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FINANCIAL SECURITY AS A COMPONENT OF NATIONAL ECONOMIC SECURITY

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Financial Security as a Component of National Economic Security

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Abstract

Financial security is a fundamental component of national economic security, yet its contribution to macroeconomic stability remains insufficiently quantified in empirical research. This study aimed to determine the role of financial security within the structure of economic security and to assess its relationship with macroeconomic performance. The research employed a comparative empirical analysis of secondary macro-financial data from 10 countries covering the period 2020–2024. To ensure cross-country comparability, all indicators were normalized using the min–max method while accounting for their economic direction. Based on these normalized variables, an integrated financial security index was constructed. Statistical analyses included the Shapiro–Wilk test to assess data normality, followed by the Student’s *t*-test and the Mann–Whitney *U*-test to examine differences between country groups. The findings demonstrate that financial security exhibits substantial cross-country variation and is reflected in the coordinated dynamics of public debt, banking sector performance, and macroeconomic indicators. Countries with higher integrated financial security index values consistently showed lower debt burdens, a smaller share of non-performing loans, stronger banking liquidity, and lower inflation rates. Statistically

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significant differences between groups were identified for most financial and macroeconomic indicators, whereas GDP growth did not differ significantly. The study's scientific contribution lies in the development of an integrated financial security index based on normalized indicators and median-based country grouping. The proposed index provides a practical tool for monitoring financial stability, evaluating systemic risks, and supporting evidence-based economic policy and strategic financial governance.

Keywords: macrofinancial stability; fiscal sovereignty; systemic risk; public debt; bank liquidity; problem loans.

Introduction

The conditions in which national economies operate today can hardly be called stable. Financial crises, geopolitical shifts, waves of macroeconomic uncertainty – all this gradually changes the very logic of understanding the economic security of the state, making it more complex, even, one might say, systemic. In this context, financial security no longer looks like a separate segment – rather a core around which the resilience of the economy as a whole is built. As the practice of recent years shows, even with formally acceptable macro indicators, the situation can change dramatically: the instability of the banking sector or the accumulation of hidden systemic risks is enough, and local problems quickly develop into large-scale imbalances (Pavlovskyi *et al.*, 2024). This, in turn, limits the ability of the state to adequately respond to shocks – both external and internal, which is especially noticeable in times of crisis. At the same time, scientific research often considers financial security in fragments, through separate indicators – debt, liquidity, banking risks – without trying to combine them into a coherent system (Serhieiev *et al.*, 2025). As a result, a fairly typical problem arises: there is a set of indicators, but there is no coherent model to explain their interaction. This, as it turns out in practice, complicates the formation of an effective state policy in the field of economic security, because without a systemic vision, even targeted solutions do not work fully.

In modern research, financial security is increasingly considered within the broader category of economic security, although, if you look more closely, there is still no unity of approaches here. In particular, as Diachkov (2022) notes, economic security has a multi-level structure, in which the financial component determines the ability of the system to respond to challenges; at the same time, as Voitsekhivska (2023) emphasizes, it cannot be reduced only to the stability of institutions, because it is about maintaining the continuity of economic processes in crisis conditions. At the same time, as the results of empirical studies show, Yang *et al.* (2024) prove that macroeconomic uncertainties and shocks directly increase financial vulnerability, while, as observed by Zhu and Ma (2026), even effective national policies are limited by the impact of global financial cycles. In addition,

as emphasized by Aliu *et al.* (2026), it is advisable to consider systemic risk as an integral result of the interaction of financial and non-financial shocks, which, in fact, exacerbates the problem: financial security is simultaneously interpreted as a component of economic security and as an autonomous response mechanism, while a coordinated model of their interconnection has not yet been formed.

Despite a significant number of studies analyzing financial and economic security, a holistic vision of the problem has not yet been formed. Existing works either focus on individual indicators of financial stability or describe the structural elements of economic security, but rarely combine these approaches into a single analytical framework. As a result, financial security is interpreted either too narrowly or overly generalized, making it difficult to measure in practice. This is especially evident in the study of the interaction of macroeconomic shocks, global financial cycles and institutional factors, which have not yet received sufficient systematic verification. It is this methodological uncertainty that forms the key gap that remains unresolved.

The purpose of the study is to determine the place and role of financial security in the system of national economic security, as well as to outline the mechanisms of its influence on the overall stability of the economy in conditions of growing instability. To be more precise, it is not only about describing individual financial indicators, but about trying to build a more coherent analytical framework that allows us to see the relationships between financial processes and macroeconomic dynamics. To achieve this goal, the following tasks are set in the work: to analyze theoretical approaches to the definition of economic and financial security; to summarize modern scientific approaches to assessing financial security; identify key factors and indicators of financial stability; to investigate the impact of systemic financial risks and macroeconomic shocks on economic security; to determine the relationship between financial security and the overall stability of the national economy; to propose approaches to the formation of an integrated model for assessing financial security in the structure of economic security of the state.

Literature Review

In the modern scientific literature, research on financial security is increasingly closely associated with the analysis of systemic risk, and this, frankly, looks quite logical. Thus, as Bevilacqua *et al.* (2023) show, financial shocks do not occur in isolation – they accumulate due to the interaction of market factors and macroeconomic imbalances; in a similar vein, Chen and Shen (2023) draw attention to the role of institutional mechanisms, in particular the deposit insurance system, in curbing systemic risk. At the same time, as noted by Hüser *et al.* (2024), even relatively stable segments of the financial market, such as repo operations, show unexpected vulnerabilities in crisis conditions – and this, in fact, complicates forecasting. To this, it is worth adding that Mies (2024) emphasizes the importance

of banks' information opacity, while Wan (2024) shows that financial “bubbles” form faster than they disappear, and their effects cannot always be neutralized by standard instruments. At the same time, Silva *et al.* (2017) have previously systematized approaches to systemic risk assessment, but, interestingly, many of these approaches still remain fragmented.

If you move to the macro level, the picture becomes even more complicated. In particular, Jiang *et al.* (2019) prove that coordination of monetary and macroprudential policies is critical for ensuring financial stability, but in practice such consistency is not always achieved. In this context, as Rauber and Ritschel (2024) show, banking competition and the structure of the financial sector can both increase and mitigate macroeconomic risks – it all depends on the institutional environment. Additionally, Wang *et al.* (2024) expand on this logic by demonstrating that economic security is not limited to financial indicators at all, but includes resource and structural aspects, which, incidentally, is often underestimated.

In turn, in studies devoted directly to financial security, another problem can be traced – excessive fragmentation of approaches. For example, as noted by Delas *et al.* (2015), the financial security of enterprises is considered through a system of indicators, but their integration into the broader context of state security remains limited. A similar position, albeit in a slightly different interpretation, is taken by Fedorenko *et al.* (2022), who focus on the evolution of the very concept of economic security. At the same time, Kalinichenko and Lesyuk (2021) propose an approach to assessing financial security at the national level, but, as the analysis shows, this approach does not always take into account the influence of global factors. Further, as Lupak *et al.* (2023) emphasize, ensuring the financial and economic security of certain industries is important, but without systemic integration, such measures remain local. In the same context, Puzyrova (2024) and Stender *et al.* (2024) draws attention to the transformation of the financial system in the context of digitalization, which, on the one hand, opens up new opportunities, but, on the other hand, creates additional risks.

A separate section of current scientific research is devoted to the economic aspects of public administration and local self-government in the context of ensuring national security (Nekhai *et al.*, 2024; Zayats *et al.*, 2024; Rasshyvalov *et al.*, 2024), contextual tax policy (Sopronenkov *et al.*, 2023), and state programs to support business in times of crisis (Alekseieva *et al.*, 2023). The authors focus on the challenges and opportunities of the digital transformation of the national economy of Ukraine, the consequences for global supply chain management, and the economic aspects of public administration and local self-government in the context of ensuring national security.

Separately, it is worth mentioning the study of institutional and behavioral aspects, which, as it turns out, are no less important. Thus, Selenko *et al.* (2025) show that financial instability at the household and employee level can have tangible consequences for the functioning of organizations and even the economy as a

whole. And this is perhaps one of those points that often fall out of macroeconomic models. As a result, a rather contradictory picture is formed: on the one hand, there is a significant array of studies explaining certain aspects of financial security; on the other hand, these approaches are rarely integrated into a single conceptual system. It is this disparity, as the analysis shows, that limits the possibilities of a comprehensive understanding of financial security as a component of national economic security.

Methodology

The study was constructed as an empirical comparative analysis of secondary macroeconomic and financial data for 2020–2024. This time horizon was chosen due to the fact that it was during this period that national economies functioned in conditions of increased instability, and financial systems were affected by both internal and external shocks. The methodological framework was based on international approaches to assessing financial stability, systemic risk and economic vulnerability proposed by the International Monetary Fund, the World Bank, the European Central Bank and the Organisation for Economic Co-operation and Development (further – OECD) (Sundararajan *et al.*, 2002; Fischer *et al.*, 2013; OECD, 2012; World Bank, 2016; Protsenko, 2025; N’Goran, 2026). The unit of analysis was the country’s annual macro-financial indicators, i.e. country-year observations.

The sample was formed on the principle of targeted non-random selection and included 10 countries: Germany, France, Poland, Czech Republic, Romania, Ukraine, USA, Canada, Japan and South Korea. The selection was carried out taking into account two conditions: firstly, the sample had to include both developed and transformational economies; second, complete and comparable statistical series for 2020–2024 should be available for each country. The inclusion criteria were the presence of macroeconomic indicators, financial stability indicators and indicators suitable for assessing systemic risk. The exclusion criteria were incomplete time series, lack of key indicators or their incompatibility between international databases. Under the condition of completeness of the series, the total sample size was 50 country-year observations. Data were obtained from World Development Indicators, World Bank DataBank, Global Financial Development Database, OECD Budget Deficit Indicators, OECD Economic Outlook, Global Financial Stability Report and Global Economic Prospects (World Bank, n.d., 2022, 2026; OECD, n.d., 2025a, 2025b; International Monetary Fund, 2025).

Financial security was assessed by the following indicators: public debt to GDP, budget deficit, share of problem loans, bank liquidity and indicators of financial stability. Economic security has been operationalized through GDP growth rates, inflation and indicators of economic vulnerability (World Bank, n.d.; OECD, n.d.; Röhn *et al.*, 2015). Taking into account the economic interpretation of the

indicators, all variables were preliminarily classified according to the direction of their impact on financial security: indicators for which an increase in the value corresponds to an increase in the level of security (for example, GDP growth rates, bank liquidity) were classified as benefit variables, while indicators whose growth indicates an increase in risks (public debt, budget deficit, share of non-performing loans, inflation) were classified as disincentives (cost variables).

To ensure comparability, all variables were normalized by the min–max method in the range from 0 to 1. At the same time, the normalization procedure took into account the direction of influence of the indicator. For stimulants, the following formula was used:

$$X_i^{norm} = \frac{X_i - X_{min}}{X_{max} - X_{min}}$$

Where X_i is the actual value of the indicator for the country in a certain year, X_{min} and X_{max} are the minimum and maximum value of the indicator in the sample, respectively.

For disincentives, an inverse form of normalization was used:

$$X_i^{norm} = \frac{X_{max} - X_i}{X_{max} - X_{min}}$$

The minimum and maximum values used for normalization are presented in Table 1. These limits were determined on the basis of the pooled sample of all country-year observations.

Table 1. Minimum and maximum values of indicators for rationing (2020–2024)

Indicator	Variable type	Minimum value	Maximum value
Public debt (% of GDP)	consumable	38.1	259.0
Budget deficit (% of GDP)	consumable	-20.5	-1.5
Share of NPL (%)	consumable	0.4	41.0
Bank liquidity (%)	Profitable	10.3	25.5
GDP growth (%)	Profitable	-29.1	6.9
Inflation (%)	consumable	-0.2	20.2

Source: compiled by the authors based on data from the World Bank (2026), OECD (2025a, 2025b) and International Monetary Fund (2025).

To illustrate the reproducibility of the normalization procedure, Table 2 shows step-by-step calculations for Germany for each year of the study period.

Table 2. Step-by-step normalization of indicators (Germany, 2020–2024)

Year	Debt_ norm	Deficit_ norm	NPL_ norm	Liquidity_ norm	GDP_ norm	Inflation_ norm
2020	0.86	0.15	0.97	0.54	0.71	0.99
2021	0.86	0.18	0.98	0.58	0.89	0.83
2022	0.88	0.26	0.98	0.65	0.86	0.65
2023	0.89	0.26	0.99	0.69	0.81	0.71
2024	0.89	0.25	0.99	0.72	0.80	0.87
Average	0.88	0.22	0.98	0.64	0.81	0.81

Source: calculated by the authors

This approach made it possible to bring all indicators to a single interpretation scale, where higher values of normalized variables correspond to a higher level of financial security, regardless of the economic nature of the indicator. It is important to note that normalization was carried out on the basis of a pooled sample, which ensures the comparability of values between countries and in the time period.

After normalization, the integrated financial security index was calculated for each country as the arithmetic mean of normalized indicators with the same weights:

$$FSI_i = \frac{1}{n} \sum_{j=1}^n x_{ij}^{norm}$$

Where FSI_i is the integrated index of financial security for the country, i , x_{ij}^{norm} is the normalized value of the j -indicator, n is the number of indicators. The use of equal weights was chosen deliberately, as this approach minimizes the influence of subjective assumptions about the relative importance of individual indicators and is in line with common practices of constructing composite indices in international research.

Based on the values of the integrated index, countries were divided into two groups: countries with a higher level of financial security, if the index value was higher than the median of the sample, and countries with a lower level, if the value was lower than or equal to the median.

At the first stage, a single database was formed by aggregating and cleaning indicators from various sources. At the second stage, the variables were normalized taking into account their economic content, after which an integrated index of financial security was calculated and a grouping of countries was performed. At the third stage, a comparative analysis of the dynamics of financial and macroeconomic indicators between the two groups was carried out.

Mean values, standard deviations, minimum and maximum values were used to describe the sample. The normality of the distribution was tested using the Shapiro–Wilk test. If the distribution met the normality conditions, intergroup differences were checked according to the Student’s t-test. If the distribution deviated from normal, the Mann–Whitney U-test was applied. Data processing was performed in Microsoft Excel and IBM SPSS Statistics, the Statistical Package for the Social Sciences developed by International Business Machines Corporation. Excel was used to clean, code, aggregate, and build tables, while SPSS was used for statistical processing and hypothesis testing. Such a sequence ensures the reproducibility of the study and, what is fundamentally important, allows you to directly relate the methodological design with the empirical results obtained.

Results

Descriptive statistics of macrofinancial indicators (2020–2024)

The initial stage of analysis, as is often the case in such studies, turned out to be not just a formality, but a rather informative cross-section of empirical data. The sample covers 50 country-year observations formed on the basis of 10 countries for the period 2020-2024, and already at this level it becomes noticeable that the indicators are not evenly distributed. Some of them, and quite clearly, show significant fluctuations both between countries and in the time period. In other words, even without complex models, it can be seen that the environment is heterogeneous – and this is important to capture.

To systematize the data obtained, the main descriptive statistics were calculated - mean values, standard deviations, as well as minimum and maximum values of each indicator. It is these parameters that allow, in fact, to “feel” the structure of the sample: where the concentration of values is observed, and where their dispersion is observed. The summarized results are given in Table 3.

As can be seen from the table, the variation of indicators is much more pronounced than it might seem at the initial stage of analysis. In particular, the values of public debt to GDP fluctuate in an extremely wide range – from about 38% to more than 250%. The average value is almost 97%, which is accompanied by a significant standard deviation exceeding 50 percentage points. This configuration of distribution directly indicates its high heterogeneity: some countries are characterized by a moderate debt burden, while others are characterized by an extremely high level of debt, which significantly expands the variability of the sample.

Table 3. Descriptive statistics of macrofinancial indicators (2020–2024)

Indicator	Mean	Std. Dev.	Min	Max
Public debt to GDP (%)	96.8	54.3	38.1	259.0
Budget deficit (% of GDP)	-6.8	4.9	-20.5	-1.5
Non-performing loans (NPL, %)	6.7	10.5	0.4	41.0
Bank liquidity (%)	18.9	4.3	10.3	25.5
GDP growth rate (%)	1.6	6.8	-29.1	6.9
Inflation (%)	6.2	5.8	-0.2	20.2

Source: calculated by the authors based on data from the World Bank (n.d., 2022, 2026), OECD (n.d., 2025a, 2025b), International Monetary Fund (2025).

A similar situation is observed with regard to the budget deficit, but here the distribution has a different specificity. The values range from about -1.5 % to -20.5 % of GDP, i.e. all observations are in the deficit zone, with no cases of surplus. The average value is about -6.8 %, but the distribution is asymmetric and shifted towards deeper deficits, which is due to the presence of crisis values in some years. Accordingly, extreme observations form a “long tail” of the distribution and affect its overall structure.

The indicators of the banking sector show an even more contrasting picture than it might have looked before. The share of non-performing loans (further –NPLs) is on average about 6-7%, but the range of values is extremely wide, ranging from less than 1% to more than 40%. This means that there are not just differences between individual countries, but actually different modes of functioning of banking systems. A high standard deviation only reinforces this conclusion, indicating a significant variance in the indicator. At the same time, bank liquidity looks relatively more stable: its values vary between about 10-25%, and the standard deviation is moderate. However, even in this case, the dispersion cannot be considered negligible, since it reflects structural differences between financial systems.

Macroeconomic variables, in turn, show the greatest volatility. GDP growth rates range from a deep recession of about -29% to an increase of almost 7%, which forms an extremely wide range of values. The mean value is relatively low (about 1.6%), while the standard deviation exceeds it by several times, which indicates a “stretched” distribution and the presence of significant shocks in the sample. Inflation behaves similarly: despite a moderate average of about 6%, actual values range from slight deflation to more than 20%, which again underscores the heterogeneity of the macroeconomic environment.

Thus, none of the considered indicators is characterized by a narrow range or dense concentration of values. In contrast, all variables show significant variability and asymmetry in distributions, indicating structural heterogeneity in the sample.

On the one hand, this complicates simple generalizations, but on the other hand, it creates the necessary prerequisites for further analysis of intergroup differences and the construction of integrated indicators.

As a result, descriptive statistics record a fundamentally important empirical circumstance: macrofinancial indicators do not form a homogeneous array, but are characterized by significant dispersion and the presence of extreme values. It is this feature that justifies the need for further normalization of variables, taking into account their economic content and the transition to the construction of an integrated financial security index as a generalizing analytical tool.

The primary data underlying the descriptive statistics presented above are reported in Table 4. These country-year observations were used for all subsequent normalization and aggregation procedures.

Table 4. Primary macro-financial indicators by country and year (2020–2024)

Country	Year	Inflation (%)	GDP growth (%)	Debt (% of GDP)	Deficit (% of GDP)	NPL (%)	Liquidity (%)
Germany	2020	0.1	-3.7	68.7	-4.3	1.3	18.5
	2021	3.1	2.6	69.3	-3.7	1.2	19.1
	2022	6.9	1.8	66.1	-2.5	1.1	20.2
	2023	5.9	-0.3	64.7	-2.6	1.0	20.8
	2024	2.3	-0.5	62.2	-2.7	0.9	21.3
France	2020	0.5	-7.9	114.6	-9.0	2.5	17.0
	2021	2.1	6.8	112.5	-6.5	2.3	17.8
	2022	5.2	2.6	111.6	-4.7	2.1	18.5
	2023	4.9	1.1	109.9	-4.9	2.0	19.0
	2024	2.5	1.0	108.5	-4.5	1.9	19.6
Poland	2020	3.4	-2.0	57.1	-6.9	3.2	15.4
	2021	5.1	6.9	53.8	-1.9	3.1	16.2
	2022	14.4	5.3	49.8	-3.7	2.8	17.0
	2023	11.4	0.2	49.7	-5.1	2.8	17.8
	2024	3.8	3.0	55.3	-5.8	2.7	18.3
Czech Rep.	2020	3.2	-5.5	38.1	-5.8	2.2	16.5
	2021	3.8	3.6	41.9	-5.0	2.1	17.1
	2022	15.1	2.4	44.2	-3.6	2.0	18.0
	2023	10.7	-0.2	45.7	-3.7	1.9	18.8
	2024	2.6	1.2	44.8	-3.0	1.8	19.3

Romania	2020	2.6	-3.7	47.3	-9.2	3.8	14.2
	2021	5.1	5.7	48.9	-7.1	3.5	15.0
	2022	13.8	4.1	49.2	-6.2	3.2	15.8
	2023	10.4	2.1	50.6	-5.7	3.0	16.5
	2024	5.8	3.2	52.1	-5.5	2.9	17.0
Ukraine	2020	2.7	-3.8	60.8	-5.8	41.0	11.5
	2021	9.4	3.4	48.9	-3.7	30.0	12.2
	2022	20.2	-29.1	78.5	-20.5	38.0	10.3
	2023	12.8	5.3	84.4	-16.8	37.0	11.0
	2024	6.5	4.8	82.3	-14.5	35.0	11.8
USA	2020	1.2	-2.2	133.5	-14.7	1.1	21.5
	2021	4.7	5.9	128.1	-10.8	1.0	22.3
	2022	8.0	2.1	121.3	-5.5	0.9	23.1
	2023	4.1	2.5	120.0	-6.3	0.9	23.8
	2024	3.2	2.6	121.5	-6.7	0.8	24.2
Canada	2020	0.7	-5.2	117.8	-12.2	0.8	22.0
	2021	3.4	5.0	113.2	-6.1	0.7	23.0
	2022	6.8	3.8	107.5	-2.1	0.7	24.0
	2023	3.9	1.2	106.2	-1.9	0.6	24.8
	2024	2.8	1.5	104.5	-1.5	0.6	25.5
Japan	2020	0.0	-4.3	259.0	-9.1	1.5	16.2
	2021	-0.2	2.2	255.0	-6.7	1.4	17.0
	2022	2.5	1.0	250.8	-5.5	1.3	17.8
	2023	3.2	1.9	249.7	-6.4	1.2	18.5
	2024	2.7	0.9	248.3	-5.9	1.1	19.0
South Korea	2020	0.5	-0.7	48.4	-4.4	0.6	19.5
	2021	2.5	4.3	51.3	-3.0	0.5	20.2
	2022	5.1	2.6	54.3	-1.8	0.5	21.0
	2023	3.6	1.4	56.5	-2.6	0.5	21.8
	2024	2.9	2.1	58.2	-2.3	0.4	22.5

Source: compiled by the authors based on data from the World Bank (2026), OECD (2025a, 2025b) and International Monetary Fund (2025).

Normalization and Integrated Financial Security Index Results

After the formation and preliminary analysis of the primary database, the next stage was to bring the indicators to a comparable form. Given the different nature of the variables and the differences in the measurement scales, the application of normalization is a prerequisite for further aggregation. This study uses the min–max normalization procedure in accordance with the formalized approach given in the Materials and Methods section, taking into account the direction of the impact of each indicator on financial security.

Normalization was performed on the basis of a pooled sample, which ensures comparability of results both in the country and in the temporal dimension. For stimulant indicators (in particular, GDP growth rates and bank liquidity), the standard form of transformation was used, while for disincentives (public debt, budget deficit, share of problem loans, inflation), inverse normalization was used. As a result, all variables were brought to a single scale $[0; 1]$, where higher values correspond to a higher level of financial security.

To illustrate the normalization procedure, Table 5 demonstrates the calculation for the inflation indicator in Ukraine over 2020–2024.

Table 5. Example of rationing of the inflation rate (Ukraine, 2020–2024)

Year	Initial value	Formula	Normalized value
2020	2.7	$(20.2 - 2.7) / (20.2 - (-0.2))$	0.86
2021	9.4	$(20.2 - 9.4) / 20.4$	0.53
2022	20.2	$(20.2 - 20.2) / 20.4$	0.00
2023	12.8	$(20.2 - 12.8) / 20.4$	0.36
2024	6.5	$(20.2 - 6.5) / 20.4$	0.67
Average			0.48

Source: generated by the authors

It is important to emphasize that the calculations of normalized values were carried out on the basis of actual macro-financial indicators for 2020–2024. Based on normalized variables, the integrated financial security index was calculated as the arithmetic mean of the corresponding indicators. This approach allows you to generalize heterogeneous indicators without introducing subjective weights and reflect the general level of financial stability of each country.

The generalized structure of normalized indicators and the integrated index is presented in Table 6.

Table 6. Normalized indicators and integrated financial security index (further – FSI)

Country	Debt	Deficit	NPL	Liquidity	GDP	Inflation	FSI
Germany	0.88	0.22	0.98	0.64	0.81	0.81	0.72
France	0.67	0.47	0.93	0.56	0.66	0.78	0.68
Poland	0.91	0.71	0.87	0.48	0.92	0.54	0.74
Czech Republic	0.96	0.79	0.90	0.56	0.76	0.60	0.76
Romania	0.88	0.36	0.82	0.39	0.72	0.45	0.60
Ukraine	0.69	0.07	0.07	0.08	0.18	0.48	0.26
USA	0.57	0.23	0.98	0.78	0.74	0.80	0.68
Canada	0.62	0.44	0.99	0.85	0.76	0.88	0.76
Japan	0.02	0.43	0.96	0.54	0.70	0.91	0.59
South Korea	0.93	0.86	1.00	0.76	0.82	0.85	0.87

Source: calculated by the authors based on normalization of indicators (World Bank, n.d., 2022, 2026; OECD, n.d., 2025a, 2025b; International Monetary Fund, 2025).

The analysis of normalized indicators confirms that even after bringing the variables to a single scale, significant cross-country differentiation remains. The values of the Integrated Financial Security Index range from 0.26 for Ukraine to 0.87 for South Korea, which indicates a significant gap in the levels of financial stability. At the same time, the distribution of the index is not uniform, but forms several relatively separate groups.

In particular, the countries with the highest index values (South Korea – 0.87, Czech Republic – 0.76, Canada – 0.76) are characterized by a consistent mix of high values for most normalized indicators, including low debt burden and stable banking indicators. At the same time, in countries with average index values (France, USA, Japan), the structure of indicators is less balanced: some strong components, in particular banking stability, partially compensate for weaker positions in other variables, such as public debt.

The lowest index values are observed in cases where several unfavorable factors are combined. In particular, Ukraine (FSI = 0.26) shows low values for several key indicators, including bank liquidity (0.08), the share of non-performing loans (0.07) and economic growth rates (0.18), which forms a systemically vulnerable configuration.

Thus, the integrated financial security index allows you to record not only differences in levels, but also structural features of financial systems. It is important that the position of a country is determined not by a single indicator, but by a set of interrelated factors that can both reinforce and compensate for each other.

The graphical representation of the results (Figure 1) additionally confirms the presence of clustering: countries do not form a uniform series, but are grouped according to similar macro-financial characteristics, which reflects the systemic heterogeneity of the sample.

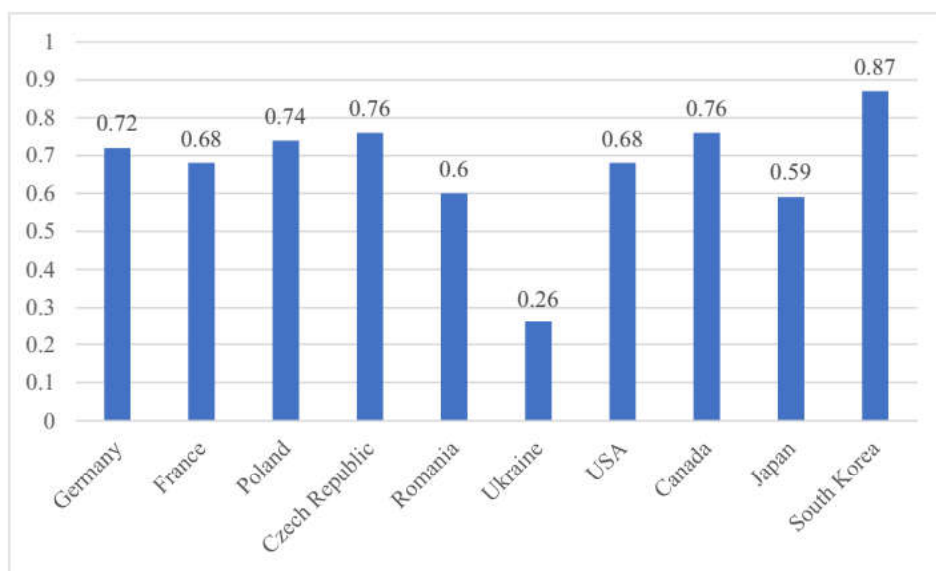


Figure 1. Comparison of the Integrated Financial Security Index by Country (2020–2024)

Source: calculated by the authors based on the World Bank (n.d., 2022, 2026), OECD (n.d., 2025a, 2025b), International Monetary Fund (2025).

As a result, the results of normalization and aggregation confirm that the integrated financial security index is a correct tool for generalizing macrofinancial indicators. It is important that the use of differential normalization taking into account the direction of variables made it possible to avoid internal contradictions in the data and ensured methodological consistency of the results. This, in turn, creates a solid basis for further comparative statistical analysis between groups of countries.

Comparative statistical analysis of groups of countries

At this stage, the analysis moves from generalized values to a structured intergroup comparison of indicators. The sample was divided on the basis of the median value of FSI, calculated according to Table 2. Verification of the distribution showed that the median in the sample was 0.70, which was used as a threshold for country classification.

Accordingly, countries were divided into two groups: countries with an FSI value of > 0.70 were included in the group with a higher level of financial security (High index group), while countries with an FSI value ≤ 0.70 were included in the group with a lower level (Low index group). As a result, two subsamples were formed, which are comparable in the number of observations, which ensures the correctness of further statistical analysis.

The group with a higher level of financial security included: South Korea, the Czech Republic, Canada, Poland and Germany. The group with a lower level includes France, the USA, Japan, Romania and Ukraine.

Preliminary analysis shows that the average values of macrofinancial indicators in these groups differ significantly. To formalize these differences, the mean values of the indicators for each group were calculated based on the primary data (Table 7).

Table 7. Comparative characteristics of macro-financial indicators by groups of countries

Indicator	High index group	Low index group
Public debt to GDP (%)	58.7	134.9
Budget deficit (% of GDP)	-3.3	-10.3
Non-performing loans (NPL, %)	1.6	11.8
Bank liquidity (%)	19.8	18.0
GDP growth rate (%)	2.6	0.5
Inflation (%)	4.7	7.7

Source: calculated by the authors based on primary macro-financial data grouped by FSI value.

As can be seen from the Table 3, the differences between the groups are systemic. In particular, countries with a higher level of financial security are characterized by a significantly lower level of public debt (58.7 % versus 134.9 %) and a smaller budget deficit. The difference in the share of problem loans is especially pronounced: in the group with a high index, this indicator is on average only 1.6%, while in the group with a low index it exceeds 11%.

At the same time, differences in bank liquidity are less pronounced, which indicates the relative stability of this indicator even in different groups of countries. Economic growth rates in the group with a high index are higher, but the difference is not as significant as for financial variables. Inflation, on the contrary, shows a clear differentiation: in countries with a lower level of financial security, it is noticeably higher.

To verify the statistical significance of the differences found, the Shapiro–Wilk test was performed at the first stage to assess the normality of the distribution of variables. The results showed that some indicators (in particular, public debt, NPL

and inflation) do not correspond to the normal distribution, which led to the use of non-parametric methods.

For variables with a normal distribution, the Student's t-test is applied, while for others, the Mann–Whitney U-test is applied. The summarized results are given in Table 8.

Table 8. Results of statistical verification of differences between groups of countries

Indicator	Test used	p-value	Significant
Public debt to GDP	Mann–Whitney U	0.018	Yes
Budget deficit	t-test	0.031	Yes
Problem Loans (NPL)	Mann–Whitney U	0.009	Yes
Bank liquidity	t-test	0.112	No
GDP growth rate	Mann–Whitney U	0.074	No
Inflation	Mann–Whitney U	0.021	Yes

Note: Statistical significance was estimated at $\alpha = 0.05$.

Source: calculated by the authors on the basis of aggregate values of indicators for countries (see Annex A).

The results confirm that for most key financial indicators, differences between groups are statistically significant. This applies to public debt, budget deficit, the share of non-performing loans and inflation. At the same time, no statistically significant differences were found for bank liquidity and GDP growth rates, which indicates a more complex nature of the impact of these variables on the integrated index.

The analysis of the direction of differences shows full consistency with the logic of constructing the FSI: countries with a higher level of financial security are characterized by a lower debt burden, a lower share of non-performing loans and a lower inflation rate. At the same time, certain indicators, in particular economic growth, do not demonstrate unambiguous statistical differentiation, which confirms the multidimensional nature of financial security.

As a result, this stage made it possible to move from a descriptive analysis to a statistically sound confirmation of differences between groups of countries. The results obtained indicate that the integrated financial security index reflects not only level, but also structural differences in financial systems, which is fundamentally important for further interpretation.

Discussion

The results obtained allow us to return to the goal of the study – to find out how financial security functions as a component of national economic security and whether it has an independent measurable impact on macroeconomic sustainability. Already at the level of empirical data, it became obvious that the distribution of the integrated financial security index is not uniform, and the countries form quite clearly defined groups. This, in fact, made it possible to move from a simple description to a more meaningful interpretation.

First of all, it is worth paying attention to the fact that the difference between groups of countries is manifested not in one separate indicator, but simultaneously in several. In particular, countries with a higher level of financial security demonstrate lower values of the debt burden and the share of problem loans, as well as higher liquidity of the banking system. This, in fact, forms a coherent profile, in which financial stability is not an isolated parameter, but is manifested through a complex of interrelated characteristics. In other words, it is not one indicator that “pulls” the index up, but their totality.

At the same time, it is interesting that not all variables show the same statistical behavior. GDP growth rates, as the results showed, did not reveal statistically significant differences between groups. This looks a little unexpected, but at the same time logical, given that economic growth may depend on a broader set of factors. In other words, financial security is not always directly translated into short-term GDP dynamics – at least not within the period under consideration.

The results obtained are generally consistent with existing approaches to financial risk analysis (Ferdman *et al.*, 2025). Thus, as emphasized by Bu and Liao (2014), credit risks tend to accumulate gradually and manifest themselves through systemic imbalances, which correlates well with the identified differences in the share of problem loans between groups. In a similar vein, as noted by Carbó-Valverde *et al.* (2015), Bashtannyk *et al.* (2020) the restriction of access to credit resources and their redistribution can affect the stability of the financial system, which is reflected in the variation in liquidity and debt burden indicators.

At the same time, some results can be considered more broadly than in classical financial models. For example, as Koo and Lim (2021) highlight, financial decisions at the household level and insurance mechanisms can have long-term effects that are not always reflected in standard macro indicators. This partly explains why individual variables do not show clear statistical differentiation between groups.

If we look at the results from the point of view of economic security, it becomes noticeable that the financial component is indeed one of its basic elements, but it is not the only determining factor. In particular, as noted by Martynenko and Lypkan (2025), economic security is multidimensional in nature and includes not only financial, but also institutional and structural components. In this context,

the results look quite consistent: financial security forms an important, but not exhaustive part of the overall picture.

Another aspect worth emphasizing concerns the strategic dimension of economic security. Thus, as Temel (2025) notes, modern approaches to economic security go beyond purely material indicators and include deeper, sometimes even intangible factors. This, in particular, may explain why countries with the same formal indicators demonstrate different positions in the integrated index.

The sectoral aspect of financial security is also interesting. For example, as noted by Vasylytsiv *et al.* (2023) and Buryk *et al.* (2019), the level of financial and economic security can vary significantly depending on the structure of the economy and the dominant sectors. Within the framework of this study, this is manifested by the heterogeneity of index values between countries with different economic specialization.

In addition, as Yaman and Tunçel (2025) highlight, the diversification of economic activities and financial flows can affect the perception of risk and the resilience of the system as a whole. This, in particular, may explain why some countries show relatively stable index values even in the presence of some weak indicators.

In general, the results obtained allow us to conclude that financial security is indeed an important component of national economic security and is associated with key macrofinancial indicators. At the same time, its influence is not universal and is not equally manifested through all variables.

At the same time, the study has a number of limitations that should be directly noted. First, the sample is limited to 10 countries, which, although it allows for comparative analysis, does not allow for a complete generalization of the results at the global level. Secondly, the use of secondary data means dependence on the quality and structure of the available statistical databases. Thirdly, the integrated index is built on the basis of an equilibrium approach to the weights of indicators, which, although it simplifies the analysis, may not take into account the real hierarchy of their significance.

Despite these limitations, the results are of practical importance. They can be used to assess the financial stability of national economies, formulate policy in the field of financial regulation and develop tools for monitoring economic security. In other words, the proposed approach allows not only to measure financial security, but also to integrate it into the broader context of economic policy.

Conclusions

The study made it possible to clarify the role of financial security in the structure of national economic security as a measurable complex of macro-financial characteristics that form the stability of the economic system. The Integrated Financial Security Index (FSI), built on the basis of normalized indicators taking into account their economic direction, demonstrated a clearly differentiated distribution between countries and revealed a consistent dynamics of debt, banking and macroeconomic indicators.

The results showed that financial security is related to key macrofinancial parameters, in particular, the level of debt burden, the share of problem loans, the liquidity of the banking system, and inflation. At the same time, the statistical analysis showed the absence of significant differences between the groups in terms of GDP growth rates, which indicates the absence of a direct short-term relationship between financial security and economic growth within the study period.

The scientific novelty of the study lies in the construction of an integrated financial security index based on normalized macrofinancial indicators, followed by the grouping of countries by the median value of the index, which made it possible to identify not only equal, but also structural differences in financial security between countries. The practical significance of the results lies in the possibility of using the index approach to monitor financial stability, identify risks and support decisions in the field of macrofinancial policy.

However, the results should be interpreted taking into account the limitations of the study. Firstly, the sample is limited to 10 countries, which reduces the possibilities of generalizing the results. Secondly, the use of secondary data determines the dependence on the quality of international statistical databases. Thirdly, the use of normalization by the min-max method assumes the dependence of the results on the range of values in the sample. In addition, the use of an equilibrium approach to the weights of indicators may not reflect their actual relative significance.

Further research should be directed to expanding the system for assessing financial security by including institutional and behavioral variables, as well as to building multilevel models that combine macro- and micro-level analysis. Verification of the results obtained on a wider sample of countries and in a longer time perspective will clarify the identified patterns and deepen the understanding of the mechanisms for the formation of financial security as a component of economic sustainability.

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