies so as to avoid duplication and close the most critical vulnerabilities within constrained resources. The audit is thus conceptualized not as an all-encompassing safeguard, but as a strategically targeted mechanism whose contribution to economic security is determined by how scarce audit capacity is allocated across competing risk domains.

Consequently, the examination of the interdependence between audit and tax control, on the one hand, and state financial stability and economic security, on the other,

acquires particular theoretical and practical relevance, especially under conditions of martial law and post-war recovery. Such a model forms a critical foundation for ensuring financial stability and strengthening the economic security of Ukraine.

Against this background, the article pursues two interrelated aims. First, it develops an integrated analytical framework for assessing the interaction between audit and tax control and its contribution to state financial stability and economic security under the extraordinary conditions of wartime Ukraine. Second, it applies this framework empirically by constructing an Integral Efficiency Indicator (IEI) and evaluating the institutional and technological determinants of supervisory performance. By combining a structured institutional assessment with an integrated efficiency indicator, we seek to contribute to the international literature on financial stability and economic security in transition economies exposed to large-scale shocks.

2. Theoretical Background

In contemporary academic discourse, the issues of national economic security, the role of audit, and the effectiveness of tax control have gained growing scientific relevance. This increased attention is driven by the ongoing transformation of public financial management systems, the digitalization of oversight mechanisms, and the intensification of external and internal risks. A comprehensive review of scholarly literature makes it possible to identify several conceptual research directions forming the theoretical and methodological foundations of this field.

Empirical and conceptual studies (Antoniuk, Koval *et al.*, 2021) emphasize that the independence of audit institutions and methodological consistency within internal control systems are critical for effective financial supervision. These works argue that internal audit should operate not only at the enterprise level but also as an integral component of national public finance management, thereby underscoring the need to strengthen institutional audit capacity. Analytical contributions (Nazarova, Hordopolov *et al.*, 2019) underline that national economic security cannot be achieved without a stable and transparent audit framework that safeguards the efficient use of public resources. Audit is conceptualized in these studies as a key instrument for mitigating corruption, reducing the shadow economy, and improving governance efficiency.

Policy-focused research analyses the interconnection between tax policy and economic security, showing that deficiencies in tax policy – particularly under martial law – constrain entrepreneurial activity and investment and create budgetary risks. Accordingly, these authors position tax reform as an essential component of national economic security strategy (Klymenko, Ukhnał & Semenyshena, 2023). The researchers' works examine the functioning of the Ukrainian tax administration system as a fundamental determinant of economic security. Their structural model comprises five functional components – taxpayer registration, digitalization, compliance, harmonization with international standards, and risk management – and demonstrates that strengthening tax administration, particularly tax control, is essential for ensuring macroeconomic stability (Lazebnyk & Pizhuk, 2025). Works addressing tax risk management assess the influence of transfer pricing audits, anti-avoidance measures, and compliance monitoring

on budget revenues. The evidence presented suggests that stronger integration between audit and tax control is a prerequisite for fiscal stability (Shevchuk, 2024).

Sectoral studies (Dmitrenko & Prav, 2020) focus on information support for audit processes in construction enterprises, identifying methodological and regulatory gaps in data standardization that reduce audit effectiveness and impair the formation of a reliable basis for tax control.

Quality-assessment research addresses professional ethics, corruption risks, and quality-assurance practices within the Ukrainian audit market. The authors report that a declining number of audit firms combined with growing workloads generates quality risks, and that weak legal regulation and limited professional accountability hinder overall audit-system effectiveness (Kulish et al., 2019). Studies on audit practice under exceptional conditions advocate shifting from traditional audit methods to strategic and analytical formats that improve managerial decision-making. These works stress the need to adapt audit and tax control systems to wartime constraints, heightened informality, and resource limitations (Oneshko et al., 2024). Research on large enterprises analyses the interaction between tax control and audit within the “business-tax authority-audit” triad and highlights the need for deeper coordination – especially in transfer pricing and internal audit practices – to enhance transparency and financial discipline (Tatenko et al., 2025).

Complementary studies (Yehorova, Chorna et al., 2025, Kalinichenko & Lesyuk, 2024) on external economic and financial security indicate that weak tax capacity, low tax revenues, and insufficient audit oversight pose substantial threats to macroeconomic stability. A synthesis of the literature reveals both conceptual progress and methodological fragmentation. Recent scholarship increasingly reconceptualizes audit and tax control as central pillars of financial resilience, yet integrated analytical frameworks remain underdeveloped and unevenly applied in practice. A core unresolved issue is the absence of a comprehensive model that systematically links audit systems with tax control mechanisms across different institutional settings. Notably, studies (Kraievskiy & Muravskiy, 2024) underscore that internal audit should be conceptualized as an analytical foundation for tax oversight, particularly in the domain of transfer pricing.

The technological-change literature (Chernukha & Oneshko, 2024) documents the impact of global trends – Standard Audit File for Tax (SAF-T), big data analytics, and blockchain – on audit transformation, arguing that digital tools improve the transparency and reliability of financial information. However, cross-country comparative evidence on how these tools jointly reshape the interaction between audit and tax control remains scarce, especially in jurisdictions exposed to extraordinary conditions such as wartime Ukraine. This gap underscores the need for further regional and international studies to test whether the structural weaknesses identified in individual cases are context-specific or reflect broader, systemic patterns. Comparable developments are observed in tax administration, where digitalization is recognized as an anti-evasion mechanism; however, the pace of digital transformation in Ukraine is constrained by limited funding, skills shortages, and regulatory barriers. Recent policy-oriented analyses (Nazarova & Tkachenko, 2025) stress the imperative to reform tax control under wartime risks and economic uncertainty, advocating the integration of innovative technologies and the creation of specialized audit tools to support fiscal sustainability.

Indeed, the efficiency and stability of the tax system directly influence the level of a state's socio-economic security, as they ensure the timeliness of budget revenues and the sustainability of financing key areas of societal development. According to the authors (Ogrenich & Cherep, 2025), the tax system serves as a fundamental instrument for maintaining economic competitiveness, promoting social justice, and counteracting both internal and external threats. Methodological contributions propose composite indicator systems for measuring tax security that account for fiscal, regulatory, and monitoring functions, and for emerging tax risks (Tarashchenko, 2024). Research on tax culture (Kushneruk & Alekseienco, 2020) links compliance behaviour with public trust and fiscal-policy stability and recommends measures to strengthen tax culture in Ukraine. Studies on critical imports (Boiarova & Savchenko, 2024) argue that tax instruments contribute to fiscal performance, domestic market resilience, and the development of appropriate regulatory frameworks in strategic import sectors.

Modern scientific sources indicate that the issues of interaction between the audit system, tax control, and state financial supervision are considered in the works of a number of Ukrainian researchers who focus on the institutional, organizational, and technological aspects of increasing their efficiency. Comprehensive analyses of public financial oversight (Dyka, Biliachenko & Levyskyi 2025) systematize control authorities' functions and propose integration with the Public Internal Financial Control (PIFC) model and risk-oriented audit planning to enhance budget stability and national economic security. The authors argue that an effective system of public financial control constitutes a critical factor in maintaining the stability of the budgetary system and serves as an essential instrument for ensuring the country's economic security. Policy briefs and practitioner-oriented research (Rusina, 2025) frame public financial control as a mechanism for enforcing fiscal discipline, preventing misuse, and supporting national security under conditions such as martial law. According to the author, strengthening the role of control under martial law is one of the key factors in maintaining Ukraine's financial stability and national security. Organizational studies (Oliinyk & Sahaidak, 2023) emphasize the strategic role of internal audit within enterprise and public-sector risk management, showing that stronger internal audit reduces misconduct, financial losses, and systemic instability.

Digital-audit scholarship (Ivanova, 2023) documents the adoption of machine learning, big data analytics, and risk-oriented audit systems and characterizes a shift toward a proactive financial-control paradigm aimed at prevention rather than *ex post* detection. The author substantiates that such innovative approaches shape a new paradigm of financial control – one that is proactive rather than reactive – and thereby enable the prevention of violations instead of their detection *post factum*.

Governance-focused research (Rudyk, Holovchak & Balla, 2024) examines independence and ethical standards in auditing, identifying conflict-of-interest scenarios and recommending institutional safeguards – auditor rotation, ethical codes, and transparency measures – to preserve. The scholars outlined typical situations in which conflicts of interest arise in audit practice, analysed their impact on the objectivity of audits, and proposed a set of measures to prevent such conflicts. In particular, they recommend introducing internal quality-control mechanisms, ethical codes, auditor-rotation procedures, and enhancing the transparency of audit engagements.

Applied evaluations (Sievidova, Susidenko & Pavlenko, 2024) assess current control and revision practices, identify implementation challenges, and propose reforms to improve management and audit systems within the Ukrainian economy. The researchers emphasise that, under market conditions, control activities constitute an essential component in ensuring legality, financial stability, and the economic security of business entities.

Overall, these scholarly contributions indicate that audit is increasingly conceptualized as a multidimensional instrument of risk management, accountability, and financial resilience rather than a mere reporting verification tool. Nevertheless, translating these insights into enhanced tax-control and public-finance practices requires further methodological refinement, institutional reform, and technological investment.

The principal research gap remains the absence of an integrated model of interaction between audit and tax control capable of ensuring effective financial oversight and strengthening national economic security. Key unresolved areas include coordination between external and internal audit, secure information exchange with tax authorities, digitalization of supervisory processes, and operationalizing risk-based approaches.

Under the legal regime of martial law, heightened informality, and pressing needs for efficient allocation of constrained public resources, the construction of a modern public financial control system – grounded in transparency, independence, analytical capacity, and technological innovation – is imperative. Such a system is essential to preserve fiscal stability, reinforce tax discipline, and enhance the financial resilience of the state.

The research examines the effectiveness of interaction between the audit system and tax control in the context of ensuring financial stability and national economic security. It also aims to develop conceptual approaches and recommendations for strengthening this interaction under conditions of digital transformation, wartime challenges, and post-crisis economic recovery. To achieve this objective, the research is designed to: clarify the essence and conceptual content of the notion of “interaction between audit and tax control” within the national economic security framework; synthesise theoretical approaches and contemporary research findings regarding the role of audit and tax control in maintaining financial stability; analyse the practical state of development of public, external, and internal audit systems in Ukraine; develop a model for assessing the efficiency of the audit and tax control system; and substantiate directions for improving audit and tax control mechanisms aimed at enhancing transparency, accountability, and the economic resilience of the state.

3. Methods

Having established the theoretical foundations and identified key institutional dimensions, we now turn to the methodological approach used to quantify the effectiveness of audit and tax control systems. The methodological framework of this research is grounded in an interdisciplinary approach that integrates elements of economic theory, financial analysis, jurisprudence, and the governance of public and corporate institutions. This approach enables a comprehensive examination of both the conceptual foundations of audit and its applied influence on the system of national economic security

in contemporary conditions. The research employs a combination of general scientific and specialised methods. System analysis techniques are used to identify structural linkages between internal and external audit and key parameters of economic security. A dialectical approach is applied to clarify the essence of audit and its role within the mechanism of public financial control, allowing the phenomenon to be examined dynamically and within the broader transformational processes characterising the Ukrainian economy.

To assess the actual state of audit activities in Ukraine, a content analysis of reports published by the State Audit Service of Ukraine, the Ministry of Finance of Ukraine, the Accounting Chamber, and other governmental institutions for the years 2022–2024 was conducted. The analysis also incorporates data produced by international analytical bodies and professional audit organisations, including the International Federation of Accountants, Transparency International, the World Bank, and the Organisation for Economic Co-operation and Development. The empirical part of the study is anchored in Ukrainian institutional data, which limits the direct cross-country comparability of the findings; future research should incorporate a broader regional dataset to assess whether the observed structural weaknesses are specific to wartime Ukraine or reflect wider patterns in comparable economies.

At the empirical level, the research incorporates statistical data on detected financial violations, volumes of inefficient use of public funds, the number of audits performed, staffing capacity of audit units, personnel qualifications, and the use of digital tools in accounting and audit processes. These data inform conclusions regarding the effectiveness of audit institutions as an integral component of the national financial and economic security system. To evaluate the prospects for further development of audit activity, modelling and forecasting methods are applied, taking into account the introduction of advanced technologies, the digitalisation of audit procedures, the automation of financial control, and the increasing adoption of artificial intelligence-based solutions in international practice.

All collected information is analysed in terms of its reliability, objectivity, and relevance to the research objectives. The application of source criticism, formalised analytical procedures, and qualitative assessment methods ensures a comprehensive understanding of the current state, existing challenges, and potential development trajectories of the audit system in Ukraine as a key instrument of economic security.

4. Economic security provision

Based on the methodological approach described in the previous section, this part of the article presents the empirical results of applying the IEI framework to the current Ukrainian audit and tax control systems. Under contemporary conditions of intensifying financial turbulence, wartime risks, and constrained public resources, ensuring economic security requires the establishment of an integrated control framework that combines audit and tax control as complementary components of a unified financial oversight mechanism. Their synergy enables not only the detection of violations but also their prevention, thereby supporting the stability of the financial system, enhancing the transparency of budgetary processes, and reinforcing public trust in state institutions.

4.1 Conceptual Foundations of the Interaction Between Audit and Tax Control within the National Economic Security System

The purpose of audit, as an independent verification of the reliability of financial information and compliance of business entities with legal norms, internal policies, and international standards, lies in ensuring the accuracy of data that underpin managerial, fiscal, and investment decision-making. Tax control, in turn, represents a system of state oversight measures ensuring correct tax calculation, timely payment of taxes and fees, and adherence to tax legislation. It performs the fiscal and control-analytical functions of the state, aimed at maintaining budgetary balance and financial stability.

The interaction between audit and tax control consists of coordinating objectives, procedures, methods, and outcomes of the respective institutions to enhance the effectiveness of public financial management (Lipych et al., 2022). This interaction encompasses: information exchange among audit authorities, tax administrations, and business entities; alignment of methodological approaches to financial risk assessment, detection of violations, and audit planning; use of audit conclusions as an analytical basis for tax monitoring; integration of digital control tools (e-reporting, risk-oriented systems, big data analytics); and feedback mechanisms where tax control results inform the development of audit programs and new financial reporting standards.

The substance of audit–tax control interaction manifests in three dimensions:

1. Institutional – establishing a coordinated system of financial oversight bodies, defining their authorities, and developing collaboration mechanisms.
2. Functional – ensuring the consistency of approaches to planning, collection, processing, and utilization of information on the financial and economic activities of enterprises.
3. Analytical – applying integrated models to assess financial discipline, risk exposure, and efficiency in resource utilization.

Within the national economic security framework, this interaction performs a dual function (Dmitrova, Tereshchuk & Karpova, 2023; Zabashstansky, Lomonos & Mikheienko, 2024): a preventive function, aimed at identifying potential threats and minimizing risks (tax evasion, misallocation of budgetary funds, corrupt practices); and a regulatory–stabilization function, ensuring the restoration of financial balance, enhancement of tax discipline, and effective public expenditure management.

The structural-logical model presented in Figure 1 illustrates a conceptual approach to organizing the interaction between audit and tax control as interrelated components of the national economic security mechanism. It depicts the multi-level structure of this interaction – from strategic objectives and the institutional environment to information-analytical processes, performance indicators, and feedback loops. The model emphasizes the necessity of integrating external and internal audit with tax control through digitalization, risk-oriented planning, information exchange, and joint analytical assessment of financial risks.

The structural-logical model illustrates that effective interaction between audit and tax control constitutes a critical prerequisite for establishing a comprehensive public financial monitoring system aimed at preventing economic threats, enhancing transparency, and strengthening trust in state institutions. Its implementation contributes

to fiscal stability, reinforces tax discipline, and facilitates the achievement of the strategic objective – ensuring Ukraine’s economic security.

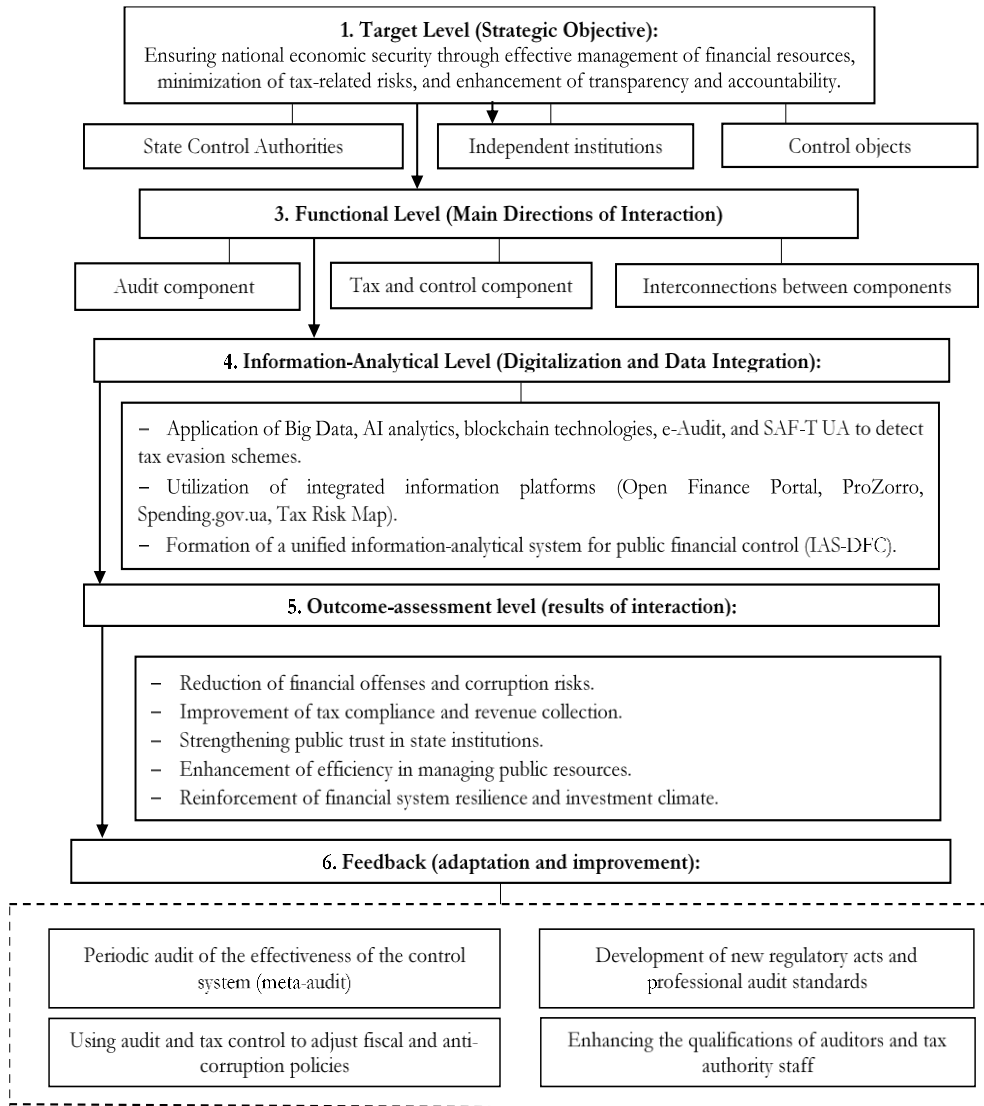


Figure 1. Structural-Logical Model of the Interaction between Audit and Tax Control within the National Economic Security System

Thus, the interaction between audit and tax control within the economic security system represents an integrated process of coordinating state and non-state control mechanisms, designed to improve financial resource management, mitigate fiscal instability risks, and ensure the long-term resilience of the national economy.

4.2 Integrated Model for Assessing the Effectiveness of Audit and Tax Control Systems

The audit and tax control system constitutes a multifactor mechanism influencing the financial stability of the state through a set of interrelated indicators, including the level of tax discipline, efficiency of budgetary resource management, volume of financial violations, and transparency of public finances. For quantitative assessment of the system's effectiveness, an integrated approach is appropriate, combining economic-statistical, expert-based, and correlation-regression methods.

State financial stability (FS) can be expressed as a function of the effectiveness of the audit system (A) and tax control (T), modified by the influence of external factors (Z):

$$FS = f(A, T, Z),$$

where, A represents the effectiveness of audit (internal and external), T denotes the performance of tax control, and Z refers to external factors, including macroeconomic conditions, economic informality, wartime risks, and legislative changes.

In a dynamic setting, this relationship can be represented as:

$$FS_t = f(A_t, T_t, Z_t),$$

where subscript t denotes time and captures the impact of macroeconomic shocks, changes in the shadow economy, and regulatory volatility on the transmission from audit and tax control effectiveness to financial stability. In this study, the model is operationalised for a single period (2023), but its structure allows for extension to longitudinal or panel designs, in which time-varying parameters would reflect how crises, reforms, and institutional changes alter the strength of these linkages.

For practical assessment, an Integral Efficiency Indicator (IEI) of supervisory systems is employed:

$$IEK = \sum w_i \times X_i,$$

where, w_i – weight coefficients determined using the expert assessment method ($\sum w_i = 1$), and X_i denote the normalised indicators of audit effectiveness (A), tax control (T), and external factors (Z).

Block 1. Audit effectiveness (A):

$$A = \frac{\sum_{i=1}^4 a_i \cdot w_{ai}}{\sum_{i=1}^4 w_{ai}}$$

where, $A1$ – share of detected financial violations in the total amount of audited funds;

$A2$ – rate of violation rectification based on audit results (%);

$A3$ – proportion of recommendations of the State Audit Service of Ukraine implemented;

$A4$ – coefficient of independence and quality of audit inspections (based on evaluations by professional organizations).

Block 2. Effectiveness of tax control (T):

$$T = \frac{\sum_{j=1}^4 t_j \cdot w_{tj}}{\sum_{j=1}^4 w_{tj}}$$

where, $T1$ – share of additionally assessed taxes actually collected in the budget;

$T2$ – timeliness of tax receipts (%);

$T3$ – coefficient of tax risk reduction (detected / prevented violations);
 $T4$ – coverage of high-risk taxpayers by audits (based on risk-scoring system).
 Block 3. Impact of external factors (Z):

$$Z = \frac{\sum_{k=1}^3 Z_k \cdot w_{zk}}{\sum_{k=1}^3 w_{zk}}$$

where, $Z1$ – shadow economy index (% of GDP);

$Z2$ – public finance transparency index (Open Budget Index);

$Z3$ – macroeconomic stability (inflation, budget deficit, debt burden).

Block 4. Integrated model for assessing financial stability

In a longitudinal framework, both w_i and the impact coefficients in the extended specification:

$$FS_t = \alpha \cdot A_t + \beta \cdot T_t - \gamma \cdot Z_t + \varepsilon_t$$

may be treated as time-varying, enabling analysis of how macroeconomic instability, informality, and regulatory changes reconfigure the relative importance of audit, tax control, and external risks over time. Such an extension would make it possible to test whether sustained improvements in audit capacity and tax-control performance are consistently associated with measurable gains in financial stability.

Based on the calculation of the Integral Efficiency Indicator of the audit and tax control system (IEI), classification of its performance levels can be carried out. This approach enables not only an assessment of the current state of supervisory but also the identification of strategic priorities for its improvement in the context of financial stability and national economic security.

A high level of efficiency (IEI = 0.75–1.00) indicates the presence of well-established mechanisms for the interaction between audit and tax control, a high degree of financial transparency, timely correction of violations, and a low level of tax-related risks. Under these conditions, the control system performs not only a reactive function but also a preventive role, ensuring the resilience of public finances and fostering trust in fiscal institutions.

A medium level of efficiency (IEI = 0.50–0.74) reflects relative stability of the system; however, it highlights the need for improving audit methods, enhancing the digitalization of procedures, and deeper integration of information databases among controlling authorities. At this level, challenges emerge concerning the independence of audit structures, incomplete implementation of audit recommendations, and insufficient coordination between state and internal audit functions.

A low level of efficiency (IEI < 0.50) signifies that the audit and tax control system operates in a fragmented manner, characterized by high levels of financial violations, low effectiveness of tax administration, and limited transparency of financial flows. This condition represents a threat to fiscal stability, an expansion of the shadow economy, and potential budgetary losses.

The proposed interpretation of the IEI allows for evaluating the qualitative state of the control system not only quantitatively but also functionally. It provides an analytical basis for management decisions aimed at strengthening audit capacity, improving tax monitoring mechanisms, and enhancing the overall level of national economic security.

The developed model enables a quantitative assessment of the relationship between audit effectiveness, tax control performance, and the level of financial stability. It facilitates not only retrospective analysis but also forecasting the impact of changes in the control system on economic security. The integral approach supports informed management decisions regarding financial policy priorities, optimization of the structure of supervisory authorities, and development of digital monitoring tools.

For a comprehensive evaluation of the performance of the audit and tax control system, the Integral Efficiency Indicator (IEI) has been proposed, which accounts for the interaction between internal and external audit, tax administration, and the influence of external macroeconomic factors. This approach allows for a quantitative assessment of the financial control system's state and its effect on the country's financial stability.

Table 1 presents the calculation of the Integral Efficiency Indicator (IEI) for 2023, including three analytical blocks: audit effectiveness (A), tax control effectiveness (T), and the impact of external factors (Z).

Table 1. Calculation of the Integral Efficiency Indicator of supervisory (IEI)

Block / Indicator	Calculation Formula	Value (2023)	Weight (w)	Weighted Value
<i>Block 1. Audit Efficiency (A)</i>	$A = (\sum ai \cdot wai) / \sum wai$	0,78	0,40	0,312
A1. Share of Detected Violations		0,82	0,10	0,082
A2. Violation Rectification (%)		0,75	0,10	0,075
A3. Implementation of Recommendations		0,70	0,10	0,070
A4. Audit Independence		0,85	0,10	0,085
<i>Block 2. Tax Control Efficiency (T)</i>	$T = (\sum tj \cdot wtj) / \sum wtj$	0,72	0,40	0,288
T1. Share of Recovered Additional Taxes		0,76	0,10	0,076
T2. Timeliness of Tax Revenues		0,80	0,10	0,080
T3. Reductio		0,60	0,10	0,060
<i>Block 3. External Factors (Z)</i>	$Z = (\sum zk \cdot wzk) / \sum wzk$	0,72	0,10	0,072
Z1. Shadow Economy (% of GDP)		0,55	0,20	0,110
Z2. Public Finance Transparency		0,60	0,07	0,042
Z3. Macroeconomic Stability		0,50	0,07	0,035
<i>Integral Efficiency Indicator (IEI)</i>	$IEI = w_1A + w_2T - w_3Z$	0,55	0,06	0,033

The obtained value of the Integral Efficiency Indicator of supervisory (IEI = 0.49) indicates a low level of performance of the audit and tax control system in Ukraine in 2023. This suggests that existing control mechanisms operate fragmentarily, and coordination between auditing and fiscal structures remains insufficient. The high share of detected violations (A1 = 0.82) and the adequate level of their rectification (A2 = 0.75) confirm the active role of audit institutions. However, the implementation of recommendations (A3 = 0.70) and the audit independence coefficient (A4 = 0.85) highlight the need to further strengthen the institutional autonomy of auditing. Indicators of the tax control block demonstrate relative stability but do not achieve high efficiency: the level of recovered additional taxes (T1 = 0.76) is acceptable, whereas the reduction of tax risks (T3 = 0.60) remains a critical challenge. External factors (Z = 0.55) exert a significant restraining effect

due to macroeconomic instability, wartime risks, and the substantial size of the shadow economy.

According to the calculations, the audit and tax control system operates at a medium-to-low efficiency level. To increase the integral indicator to 0.65–0.75, it is advisable to expand the digitalization of audit and tax monitoring processes, ensure data exchange between fiscal, auditing, and analytical institutions, strengthen the professional independence of audit bodies, enhance public finance transparency, and reduce the shadow economy. The IEI serves as an effective analytical tool for assessing the state of the control system and identifying priority directions for its improvement in the context of national financial stability.

4.3 Institutional Interaction of Audit and Tax Control as a Factor of State Financial Stability

Audit, both internal and external, occupies a central role within the national economic security system, as it facilitates the detection of violations, enhances transparency, monitors resource use, and enforces financial discipline. Tax control, in turn, represents an essential instrument for maintaining financial stability, since without effective tax administration and enforcement, state finances remain vulnerable. The interaction between audit and tax control remains underexplored; however, evidence suggests that integrating these procedures (auditing and tax control) can serve as an effective mechanism for ensuring financial resilience. In Ukraine, a significant gap persists between scholarly recommendations and practical implementation due to weak regulatory frameworks, insufficient personnel qualification, challenges with institutional independence, and limited digitalization and data integration. Under current conditions – including martial law, economic transformation, globalization, and a substantial shadow economy – the roles of audit and tax control are increasing. They must not only react to violations but also adopt a proactive stance through analytics, managerial decision-making, and risk-oriented approaches.

Amid rising financial risks, inefficient use of state resources, and increasing demands for enhanced oversight in the public sector, the effective functioning of internal and external audit systems becomes a critical prerequisite for national economic security. Analysis of recent statistics demonstrates that auditing activity in Ukraine in 2023 experienced both quantitative and qualitative growth, although significant challenges remain regarding independence, resource provision, and trust in audit outcomes. According to the official report of the State Audit Service of Ukraine, in 2023 alone, financial violations totaling over UAH 134.2 billion were detected, including UAH 76.8 billion of unauthorized expenditures and UAH 73.1 billion in embezzlement. Additionally, the Service conducted over 12,000 monitoring sessions of public procurement, covering a total of UAH 188 billion, preventing inefficient spending of UAH 20 billion in budgetary funds (State Audit Service of Ukraine, 2024).

This scale of detected violations indicates not only the persistence of systemic misuse of public resources but also the intensification of audit efforts and improvements in detection capacity. Our results are consistent with research showing that high levels of detected irregularities tend to coexist with weak transparency and constrained institutional independence of supreme audit institutions, particularly in transition and emerging

economies (Blume & Voigt, 2011; Transparency International & U4 Anti-Corruption Resource Centre, 2018). Similar findings demonstrate studies that “good auditing” – characterised by organisational independence and professional capacity – is associated with lower public sector corruption, whereas limited autonomy of audit bodies undermines their preventive role (Gustavson & Sundström, 2018; World Bank, 2021).

Moreover, empirical evidence indicates that effective external audit is positively linked to fiscal transparency, which in turn supports better budgetary discipline and reduced opportunities for misuse of public funds (Cicek & Dikmen, 2021). This supports the thesis that, in environments where large-scale violations are repeatedly uncovered, enduring governance failures and insufficient independence of audit institutions make it difficult to shift from reactive, ex post inspections towards proactive, risk-based audit systems. In this sense, the Ukrainian case reflects broader international patterns and demonstrates the significant potential for external audit to act as a mechanism for mitigating systemic corruption and safeguarding budgetary resources (*Figure 2*).

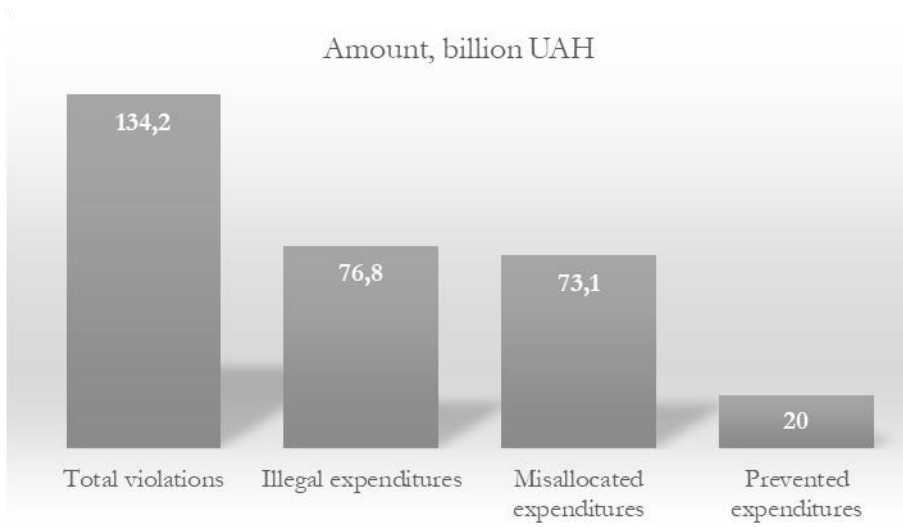


Figure 2. Financial Indicators of SAS Audit in 2023

The total volume of detected financial violations amounted to UAH 134.2 billion, reflecting a significant level of inefficient use of public funds and breaches of financial discipline. Of this total, unauthorized expenditures accounted for UAH 76.8 billion, indicating instances of improper use of budgetary resources, abuse of authority, or procedural violations in fund management. Misallocated expenditures amounted to UAH 73.1 billion, reflecting the use of state funds for purposes other than those intended, without adherence to designated financing priorities. At the same time, prevented expenditures totaling UAH 20.0 billion demonstrate the effectiveness of audit measures, as these controls successfully mitigated illegal or irrational use of budgetary resources.

The audit results underscore both the high prevalence of violations within the public financial management system and the critical role of supervisory authorities in detecting and preventing financial abuses. This highlights the need to strengthen financial

oversight, enhance budgetary transparency, and implement modern digital monitoring mechanisms for fund utilization.

It is also noteworthy that in 2023, a certification program for internal auditors in the public sector was launched, involving 143 specialists, of whom 36 successfully obtained certification (*Figure 3*).

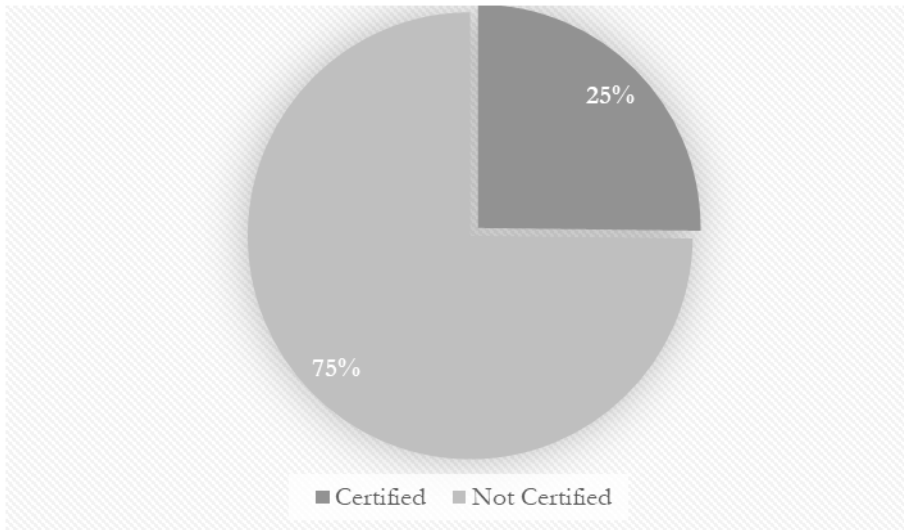


Figure 3. Certification of Internal Auditors (2023)

According to the diagram, only 25.2% of auditors are certified, indicating that they have undergone professional training and constituted their qualifications according to international or national standards. In contrast, 74.8% of auditors remain uncertified, meaning they do not have official confirmation of their professional competence. This indicates that three-quarters of internal audit specialists require further qualification, which poses a challenge for the state financial control system. This situation points to the need to strengthen professional training programs, create conditions for staff certification, and implement internal audit standards in accordance with international requirements. The chart data demonstrate a low level of professional certification of internal auditors in 2023, which may affect the quality of audit inspections and the overall effectiveness of the internal control system in the public sector.

A similar position is expressed (Dmitrenko, 2018), emphasizing that internal audit is an effective tool of strategic management, allowing financial threats to be identified at an early stage and organizational internal policies to be adapted to dynamic changes in the external environment.

The analysis shows that effective functioning of external and internal audit is an integral part of ensuring the country's economic security. Audit contributes to:

1. Detection and prevention of corruption.
2. Enhancement of transparency and accountability in enterprises' financial activities.
3. Strengthening public and international partners' trust in state institutions.

4. The analysis of the current state of external and internal audit in Ukraine indicates their growing importance in ensuring economic security. In 2023, the State Audit Service of Ukraine conducted audits of the financial activities of several state enterprises, identifying violations totaling more than UAH 68 billion. In particular, the audit of NEC “Ukrenergo” revealed abuses related to untimely termination of electricity supply and inefficient use of budget funds.

5. Internal audit also shows positive dynamics. As of 31 December 2023, the number of employees in internal audit units of state bodies in Ukraine was 1,702, of which 1,180 positions were filled, or 69.3%. This indicates increased attention to internal control and the effectiveness of risk management in the public sector (Ministry of Finance of Ukraine, 2024).

6. Moreover, in 2023, a national certification of employees of internal audit units in state bodies was introduced. Certification was completed by 143 internal auditors, or over 12% of the actual number of auditors in the state system. As a result of the qualification exams, 36 internal auditors received certificates, indicating an increase in the professional level of specialists in this field (Ministry of Finance of Ukraine, 2024).

7. External audits of the effectiveness of the audit quality control system ensure that the State Audit Service of Ukraine receives objective and unbiased information regarding those management elements requiring special attention. This allows the formation of effective managerial decisions aimed at improving the functioning of the internal quality control system of audit activities (Radionova, Denysenko & Levchenko, 2025).

Thus, the research results confirm that external and internal audits are indispensable components of Ukraine’s economic security system. Their effective functioning contributes to the detection and prevention of corruption, enhances the transparency of financial activities, and strengthens trust in state institutions.

5. Discussion

The results presented above provide a basis for reassessing the role of audit and tax control in Ukraine’s public financial management system; this section interprets these findings in a broader comparative context and formulates concrete recommendations for reform. The interaction between the audit system and tax control is a decisive factor in ensuring the financial stability and economic security of the state.

The analysis of the integrated control efficiency indicator (IEI = 0.49) demonstrated a medium-low level of system performance, indicating the fragmented interaction between audit and fiscal institutions, limited digitalization of processes, and insufficient independence of supervisory bodies. Despite the active work of the State Audit Service of Ukraine, the scale of financial violations identified (over UAH 134 billion in 2023) demonstrates the need to shift from reactive to preventive control. In this context, audit must transform from a formal reporting procedure into a strategic analytical tool that influences the formation of public policy in the sphere of financial discipline (State Audit Service of Ukraine, 2023a).

Particular attention should be paid to the institutional strengthening of the internal audit system, increasing the level of professional certification, and creating a unified

electronic data-exchange environment between the State Audit Service of Ukraine, the State Tax Service of Ukraine, and the Ministry of Finance of Ukraine. This will enhance the accuracy of analytical information, reduce corruption risks, and improve the coordination of supervisory procedures.

The discussion of the results also emphasized the need to introduce a risk-oriented approach (Risk Scoring) in tax monitoring, to strengthen the independence of external audit, and to create an effective system of public oversight in the field of public finance. The research (Kmit & Samoilyuk, 2023) notes that the main problem of state financial control in Ukraine lies in the difficulties of ensuring effective management of financial resources, which is caused by systematic violations of budget legislation, inefficient use of funds, and shortcomings in the administration of state budget revenues.

The debate also focuses on the actual independence of audit institutions within the system of public administration. It is emphasized (Dmytrenko, 2018) that internal audit in public institutions is often structurally subordinated to the management of the same body in which it operates, which makes objective conclusions impossible and creates a conflict of interest. The author highlights the need for institutional restructuring of internal audit, particularly through the establishment of an independent supervisory body that would coordinate the activities of audit units at the national level.

The research (Melnyk, Mykhalska, Travinska & Feshchenko, 2024) confirms that internal audit has already gone beyond the boundaries of purely accounting checks and financial reporting – the discussion now concerns a systemic approach, risk management, monitoring, and performance evaluation. Thus, a shift toward the strategic function of internal audit can be traced.

The study (Kovalova & Marenych, 2023) proves that under crisis conditions (martial law), internal audit becomes a tool of strategic analysis – not merely “whether compliance has been ensured”, but “how to prevent”, “which risks have priority”. This confirms that audit is gaining a strategic role.

The Internal Audit Activity Plan (State Audit Service of Ukraine, 2023b) outlines the strategic objectives of internal audit, including modernization of mechanisms, digitalization, integration with risk management, and strengthening the impact of audit on performance. This provides not only a scientific rationale but also documentary confirmation that internal audit is officially considered a strategic instrument rather than solely a control function.

Another determinant area of discussion is institutional interaction and coordination. The effectiveness of audit increases when the results of inspections are quickly transferred to the bodies responsible for tax administration and financial monitoring, as well as when feedback exists regarding the actual recovery of damages. The “Public Results of the State Audit Service for 2023” (State Audit Service of Ukraine, 2023) demonstrate the scale of identified violations and the directions of interaction with other control entities – this confirms the need for an integrated informational environment so that audit findings transform into financial results (recoveries, prevented losses).

The link “audit – financial monitoring – law enforcement bodies” is particularly determinant. According to the Financial Monitoring Service, in 2023 financial transactions worth billions were suspended and blocked, and the total value of suspicious transactions was substantial (Financial Monitoring Service, 2023). This proves that well-organized

interaction between audit, financial monitoring, and law enforcement bodies has a tangible preventive effect and directly influences financial security.

The methodological guidelines (Ministry of Finance, 2020) establish the adaptation of international internal audit standards (IIA) to the public sector of Ukraine and emphasize risk-orientation and audit quality. This creates a legal and methodological basis for the strategic positioning of audit – from purely operational control to a function that supports managerial decision-making.

The Open Budget Survey - 2023 results for Ukraine highlight challenges in the transparency of the budget cycle. For audit and tax control, this means that the power of their findings increases in an environment of open data – where public and media oversight intensifies pressure on the implementation of recommendations and the actual elimination of violations. Thus, transparency reforms go hand in hand with improving the effectiveness of audit.

The synergy between audit and tax control is formed at the intersection of three strategic trajectories that determine the effectiveness of state financial oversight as a whole. First, this is the integration of data and processes between control institutions, ensuring a unified information-analytical space for exchanging inspection results, recommendations, and risk indicators. Such an approach eliminates duplication of functions among the State Audit Service of Ukraine, the State Tax Service of Ukraine, the Economic Security Bureau of Ukraine, the National Agency for Corruption Prevention, and the State Financial Monitoring Service of Ukraine, ensuring the integrity of the control process. As a result, financial information becomes more coherent, timely, and suitable for real-time managerial decision-making.

Second, synergy is based on the implementation of risk-oriented standards and methodologies harmonized with the international requirements of INTOSAI and the IIA. This implies a shift from purely documentary to analytical audit, where the focus is not only on recording violations but also on predicting their consequences and preventing risks. The use of risk-scoring models, digital analytical platforms, and machine-learning tools enables the timely identification of financial vulnerabilities, optimization of supervisory resource allocation, and improvement of inspection effectiveness.

Third, an essential condition for sustainable interaction is public transparency of the budget cycle, which reinforces the implementation of audit recommendations and the accountability of budget-funded institutions. Ensuring open access to inspection results, audit conclusions, and analytical reports creates conditions for public oversight, strengthens trust in state institutions, and promotes responsible behavior of public officials.

Thus, improving audit and tax-control mechanisms represents a strategic direction for enhancing transparency, accountability, and the financial resilience of the state. The implementation of the proposed recommendations will support the transition of the state financial-control system to an integrated, digital, and analytically oriented model capable of effectively responding to modern economic risks and ensuring the long-term resilience of the national economy (*Table 2*).

The implementation of the proposed directions will enhance the effectiveness of financial control, ensure transparent management of state resources, and strengthen trust in fiscal and audit institutions.

Table 2. Directions for improving the audit and tax control system to enhance state transparency and resilience.

Strategic Area	Key Measures	Expected Impact
Digitalization and Automation of Control Procedures	Creation of a unified audit and tax monitoring information system; application of Big Data, AI analytics, and blockchain; maintenance of an electronic register of audit inspections.	Increased operational efficiency and accuracy of control; reduction of corruption risks; strengthening the preventive nature of audits.
Strengthening Institutional Independence of Audit Bodies	Ensuring financial and organizational autonomy; alignment with INTOSAI and EU standards; expansion of external audit powers.	Enhanced impartiality and objectivity of control; increased trust in audit conclusions.
Development of Internal Audit System in the Public Sector	Certification of internal auditors; integration of internal audit into strategic management; implementation of KPIs for performance evaluation.	Improved quality of managerial decisions; reduction of internal risks and losses.
Improvement of Tax Control Methods	Transition to a risk-oriented approach (Risk Scoring); implementation of e-audit; motivation of taxpayers toward tax compliance.	Optimization of inspections; increased tax discipline; reduced burden on compliant taxpayers.
Enhancing Transparency and Accountability in Public Finance	Publication of audit results in open sources; monitoring of the Open Budget Index; public oversight of recommendation implementation.	Increased transparency of financial information; strengthened public trust in state institutions.
Strengthening Analytical and Scientific-Methodological Audit Base	Use of integrated and regression models for performance evaluation; establishment of an audit research center; updating methodologies according to international standards.	Improved scientific justification of control; enhanced effectiveness of strategic planning.
Formation of Financial Integrity and Responsibility Culture	Educational programs for officials and entrepreneurs; implementation of an auditor code of ethics; partnership approach to tax supervision.	Reduced level of financial misconduct; increased integrity and reputational capital of state institutions.

Comprehensive adoption of digital, organizational, and ethical reforms will contribute to the development of a resilient audit and tax control system capable of supporting the country's economic stability and financial security.

6. Conclusion

This paper has shown that, despite substantial institutional and technological reforms, the interaction between audit and tax control in Ukraine remains only partially integrated and operates at a medium-to-low effectiveness level. The proposed Integral Efficiency Indicator (IEI) reveals that systemic weaknesses – including limited coordination between audit and fiscal structures, incomplete digitalisation of information

flows, constrained institutional independence, and persistent human-capital and methodological gaps – significantly reduce the preventive capacity of public financial oversight. At the same time, the analysis demonstrates that audit and tax control retain considerable potential to strengthen financial stability and economic security if they are re-oriented towards risk-based, forward-looking functions and embedded more systematically into budget planning and fiscal risk management processes. The synergy between these institutions creates a unified mechanism of state financial control, which ensures the effective use of budgetary resources, timely detection and prevention of violations, and enhances public trust in government bodies.

The study revealed that external audits conducted by the State Audit Service of Ukraine serve as a powerful tool for identifying widespread violations in the use of public finances, as evidenced by the significant volume of abuses detected in 2023. However, the absence of an adequate mechanism for implementing the State Audit Service's of Ukraine recommendations and the low level of cooperation with law enforcement agencies considerably reduce the effectiveness of even the most professional audits. Conversely, internal audit, despite positive trends in staffing and the introduction of specialist certification, still does not fully perform its analytical and forecasting functions, limiting its influence on risk management policy development and resource optimization at institutional and enterprise levels.

The scientific literature reviewed in this study confirms the relevance of expanding the functional scope of audit – from classical financial statement audits to participation in managerial decision-making, evaluating the effectiveness of state policy, forecasting threats, and developing response strategies. Such a transformation can elevate the status of audit from a merely supportive body to a key player in the system of economic security, aligning with global trends of integrated financial control.

The calculation of the integral efficiency indicator ($IEI = 0.49$) indicated a medium-to-low level of system performance, which can be explained by several systemic factors: insufficient coordination between audit and fiscal structures, the lack of a unified digital data exchange space, limited independence of controlling bodies, and personnel and methodological issues. This highlights the necessity of moving from a fragmented inspection system to an integrated, risk-oriented model of state control.

Within such a model, an effective audit system must perform not only retrospective, but also strategic, analytical, and forecasting functions. In practical terms, this requires that:

- audit findings on systemic weaknesses and recurrent violations are used to revise expenditure ceilings and to introduce explicit corrective measures into the next annual and medium-term budget cycles;

- programmes with a consistently high share of violations or low implementation performance are flagged as “high-risk” and become subject to targeted restructuring plans, temporary spending caps, or conditional continuation of funding;

- audit recommendations are formally incorporated into budget call circulars and budget negotiation processes, so that line ministries must demonstrate how they have addressed identified deficiencies when submitting new budget proposals;

– major audit reports are systematically reviewed by the Ministry of Finance and relevant parliamentary committees before approving key budget parameters and medium-term fiscal strategies.

In addition, audit reports should serve as a structured input for fiscal risk statements and medium-term budget frameworks by explicitly identifying contingent liabilities (e.g., guarantees, PPPs), recurrent implementation bottlenecks, and sectors where revenue and expenditure risks are concentrated.

Conceptually, this implies a shift from *ex post* error detection towards forward-looking risk management and policy formation. Audit institutions are expected to:

– maintain risk registers for high-risk sectors and programmes and update them on the basis of each audit cycle;

– provide regular early-warning notes to the Ministry of Finance and the government on emerging patterns of non-compliance or rapidly increasing fiscal exposures;

– participate in fiscal risk working groups and contribute audit-based evidence to scenario analysis and stress testing of public finances.

Tax control, in turn, should move from mechanical detection of tax arrears to structured tax-risk management by:

– constructing and regularly updating risk profiles of taxpayers and sectors using big data tools, electronic auditing, and, where appropriate, artificial intelligence;

– linking risk scores to differentiated treatment strategies (e.g., simplified procedures for low-risk taxpayers and intensified audits for high-risk cases);

– using aggregated risk information to adjust compliance strategies, sectoral campaigns, and resource allocation within the tax administration.

Given Ukraine's exposure to ongoing military aggression, profound economic transformation, and a persistent risk of public resource losses arising from corruption schemes, the combined use of strategically oriented audit and risk-based tax control can strengthen long-term fiscal resilience by informing budgetary decision-making, enabling earlier identification of fiscal risks, and reducing the likelihood of violations before they materialize.

Improving the effectiveness of interaction between audit and tax control requires not only technical adjustments within individual institutions, but a coherent, system-wide reform agenda. In the Ukrainian context, such an agenda should focus on the following strategic directions:

– Creating a unified, integrated information-analytical system of state financial control with automated exchange of audit and tax data;

– Enhancing the regulatory framework in line with INTOSAI and IIA standards and EU requirements, ensuring consistency and predictability of control procedures;

– Strengthening the institutional independence of audit bodies and increasing the accountability of officials for non-implementation of audit and tax control recommendations;

– Raising the professional qualifications of auditors and tax inspectors, particularly in digital technologies, data analytics, and risk management;

- Implementing risk-scoring models in tax administration and state financial auditing to prioritise high-risk entities and operations and to optimise the use of limited supervisory resources;

- Expanding interagency cooperation with anti-corruption, law-enforcement, and financial institutions (e.g., NACP, State Financial Monitoring Service, BEB, SBU, and others) through formalised mechanisms of information exchange, joint risk assessment, and coordinated follow-up.

International experience suggests, however, that these reforms cannot be implemented effectively without unified and sustained political commitment across the core institutions involved in public financial management. Without coherent support from the legislature, the executive, and central fiscal authorities, digital integration and regulatory harmonisation risk remaining largely declarative, while risk-scoring tools and interagency platforms are under-utilised. Ensuring continuous investment in staff training, the development and proper use of risk-scoring models, and institutionalised interagency cooperation is therefore essential for translating the above strategic directions into sustainable improvements in preventive oversight, fiscal resilience, and economic security.

An important outcome of coordinated audit and tax control work is not only the strengthening of financial discipline but also the increase of public finance transparency, reduction of the shadow economy, improved efficiency of budget expenditures, and enhanced trust of international partners in the Ukrainian financial system.

Thus, the transition to an integrated audit and tax control model should become a key priority of state policy in financial risk management. This will establish a foundation for long-term financial resilience, enhance the state's ability to respond effectively to crises, and ensure economic security as a basis for sustainable development in Ukraine.

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