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## GEO-ECONOMIC EVOLUTION IN FINANCIAL AND CREDIT POLICIES OF UKRAINE'S AGRI-FOOD INDUSTRY

### Summary

**Background.** The financial and credit policies of Ukraine's agri-food sector are crucial for its stability and growth, particularly within the changing geo-economic context. Understanding these changes and their impacts is essential for developing effective measures to support the sector.

**Results and conclusions.** The article investigates effective measures for developing the financial and credit policies of Ukraine's agri-food sector within the geo-economic context. It discusses the directions of geo-economic changes affecting these policies. The article shows a global development vector of financialization in geo-economics that alters the models of financial and credit flow balances. The geo-financial approach is introduced and an export structure of agri-food products between Ukraine and the EU is thoroughly analyzed. The geographical structure of Ukraine's geo-financial system is examined. The impact of currency risks on grain exports for the average agri-food entity in Ukraine is assessed. The article identifies dynamic inflation rate fluctuations affecting monetary tools and financial and credit policies of the agri-food industry in EU countries. It evaluates the extent of lending to agri-food business entities. The article specifies the institutional structure of geo-finance operations and the conditions that determine the flow of financial resources from global financial institutions to support new financial cycles in a country at war.

**Keywords:** geo-financial systems, financial and credit strategies, agri-food sector, bank financing, funding grants

### Introduction

The agri-food sector is a part of agriculture and food value chain activities that encompass all economic activities involved in the production, processing, distribution,

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marketing and consumption of food and agricultural products. The full functioning of the agri-food sector depends on various factors. Currently, in Ukraine, there are hypertrophied disparities in the banking sector, the supply of credit resources from financial institutions is significantly reduced, and the recession of financial and credit support of the agri-food industry is accelerated. Drastic uncontrolled fluctuation of the exchange rate increased the cost of raw materials in the production sphere, reduced cash receipts of various levels and suspended the capitalization of financial resources of the agri-food industry. During martial law, the infrastructure of Ukraine's agri-food sector was significantly damaged and experienced the loss of human capital and the spread of production disparities. The situational nature of this trend complicated the activity of the agri-food industry and negatively affected the volume of its tax revenues to the budgets of different levels of Ukraine.

Such a situation poses new challenges and threats to the agri-food sector in Ukraine. The government of the country should develop and implement new strategies for the financial and credit policy in the agri-food sector to increase the volume of cash receipts and the income of local budgets of territorial communities and the state budget. The effectiveness of these financial and credit strategies is directly determined by the resource base and the diversified structure of the formation of its sources. The proper functioning of the production sphere of the agri-food sector can satisfy the state's requirements and is a priority task at the stage of rapid geo-economic changes in Ukraine. Simultaneously, the stability and efficiency of the nation's financial instruments will be determined by the movement of financial flows from global financial institutions to the post-war restoration of economic ties in the agri-food industry. However, the obligatory condition is the increase in financial support for the agri-food sector and the demand for agricultural production. The financial development of the agri-food industry can be restored through the channels of the monetary transmission mechanism. However, inadequate financial and credit regulations in the state often hamper its financial progress.

It is almost impossible to separate the development of financial and credit policy and monetary policy in the agri-food sector of the economy. Many scientists and practitioners prove they have a powerful distributional influence on the formation of tax revenues to the budget and loans for business entities, regardless of the group of banking institutions and the size of investment funds to the industry [2]. The operation of the monetary transmission mechanism in Ukraine was under inflation targeting before the commencement of martial law. This is evidenced by the strong correlation between the NBU discount rate and the amount of loans extended to entities in the agri-food industry in the national currency [9]. The easing of the central bank's financial and credit policy instruments proved effective in fostering the development of financial market participants [3]. Therefore, there was a logical reduction in the supply of avai-

lable resources from banking institutions for the agri-food industries at the beginning of the armed conflict. The reason for this trend was an increase in the NBU discount rate and a notable rise in the credit risk of borrowers [10]. This showed the necessity of adjusting the NBU policy to promote lending to Ukraine's agri-food industry.

This article aims to determine the directions of geo-economic changes in shaping the financial and credit policy for Ukraine's agri-food sector that can help suspend the monetary, banking and budget recession and restore economic relations with the EU and the global community during martial law.

### Materials and Methods

The internationalization of the geo-economic system through the monetary, banking and budget components has entered the final phase. It reflects the main trend in the evolution of financial and credit policies in the agri-food industry within the contemporary global context [15]. Based on the system of national accounts (SNA), it is possible to reduce all geo-economic transformations in shaping the financial and credit policy of the agri-food sector to four interrelated institutional sectors: private, budgetary, monetary and foreign economic [12, 45].

The private sector within the framework of the country's financial and credit policy provides savings from the production sphere of the agri-food industry in both domestic and international markets. It reflects the cyclical demand for monetary resources in the national currency. In the case of unsatisfied needs, the private sector reflects the demand for resources of foreign financial institutions. The expression in parentheses on the left-hand side of the formula is nothing but domestic savings of the agri-food industry ( $S'$ ) and investment ( $I'$ ). The right-hand side of the formula represents the net export of the agri-food industry ( $NX'$ ) [48]:

$$S'd - I'd = NX' \quad (1)$$

Therefore, accumulations for the financing of the agri-food industry can be closely related to the external activities of entities representing this sector. The budget sector in the financial and credit policy of the country forms tax revenues to budgets of all levels ( $T$ ) and reflects part of the aggregated demand for budget financing of the agri-food industry, which is represented by the formula (2), [48]:

$$G = C''d + C''a + I''d + I''\alpha \quad (2)$$

where:  $G$  – budget expenditures for financing the agri-food industry;  $C''d$  – the volume of financial resources for targeted use under programs of state financial support of the agri-food industry;  $C''a$  – the amount of state expenditures on the consumption of foreign financial aid by subjects of the agri-food industry;  $I''d$  – the amount of budget investment at the national level for the restoration of agri-food production;  $I''\alpha$  – the

volume of budgetary investment expenditures on foreign resources consumed by national producers of the agri-food industry.

The difference between budget receipts and budget expenditures constitutes the budget surplus (savings) ( $BS$ ) [48]:

$$BS = I - G \quad (3)$$

The monetary sector ensures cooperation between the country and international financial institutions; they direct financial flows into the budget and banking system during times of war or crisis to support agri-food production at certain interest rates to be used by banking institutions at the national level. As a result, there are liquid requirements for budgetary institutions and for this country, where national and foreign subjects of the agri-food industry operate. They form assets, which later, at the request of global financial institutions, must ensure a rhythmic cycle of the outflow of financial resources from the country. Along with this, there are obligations of national banking institutions to the private sector of agri-food production and budgetary institutions, and their totality represents the entire monetary mass of the country [7, 41].

Based on the conditions of the equilibrium state of the monetary sector serving the agri-food industry, mutual repayment of requirements and obligations is formed according to the following formula:

$$M = NFA + NDA \quad (4)$$

where:  $M$  – liabilities (money supply);  $NFA$  – net foreign assets;  $NDA$  – net internal assets.

Net foreign assets of the monetary sector for both the National Bank and banking institutions under its control represent the country's net international reserves ( $R$ ). They are the main source of financing the deficit of funds of the private (agri-food) and budget sectors. Another source is the net export of capital ( $KA$ ), which is a source of financing the deficit of funds within the domestic financial and credit policies.

$$KA = K_{ex} - K_{im} \quad (5)$$

The need for the inflow of capital is defined as the inverse variable to the official reserve budget assets in the state ( $\Delta R$ ). Capital increases when the budgetary investment expenditures exceed the cash savings of subjects of the agri-food industry.

$$KA - \Delta R = (I - S) + (G - T) \quad (6)$$

The external economic direction of the financial and credit policy in the agri-food sector arises as a result of the interaction of the national sector with partner countries at the European and world levels. This interaction is a geo-financial system that can be formalized as follows:

$$NX = (S - I) + (T - G) \quad (7)$$

This formula and formula (6) reflect the movement of financial and credit flows in the opposite direction.

$$KA - \Delta R = -NX \quad (8)$$

This indicates that when the net export of monetary savings of subjects in the agri-food industry is negative, there is an inflow of foreign investments and financial loans from global financial institutions within the EU and beyond into the country. An equilibrium is reached that supports the developed hypothesis that financialization in the geo-economy follows a global development trend. This trend reshapes the models of overall financial and credit flow balances between two countries, impacting the global and national economies.

A system of algebraic equations is used to determine the balance of agri-food entities' savings, the interest rate and the balance of financial and credit payments for both states.

$$\text{Line (y) of equilibria in national markets} \quad \left\{ \begin{array}{l} \text{Investment market (IS)} \quad S(r, y) + I(r) + IM'(y') \\ \text{Financial and credit market (LM)} \quad \bar{P}L(r, y) = D + R \end{array} \right\} \quad (9)$$

$$\text{Line (y) of equilibria in world markets} \quad \left\{ \begin{array}{l} \text{Investment market (IS')} \quad S'(r', y') + I(r) + IM'(y') \\ \text{Financial and credit market (LM')} \quad P'L'(r', y') = D' + R' \end{array} \right\} \quad (10)$$

$$\text{Balance of financial and credit payments} \quad \left\{ \begin{array}{l} BP = \Delta R = -\Delta R' \text{ or} \\ (BP, B'P') = IM'(y') - IM(y) + KA(r, r'), [= 0] \end{array} \right\} \quad (11)$$

where:  $S$  – agri-food entities' savings;  $I$  – national investments;  $IM$  – import for foreign investments;  $PL$  – demand for financial resources (capital);  $D$  – offer of financial resources at the expense of internal loans;  $R$  – international reserves of partner countries (capital);  $\Delta R$  – changes in international reserves of partner countries (capital);  $KA$  – balance of financial and credit flows (capital);  $r$  – interest rate (banking factor);  $*'$  – designation of indicators of the partner country (market participants).

In the open geo-financial system, geo-economic changes that shape the financial and credit policy of a state's agri-food sector are facilitated by localizing global financial institutions from partner countries (market participants). These institutions regulate bank lending interest rates using the tariff method, thus fostering the global development of new economic ties with the EU and the rest of the world [24].

The geo-financial approach allows for the assessment of how the banking sector impacts financial and credit policies in a country's agri-food sector. This is crucial because the banking sector serves as a key determinant of financial stability for banking institutions. It helps them avoid significant strategic errors in the financial and credit systems of agri-food industry entities when shaping a new foreign economic paradigm and their financial security strategy [26].

The financial and credit system (FCS) of subjects of the agri-food industry may experience a prolonged recession if it remains within the limits of the trade and media-

tion doctrine. In other words, the national FCS loses its dominant redistributive function in the reproductive process of the financial cycle, spending resources through foreign trade. At the same time, a larger share of capitalized financial resources goes to international financial institutions. Therefore, according to national legislative requirements, banking institutions should form reserves for assets and financial liabilities [53].

Banking institutions use formed reserves for assets only when assets are assigned to the lowest (unreliable) quality category. Reserves are used by banking institutions under provided guarantees, mandates, letters of credit and acceptances if it is necessary to fulfill their financial obligations. According to the International Monetary Fund (IMF), the assessment of the financial stability of banking institutions is formed by maturity, and in the monetary sector it is grouped by indicators [22, 27]. Thus, the “Capital Adequacy” group includes indicators that determine the stability of banks in relation to sudden changes in the structure of their balance sheets. The most common measures of capital adequacy are total risk-adjusted capital ratios (defined as the ratio of regulatory capital to risk-weighted assets) [21, 36].

According to the group of indicators “Quality of assets”, there may be risks of solvency of banking institutions, caused by a decrease in the quality of assets. This provokes deterioration in financial health and a decrease in profitability of entities of the agri-food industry. The ratio of non-performing loans to total gross loans and advances is often used as a proxy for asset quality. The coverage ratio is the ratio of created reserves to non-performing loans; it indicates the share of bad loans for which reserves have already been made [21, 37].

In addition, insufficient diversification of the credit portfolio of banking institutions indicates the significant vulnerability of the country’s financial and credit system. It has an adversarial effect on lending to small and medium-sized business structures of the agri-food industry. The concentration of loans in the agri-food industry or its affiliated business structures during a crisis (such as wartime) increases the vulnerability of banking institutions to crisis events within the country. An unfavorable trend in the dynamics of these ratios may indicate the growth of the equity capital crisis. Furthermore, it is recommended to monitor the indicators of the quality of capital [60].

Generally accepted coefficients of the profitability of banking institutions, such as the rates of return on assets and equity, were used in the group of indicators “Profit and profitability” [20, 21]. When analyzing the indicators of this group, it is necessary to consider the specifics of the activity of certain banks. For example, higher loan rates, lower deposit rates and higher operating costs are typical in the retail activity of banking institutions that cooperate with business structures of the agri-food industry, compared to wholesale corporate banking activities. They are characterized by a high mar-

gin associated with high operating costs. Banks that provide a broader array of services for subjects of the agri-food industry have higher non-interest income [21, 57].

The group of indicators “Liquidity” characterizes the ability of banking institutions to withstand shock changes in factors of the foreign economic sector. For example, since a financial crisis leads to losses on loans, it can undermine the trust in banking institutions on the part of financial market participants and subjects of the agri-food industry (depositors). A decrease in the price of bank assets and loss of financing of the strategic agri-food subsector, in turn, can lead to a liquidity crisis capable of turning solvent banks into insolvent ones [22, 57].

The group of indicators “Sensitivity to market risk” determines the level of activity of banking institutions to introduce financial instruments in a timely manner as a result of changes in market prices for assets and the minimization of market risk. The most significant components of market risk are interest rate and currency risks. Derivative financial instruments can be used to manage such risks [62].

From the perspective of capital adequacy, the banking institutions of the second group are in a favorable position compared to the banks of the first group. First, a significant share of Western European capital is in banks of the second group. Since parent companies of banks with European investments are subject to the requirements of Basel III, they are forced to take a more balanced approach to the assessment of accepted risks and more responsibly to ensure these risks with a sufficient amount of capital. In addition, despite the significant shares of foreign currency loans in bank portfolios, such banks are less prone to currency risks, as they can count on support from the parent structure [33]. Secondly, in banks of the second group with both foreign and domestic capital, there is a significant share of loans in the portfolio of loans granted to subjects of the agri-food industry. However, this fact increases banks’ susceptibility to credit risk. Simultaneously, the relatively high diversification of the resource base allows banking institutions to maintain an acceptable level of liquidity [34].

According to the IMF methodology, a systematic analysis of the financial health of banking institutions should be used to determine the risk of exchange rate changes, the risks associated with interest rate fluctuations, credit and liquidity, as well as the risk of spreading instability [42]. The IMF’s system analysis was used to calculate indicators affecting the geo-economic changes in the development of the financial and credit policy of the country’s agri-food industry.

The Basel Committee methodology provides the risk of exchange rate fluctuations to be assessed by monitoring the net open currency position of banking institutions for each currency type based on the following indicators:

- net current currency position, which is total assets that exclude total liabilities but include accrued interest on current accounts denominated in foreign currency;

- net forward currency position, which is the aggregate received payments that exclude total paid amounts for future currency transactions but include currency futures and swaps;
- calendar of guarantees provided (or similar instruments) in foreign currency for subjects of the agri-food industry;
- net future revenues (expenses) that have not yet accrued [28].

When these indicators demonstrate shock fluctuations of exchange rates, their impact on the activities of banking institutions provokes a crisis in the financial condition and solvency of entities within the agri-food industry [32]. Thus, the model of sensitive analysis should be applied. The impact of the shock of exchange rate fluctuations on the level of financial resources (capital) is determined by the following formula:

$$\Delta[C(E)/A_{rw}(e)] = \frac{\Delta e}{e} \frac{F}{C} \frac{C}{A_{rw}} \times \left(1 - \frac{\Delta a_{rw}}{\Delta C} \frac{C}{A_{rw}}\right) \quad (12)$$

where:  $F$  – net currency position;  $e$  – current exchange rate as of the reporting date;  $A_{rw}$  – risk-weighted assets as of the reporting date;  $C$  – amounts of financial resources (capital) as of the reporting date;  $\Delta e$  – exchange rate change over a period of time.

When the open currency positions of banking institutions dramatically grow, the relationship between the exchange rate and its impact on capital is non-linear. Thus, it is required to consider balance sheet and off-balance sheet indicators in a stress test. Two approaches, the gap model and the term structure model, are used to assess the risk of interest rate fluctuations in a systemic analysis [32]. The gap model is based on an analysis of the disparity between fluctuations in interest income of national financial institutions based on their assets and fluctuations in interest expenses according to obligations to global financial institutions. An analysis of the interest rate gap change ( $GAP_{ij}$ ) is used to determine the change in the net interest income of a specific group of banks or certain types of assets and liabilities.

$$\Delta N_{etij} = \sum_{j=1}^k \sum_{i=1}^n GAP_{ij} \Delta R_j \quad (13)$$

where:  $\Delta N_{etij}$  – exchange in net interest income and group of banks by type of net assets;  $n$  – number of banks;  $k$  – the number of types of net assets.

The term structure model of lending to subjects of the agri-food industry measures the correspondence of the terms of the movement of financial and credit flows of banking institutions by calculating and comparing the volume and duration of loans extended to entities during a reporting period. The model is represented by the following formula:

$$D = \frac{\sum_{t=1}^n CF_t \times DF_t \times t}{\sum_{t=1}^n CF_t \times DF_t} = \frac{\sum_{t=1}^n PV_t \times t}{\sum_{t=1}^n PV_t} \quad (14)$$

where:  $D$  – the term structure of lending to subjects of the agri-food industry during a reporting period;  $CF_t$  – the financial flow that will be received or returned by the end



of a period  $n$ ;  $n$  – the end of a reporting period;  $DF_t$  – is the discount level, which is equal to  $(1/(1 + R)^2)$  where:  $R$  – the current value of the interest rate;  $PV_t$  – is the current value of cash flows, which is equal to  $CF_t \times DF_t$ .

The term structure of a credit portfolio is calculated using the following formula:

$$D = \sum_{t=1}^m x_i \times D_i \quad (15)$$

where:  $x_i$  – the share of the  $i$ -th instrument in the loan portfolio;  $D_i$  – term structure of the  $i$ -th financial instrument.

In order to apply the model of the term structure of lending to subjects of the agri-food industry, the sensitivity of the value of assets and liabilities to fluctuations in interest rates is calculated. The higher the value of the term structure, the more sensitive the prices of assets and liabilities are to interest rate fluctuations.

$$\frac{\Delta A(r_a)}{A(r_a)} = -\frac{D_a \Delta r_a}{(1+r_a)}, \frac{\Delta L(r_l)}{L(r_l)} = -\frac{D_l \Delta r_l}{(1+r_l)} \quad (16)$$

where:  $A(r_a)$  – market value of assets of banking institutions;  $L(r_l)$  – market value of liabilities of banking institutions;  $D_a$  – term structure of assets;  $D_l$  – term structure of obligations;  $r_a$  – interest rates on relevant assets;  $r_l$  – interest rates on relevant obligations.

The effect of interest rate fluctuations on capital is determined by the following formula:

$$\Delta[C(r_a, r_l)/A_{rw}(r_a)] \cong -\frac{(L/A_{rw})}{(1+r_a)} GAP_D \quad (17)$$

where:  $GAP_D$  – gap of the term structure of assets and liabilities, calculated by the following formula:

$$GAP_D = D_a - D_l \frac{1+r_a}{1+r_l} \frac{\Delta r_l}{\Delta r_a} \quad (18)$$

where:  $D_a$  – term structure of assets;  $D_l$  – term structure of obligations;  $r_a$  – interest rates on relevant assets;  $r_l$  – interest rates on relevant obligations.

Two methods of system analysis are applied to assess the credit risk of banking institutions. The first method is based on an analysis of indicators of a credit portfolio, including its dynamics and structure of loans granted to subjects of the agri-food industry [52]. The second method of assessing the credit risk of banking institutions involves analyzing the financial condition of subjects of the agri-food industry.

A systematic analysis of the liquidity risk of banking institutions when lending to subjects of the agri-food industry determines as fluctuations the value of the gap between the maturity terms of assets and liabilities influenced by the private (agri-food) sector market. The IMF recommends focusing on the growth rate of the gap between highly liquid assets and liabilities when conducting a liquidity risk analysis [32]. One of the most well-known channels of risk transfer is through unsecured loans granted on

the interbank market. Another reason for the spread of risks is the low level of trust in banks that are part of a certain geo-financial system having a low international rating. In this case, the resource base of banking institutions is artificially narrowed, which is limited by the movement of financial and credit flows and does not have access to international financial markets [32].

#### Results

The economic environment of Ukraine's agri-food industry has suffered systemic negative effects due to the Russian aggression. Many short- and medium-term risks and challenges in the financial and credit policy of Ukraine require partner countries to react in a coordinated manner. The aggression revealed the contradictions of the modern world regarding the integration of the value of food flows and financial and credit flows of one country and its ability to interact with other countries. This competition also increases the attention to the problems of interaction and opposition of the three most influential centers of the geo-financial and geo-economic systems [8, 58]. However, the war initiated by the aggressor country against Ukraine accelerated the realization of the country's lack of alternatives to full membership in the European Union. This requires Ukraine to increase institutional efforts, introduce measures and tools to preserve financial stability, strengthen the capital of the agri-food industry in the context of military operations and post-crisis recovery.

Ukraine is a global player in the markets of agricultural and food products, on which the food security of many countries of the world depends. Foreign trade in agri-food products in Ukraine is supported from the state budget. The export and import of agricultural and food products increased by 20.5 % and 9.5 %, respectively, in 2020 ÷ 2021 in Ukraine (Fig. 1).

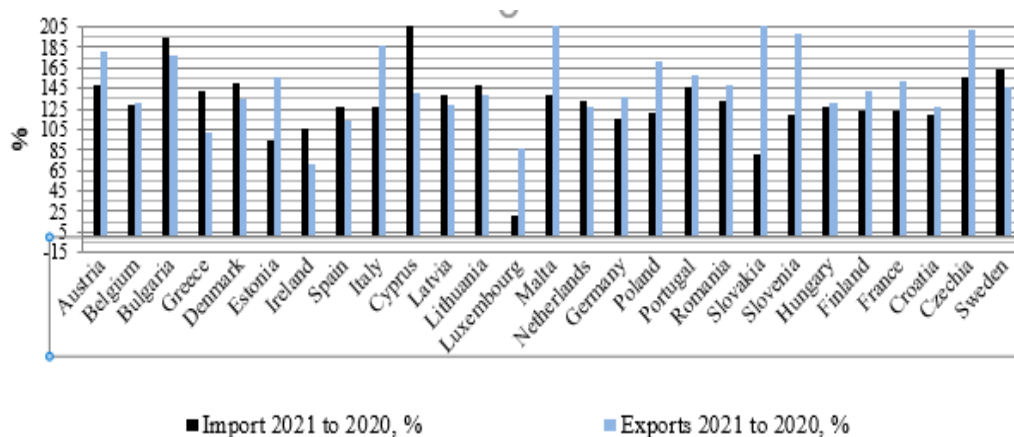


Figure 1. Foreign trade in agricultural products of Ukraine with the EU for 2020 ÷ 2021 [35]  
Rycina 1. Handel zagraniczny produktami rolnymi Ukrainy z UE w latach 2020 ÷ 2021 [35]

In 2022, Ukraine exported products of the agri-food industry in the amount of USD 21.1 billion. Among the above-mentioned products, the following were exported: corn (USD 5.3 billion), wheat (USD 2.3 billion), sunflower oil (USD 5.0 billion), rapeseed (USD 1.4 billion) [28]. During the “grain corridor” operation, 15.9 million tons were exported from Ukraine, including 4.7 million tons of wheat and 7 million tons of corn [31]. The agri-food sector of Ukraine faced numerous challenges in 2023 caused primarily by the Russian aggression, including the blockade of the Black Sea and road logistics, the destruction of agricultural infrastructure and stable interstate ties, obstacles to the export of agricultural products to EU countries, etc. The total export income amounted to USD 21.9 billion in 2023, which was 8 % less than in 2022 [9].

Grain crops in the agri-food sector generated export income of USD 8.28 billion in 2023, representing a 15.4 % increase compared to 2022. The export value of oil crops amounted to USD 2.78 billion in 2023, which was 25.6 % less than in 2022 [9] (Fig. 2).

The main reasons for the decrease in export income in 2023 was a drop in prices for almost all types of agri-food products compared to 2022. In 2023, the top five exporters of Ukraine's agri-food products were Romania (USD 2873.7 million), China (USD 2212.4 million), Turkey (USD 1989.9 million), Spain (USD 1761.9 million) and Poland (USD 1749.6 million) (Fig. 3).

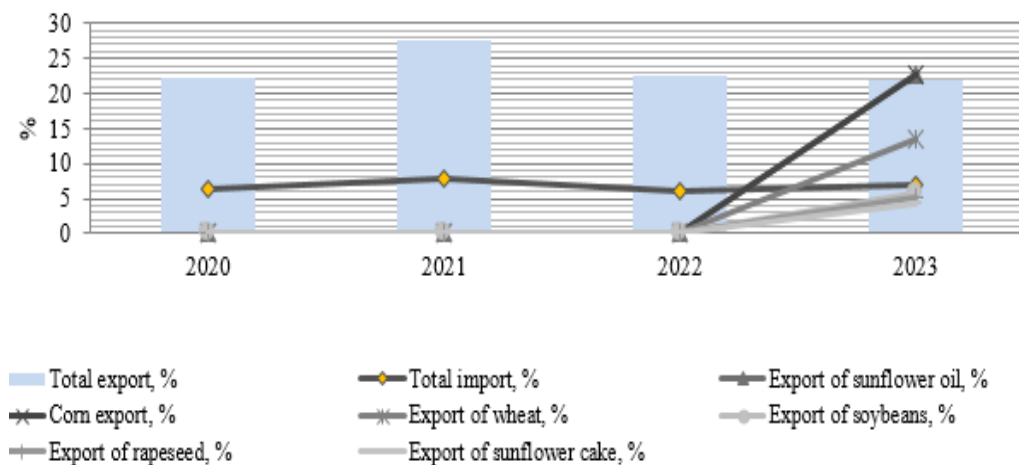


Figure 2. The structure of exports of agricultural and food products in Ukraine for 2020 ÷ 2023 [28, 31, 36, 37, 38]

Rycina 2. Struktura eksportu produktów rolno-spożywczych Ukrainy w latach 2020 ÷ 2023 [28, 31, 36, 37, 38]

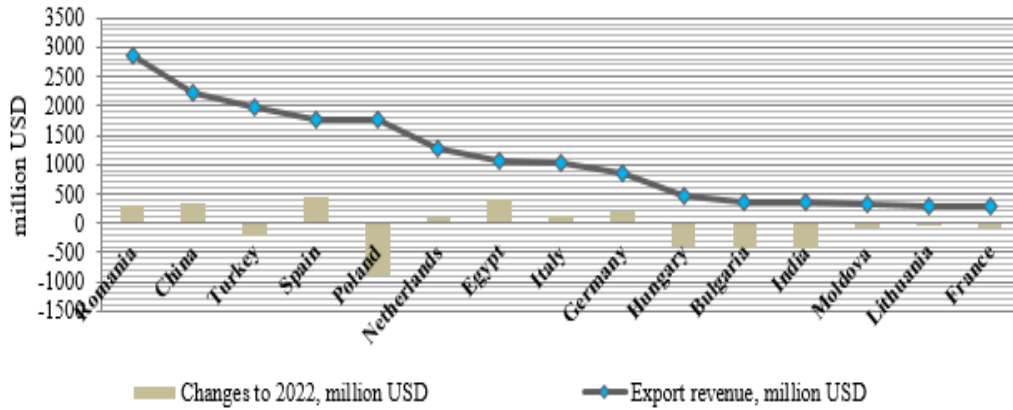


Figure 3. Ranking of countries of the world and Europe by export of agri-food products from Ukraine in 2023 [28, 31, 36, 37, 38]

Rycina 3. Ranking krajów świata i Europy według eksportu produktów rolno-spożywczych z Ukrainy w 2023 r. [28, 31, 36, 37, 38]

In the geographical structure of Ukraine's geo-financial system in 2023, the European Union ranked first in providing the agri-food industry with its own savings, accounting for 56.9 %. Asian countries came second with 30.6 %, followed by African countries in third place with 7.1 %. North and South America were in sixth place, contributing 0.9 % to the structure (Fig. 4).

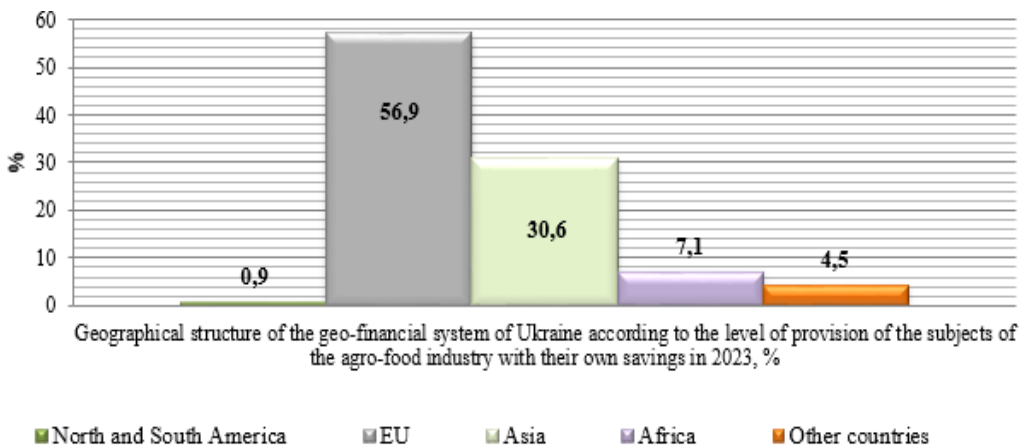


Figure 4. Geographical structure of the geo-financial system of Ukraine according to the level of provision of the subjects of the agri-food industry with their own savings in 2023 [39]

Rycina 4. Struktura geograficzna systemu geofinansowego Ukrainy według poziomu zabezpieczenia podmiotów przemysłu rolno-spożywczego własnymi oszczędnościami w 2023 r. [39]

In light of the situation regarding Ukraine's accession to the EU, its main task is to adapt the financial and credit policy to the provisions of the Common Financial and Credit System of the EU. The legislation of Ukraine in the field of the agri-food industry, in turn, should meet the relevant requirements. Since legislative and regulatory acts may pose challenges for agrarians to implement during wartime, they should be adopted with a deferred implementation period, after the end of martial law.

The foreign economic sector of the agri-food industry faces significant currency risks on export-import operations. This, in turn, affects the monetary sector and increases the dependence of production entities on the financial and credit flows of national banking institutions and global financial institutions. Thus, when exporting grain crops in 2023, the loss of profit for 1 ton of products (own savings) on average for one subject of the agri-food industry amounted to USD 129.34. The reason for the lack of own financial savings is the increase in the revaluation of the national currency in relation to the US dollar by 1.2 times, which led to a loss from 1 ton of grain exports in the amount of USD 74.71 per subject of the agri-food industry.

If hostilities in the country ceased in 2024 and global geo-economic policies and the geo-financial system stabilized, it would have been possible to estimate the increase in financial savings of entities in the agri-food sector compared to 2023. The primary condition here was the devaluation of Ukraine's national currency, aimed at increasing the pricing mechanism for agri-food exports by 1.26 times. This calculation was based on the assumption that the national currency exchange rate would return to its pre-war level. This would allow Ukrainian producers of the agri-food industry to ensure the capitalization of their own financial savings. At the same time, on average, the profit for 1 ton of products for one economic entity would be equal to USD 317.75 (Fig. 5).

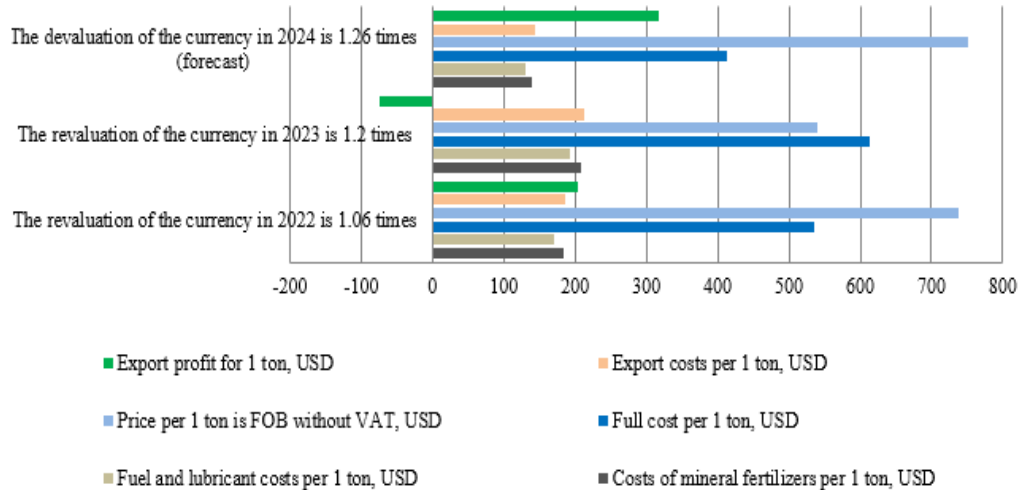


Figure 5. The impact of currency risks on the export of grain crops on average for each entity in Ukraine's agri-food industry for 2022 ÷ 2024

Rycina 5. Wpływ ryzyka walutowego na eksport zbóż średnio dla każdego podmiotu z ukraińskiej branży rolno-spożywczej w latach 2022 ÷ 2024

With the beginning of the war in Ukraine, geo-economic changes took place in the financial and credit policies within the agri-food sector of European countries. Fiscal balances deteriorated and price growth prompted increased interest rates on loans [17]. This worsened the conditions of access to financial resources, especially for those developing countries in the European world; it led to the devaluation of their currency and increased the cost of food and energy imports [47].

The level of inflation fluctuated from 2 % to 12 % in 2022 in the group of European countries and was higher than the EU average (Fig. 6). Given that these countries are the closest to the territory of the war, they experienced increased financial losses due to the disruption of logistics chains, the influx of refugees, the additional cost of financial services (including loans and insurance), etc. This group of countries needs substantial financial support from the European Central Bank. Otherwise, such a stratification of the incomes of Western and Eastern European countries may provoke the strengthening of administrative contradictions at the EU level.

It should be noted that Eastern European countries, which decided to retain their own currencies, are additionally at risk of devaluation. In the medium-term period, devaluation may stimulate the export of agri-food products, but in the short-term it will mean an even greater increase in the price of agri-food products and energy sources for business entities. Therefore, maintaining the stability of the exchange rate for these countries becomes one of the key tasks for the financial stability of entities within the agri-food industry [47].

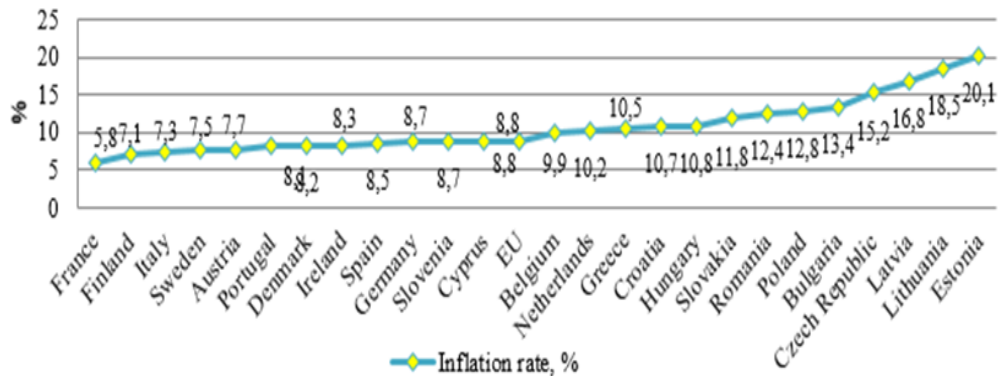


Figure 6. Inflation rate in EU countries for 2022 [47]

Rycina 6. Wskaźnik inflacji w krajach UE w 2022 r. [47]

While the NBU interest rate was 10 % in the first quarter of 2022, it rose to 25 % in the second quarter of 2022. This step was dictated by the need to preserve macroeconomic balances, reduce inflationary pressure and maintain the stability of the national currency. Since the real inflation rate was within 25 % during this period, this step could ensure financial stability and reduce the progressive deficit in the country's foreign economic and budgetary spheres (Fig. 7).



Figure 7. Dynamics of the discount rate of NBU in 2022 ÷ 2023 [30, 33, 34, 36, 39]

Rycina 7. Dynamika stopy dyskontowej NBU w latach 2022 ÷ 2023 [30, 33, 34, 36, 39]

The instruments of the financial and credit policies affecting the agri-food industry coincide with the instruments of the country's monetary policy, but they are not identical [4]. Both of them are the measures of intervention in the process of credit distribution among the producers of the agri-food sector and can be applied as instruments of control over the supply of money and inflation. The key instrument of credit and monetary policy is the discount rate of the central bank, which is an indicator for

assessing the value of money. Interest rate management is one of the most important monetary instruments of the financial and credit policy in the agri-food industry. It regulates the supply (demand) of financial and credit resources, the value of money and capital, the investment readiness of partner countries to invest in the restoration and provision of a stable financial system of industry entities, as well as stopping the outflow of their capital [2, 29].

## **Discussion**

The emergence of geo-economic changes in shaping the financial and credit policy of the agri-food sector is associated with the following factors: increased interdependence between the monetary and budget sectors; the creation of various digital financial and credit systems and a network of intensive financial flows in the agri-food industry, in particular, its financial support, which led to the expansion of the "geography" of financial resources. At the same time, the space and time of movement of financial resources becomes more mobile [55].

In real time, financialization in geo-economics is a priority of many states, which is a symbiosis of formative and distributive financial flows based on financial technologies and strategic development tools [42]. The growing influence of financialization in geo-economics blurs the line between internal and external spheres of activity, and, especially, between internal and external policies in the banking and budgetary spheres of the agri-food industry. Since the global geo-financial transformation manifests itself in the formation of new centers of financial diplomacy, it resolves international conflicts regarding the sustainable financial security of any country that is increasingly dependent on geo-financial factors [43]. As a result, geo-financial methods of analysis are increasingly used by national governments when building models for the development of the financial and credit policy of the agri-food industry, both in the short term and in the long term [49].

Geo-economics and geo-finance are closely interconnected and outline the following important issues in the agri-food industry functioning:

- 1 the influence of climatic and landscape features on the specifics of financial support of the agri-food industry;
2. financial and credit flows for the recovery of the agri-food industry;
3. financial policy and strategy for increasing the competitiveness of the industry in the conditions of economic globalization;
4. the merger of the financial and credit and monetary system of the state in the field of international cooperation and financial and economic relations;
5. the formation of systematic and consistent strategic interaction of market participants;
6. the global coordination of financial flows to increase the volume of food flows;



7. a change in the system of division of labor and stabilization of the financial stability of the agri-food industry [15, 49].

The functioning of geo-finance in the agri-food sector and their institutional design are determined by the following factors:

1. The modification of commodity production of the agri-food industry through the globalization of production and investment and financial cooperation, carried out on the basis of technological chains.
2. The formation of internationalized reproductive nuclei (financial cycles) in the cross-border financial and credit support of the agri-food industry.
3. The formation of a mobile cross-border financial and credit system, which creates the economic environment for the operation of global conveyors – mobile reproductive financial cycles (cores).
4. The formation of the income system for financial and credit flows within the agri-food chain as interstate reproductive nuclei (IRN).
5. The redistribution of income (financial capital) as a strategic reference point for the reproduction of the foreign economic sector (geo-economic vector) [56, 57, 58].

Threats to the financial and credit policy governing the agri-food industry in European countries are geo-economic changes and the instability of supply chains, which provokes the risk of rising interest rates on bank loans. A characteristic detail is that most European countries are confident that the state of financialization of their national economy will differ from the global background for the better. This may indicate the presence of sovereignization sentiments in order to limit spending in favor of other countries [62]. Thus, inflation and the risk of interest rate increases are the biggest financial risks for subjects of the agri-food industry in European countries.

However, both risks in one way or another embody one threatening process – an increase in financial costs in the business structures of agri-food production and reduce the real consumption of financial resources. Based on this, monetary regulation in the financial and credit policy landscape of the agri-food industry in European countries should be coordinated with the possibilities of fiscal support for risk groups of agrarian business. The International Monetary Fund emphasizes that it is better for the EU to rely more on fiscal rather than monetary levers in the context of the challenges of the war in Ukraine [46, 59]. This means that the European Central Bank and national banks in the interest of fighting inflation can resort to raising rates, but this must be accompanied by fiscal support for small agricultural businesses to compensate them for the financial costs associated with raising rates. This is exactly the practice observed in the EU. In some countries, energy taxes were reduced on a long-term basis in 2022. France, for example, in the first quarter of 2022, introduced a one-year reduction in taxes on electricity (allocated EUR 8 billion, or 0.3 % of GDP) and reduced the tax on gasoline by EUR 0.15 per liter for four months, which cost the budget more than EUR

2.2 billion, or 0.1 % of GDP. In Germany, the gasoline tax was reduced by EUR 0.3 per liter [47].

In Western European countries, there are enough state programs for compensating interest rates on loans to subjects of the agri-food industry. This clearly emphasizes the risk of disintegration of the EU. The EU needs to start developing financial security programs for vulnerable business structures of agricultural production at the level of regional financial and credit policy as soon as possible, through the expansion of monetary supply and related fiscal stimulus measures and preservation of its own currency. There is a high probability that this influence may manifest itself in the form of the intensification of speculative operations in their currency, securities and real estate markets as a result of the uncontrolled movement of cross-border financial and credit flows (capital). An increase in the volume of such speculations can increase inflationary processes. Including and for this reason, international financial institutions have long emphasized the need for a policy of control over financial and credit flows (capital), which can be implemented by means of macroprudential instruments and requires a review of approaches to freely floating exchange rates [47].

In order to restore credit activity (regulate credit risk) and avoid significant arrears on loans, the NBU made changes to the Rules of Banks [36]. The NBU relaxed the regulatory policy on credit risk assessment in order to promote the intensification of lending to economic sectors. Such measures of the NBU include the following:

- granting the right to banking institutions not to recognize default on loans, long-term restructuring of which decreased the value of future cash flows by more than 10 %;
- the suspension of effects of high credit risk, determined by the financial results and debt burden of borrowers;
- the abolishment of restrictions on carrying out operations with parent companies of banking institutions regarding the exchange of foreign currency on the terms of “swap”;
- reducing the risk weight for consumer unsecured loans from 150 % to 100 % [38].

The central role of banking institutions in the financial and credit policy of the agri-food industry allows them to influence the methods of financing and investing. They are actively implementing financial instruments aimed at supporting and restoring their financial capabilities. However, it is important for the banking sector to independently adhere to responsible business practices, as the trend of bank lending in Ukraine had a downward trend (Fig. 8).

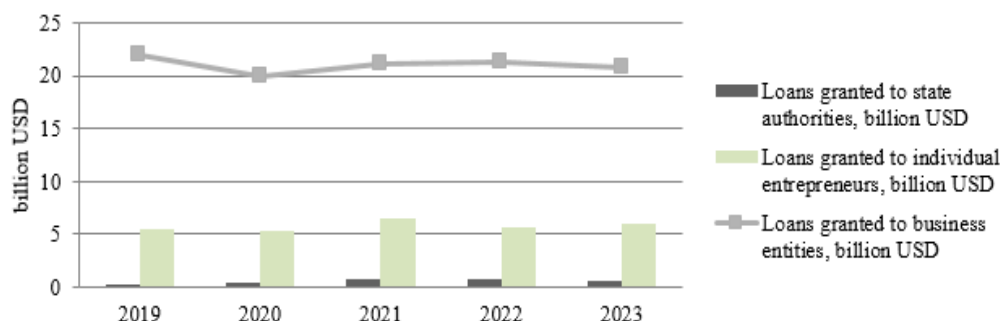


Figure 8. Volumes of bank lending in Ukraine from 2019 ÷ 2023 [33, 34]

Rycina 8. Wolumeny kredytów bankowych na Ukrainie w latach 2019 ÷ 2023 [33, 34]

A decrease in the amount of loans granted in 2023 by 39.1 % compared to 2021 was due to a decrease in the amount of loans granted to state authorities and individual entrepreneurs. The structure of bank lending is dominated by loans granted to business entities, which in 2023, compared to 2021, had also a tendency to decrease by only 2.3 %. This is due to the relocation of business structures from the occupied territories, the destruction of property and the loss of economic ties between partners, including banking institutions.

It should be noted that USD 20.72 billion of loans was issued to promote the growth of economic sectors during the martial law in Ukraine [39, 40]. The strengthening of credit support for producers of the agri-food industry on the part of the state made it possible to intensify state lending programs in which state banks take an active part. Thus, out of the total amount of issued bank loans, 56.4 % of them are directed to the sources of financing of agribusiness structures under the state program “Available Loans 5-7-9 %”. Loans under the program make up about 40 % of the net corporate portfolio in the national currency. Bank lending grew in 2022 primarily due to this program. Within the framework of this program, more than 80420 business structures of the agri-food industry were credited during 2022 ÷ 2023; the restoration of their financial potential amounted to USD 6.94 billion. In the first two months of 2024, the amount of loans under the state program amounted to USD 7.32 billion (Fig. 9).

The synergy of the “Affordable loans 5-7-9%” program with portfolio guarantees significantly expanded customers’ access to credit. The recovery of the economy, the improvement of the financial indicators of the agri-food industry and the severe limitation of budget resources caused the need to narrow the focus of the program in order to support small and medium-sized agribusiness and enterprises vulnerable to security risks. The purpose of issuing a loan was added to the program, such as business support during wartime, expanded loans to the agricultural sector, support for the sowing campaign, the restoration of the destroyed business of subjects, and their reloca-

tion. Farmers of the following regions received the largest amount of loans under the state support program: Kyiv region – USD 0.36 billion (1029 enterprises), Dnipro region – USD 0.20 billion (893 enterprises), Vinnytsia region – USD 0.18 billion (1558 enterprises), Cherkasy region – USD 0.17 billion (564 enterprises), Kirovohrad region – USD 0.15 billion (1803 enterprises), Odesa region – USD 0.13 billion (1179 enterprises) (Fig. 10).

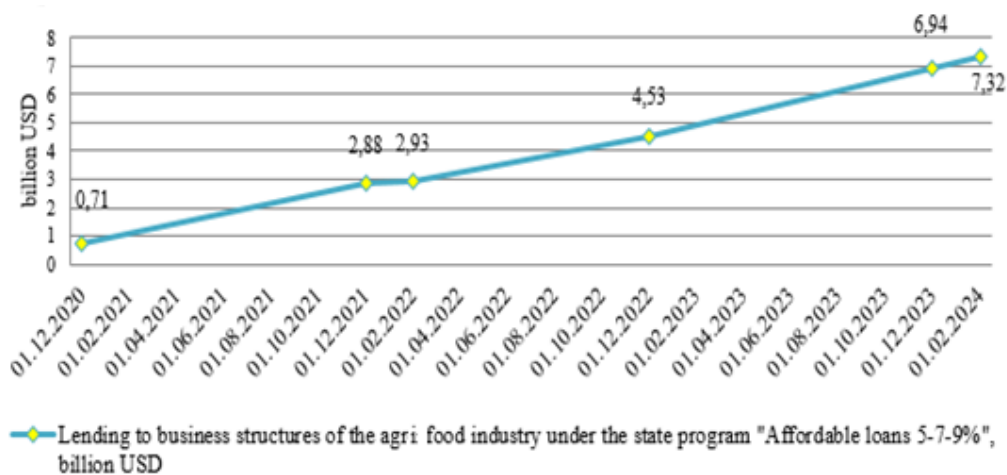


Figure 9. Lending to business structures of the agri-food industry under the state program "Affordable loans 5-7-9%" in 2022 ÷ 2023 [8, 36, 39]

Rycina 9. Kredytowanie struktur biznesowych branży rolno-spożywczej w ramach państwowego programu „Pożyczki przystępne 5-7-9%” w latach 2022 ÷ 2023 [8, 36, 39]



Figure 10. The volume of lending to business structures of the agri-food industry in the regions of Ukraine under the state program "Affordable loans 5-7-9%" [8, 36, 39, 40]

Rycina 10. Wielkość kredytów udzielanych strukturom biznesowym przemysłu rolno-spożywczego w regionach Ukrainy w ramach państwowego programu „Pożyczki przystępne 5-7-9%” [8, 36, 39, 40]

The sources of financial and credit support for Ukraine's agri-food industry are external loans and grants from global financial institutions in Europe and the world. Ukraine received USD 32.2 billion in international financial aid and USD 32.7 billion in support of the agri-food industry in 2022. Over the three quarters of 2023, the share of loans increased by 11.2 percentage points, while the share of grants decreased by 13.6 percentage points (Fig. 11).

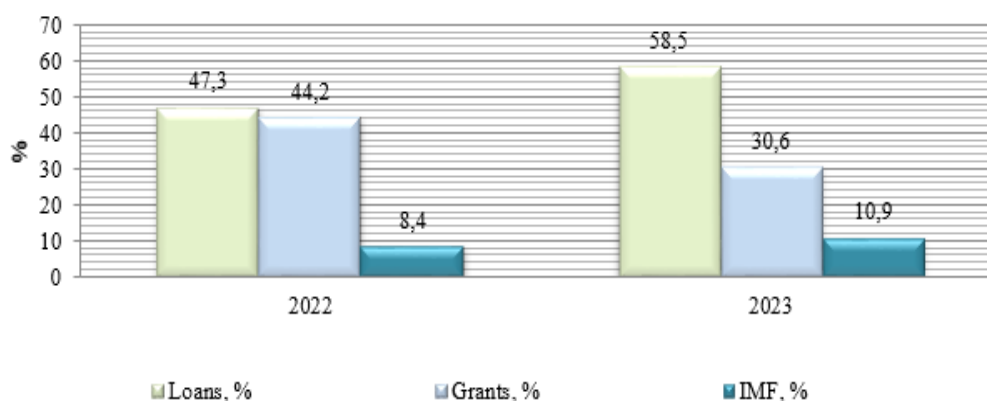


Figure 11. The structure of the sources of formation of the financial and credit system of the agri-food industry of Ukraine by global financial institutions for 2022 ÷ 2023 [29, 39, 40]

Rycina 11. Struktura źródeł kształtowania systemu finansowego i kredytowego przemysłu rolno-spożywczego Ukrainy według globalnych instytucji finansowych na lata 2022 ÷ 2023 [29, 39, 40]

In 2023, the general fund of the State Budget of Ukraine received approximately USD 5 billion in external financing. Grants provided on a non-refundable basis accounted for 11 % of the total financial assistance [29]. Japan donated USD 2.2 billion (concessional financing and grants), the EU – USD 1.6 billion (concessional financing), the International Monetary Fund – about USD 900 million (concessional financing), Norway – USD 190 million (grant), Germany – USD 55 million (grant), USA – USD 50 million (grant), Switzerland – USD 20 million (grant), World Bank – USD 8 million (concessional financing).

In January 2024, as part of a World Bank project aimed at social protection and restoration of the agri-food industry, the State Budget of Ukraine received USD 390 million from Japan. From the total amount of funds, a share of financial assistance in the amount of USD 89.8 million is directed to the project “Emergency project of providing inclusive support for the restoration of agriculture of Ukraine” [50].

## **Conclusions**

Thus, the geo-economic changes in the development of the financial and credit policy of Ukraine's agri-food sector testify to the transformation of the financial support of agribusiness structures through important macro-financial indicators. These indicators include the stability of prices for the export of agricultural products during exchange rate regulation, efforts to implement financial activity of banking institutions to restore and increase the financial capabilities of economic entities. In the conditions of economic instability, the monetary, budgetary, banking and foreign economic sectors as components of the financial and credit policy of the agri-food industry determine the readiness of the country to resist external aggression. Therefore, these sectors affect the financial stability of agri-food producers.

The Russia's full-scale invasion of Ukraine made adjustments to all branches of the economy, changed the rules of their operation and introduced new restrictions on lending and financial assistance to the agricultural sector. Due to the coordinated work of the NBU, the banking sector is stable and controlled. The restoration and development of the financial and credit strategies within Ukraine's agri-food sector requires the coordinated work of all links of the internal mechanism and the financial support of partner countries and international organizations.

The main directions affecting the effectiveness of financial credit instruments are as follows: maintaining the level of capitalization of banks by ensuring their liquidity through a flexible refinancing mechanism and, as a result, increasing bank creditworthiness to support the agri-food industry entities; improving the quality of credit resources due to the improvement of the quality of bank assets; the creation of appropriate loyal conditions for obtaining a loan, which can become temporary tax benefits, as a tool for stimulating lending and investing in priority sub-sectors of the agri-food sector of the economy; the expansion of the internal market opportunities through the NBU's use of coordinated instruments of influence on the mechanism of the entire financial market; the development of a comprehensive strategy for the expansion of lending to agribusiness structures of agrarian orientation in the country.

The strategy of the financial and credit policy for the development of the agri-food industry should ensure an increase in direct and indirect financing of its business entities to increase output and, subject to increased state support, attract economic structures to capital investment and growth of own savings. This will significantly increase the financial indicators of the subjects of the agri-food industry and tax payments to the budget, in particular VAT and income tax. Primary financial support measures for agri-food industry producers during the period of martial law should be as follows:

1. to extend the validity of the state program "Affordable loans 5-7-9 %";

2. to expand the list of crops for which government grants are provided for the development of horticulture, berry growing and viticulture. In total, agribusiness structures received state aid in the amount of USD 13.1 million for the development of gardens and greenhouses in 2023. In particular, USD 10.5 million was paid for the development of gardens, USD 2.6 million for greenhouses;
3. to restore additional state incentives for developing family farms without the creation of a legal entity, which were suspended. Thus, for the 1st quarter of 2023, the compensation of the single social contribution to family farms in the amount of USD 0.05 million was carried out;
4. to implement state support for the organization of water use on reclamation lands in order to enhance agricultural production efficiency under the conditions of climate change.
5. to provide funds to producers of the agri-food industry on a non-refundable basis equaling up to 25 % of the expenditure amount (excluding VAT);
6. to regulate price of certain types of agricultural and food products in order to maintain the stability of the population's food supply. For a period of three months after the end of the war, it is necessary to establish the maximum level of trade allowance for wheat flour, milk, eggs, poultry carcasses, sunflower oil, rye-wheat bread (in the amount of no more than 10 %). Export licensing requirements for the specific types of livestock agricultural products should be abolished;
7. to endorse the action plan for demining agricultural land (about 470000 hectares of agricultural land);
8. to provide grant aid from the Food and Agriculture Organization (FAO) of the United Nations for financing micro- and small agricultural producers and cooperatives;
9. to provide assistance for the purchase of seeds of spring crops (wheat, barley, peas) for small farmers in the front-line regions.

The above measures will mitigate the adverse effects of the war for the agri-food industry and create conditions for preserving and restoring its financial potential.

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## EWOLUCJA GEO-EKONOMICZNA W POLITYCE FINANSOWEJ I KREDYTOWEJ PRZEMYSŁU ROLNO-SPOŻYWCZEGO NA UKRAINIE

### S t r e s z c z e n i e

**Wprowadzenie.** Polityka finansowa i kredytowa sektora rolno-spożywczego Ukrainy ma kluczowe znaczenie dla jego stabilności i wzrostu, szczególnie w zmieniającym się kontekście geoeconomicznym. Zrozumienie tych zmian i ich wpływu jest niezbędne do opracowania skutecznych środków wspierających sektor.

**Wyniki i wnioski.** W artykule zbadano skuteczne środki rozwoju polityki finansowej i kredytowej sektora rolno-spożywczego Ukrainy w kontekście geoeconomicznym. Omówiono kierunki zmian geoeconomicznych wpływających na te polityki. W artykule pokazano globalny wektor rozwoju finansjalizacji w geoeconomii, który zmienia modele bilansów przepływów finansowych i kredytowych. Przedstawiono podejście geofinansowe i dokładnie przeanalizowano strukturę eksportu produktów rolno-spożywczych między Ukrainą a UE. Zbadano strukturę geograficzną ukraińskiego systemu geofinansowego. Oceniono wpływ ryzyka walutowego na eksport zboża dla przeciętnego podmiotu rolno-spożywczego na Ukrainie. W artykule zidentyfikowano dynamiczne wahania stopy inflacji wpływające na narzędzia pieniężne oraz politykę finansową i kredytową przemysłu rolno-spożywczego w krajach UE. Oceniono zakres udzielania pożyczek podmiotom prowadzącym działalność rolno-spożywczą. W artykule określono strukturę instytucjonalną operacji geofinansowych oraz warunki, które determinują przepływ środków finansowych z globalnych instytucji finansowych w celu wsparcia nowych cykli finansowych w kraju będącym w stanie wojny.

**Słowa kluczowe:** systemy geofinansowe, strategie finansowe i kredytowe, sektor rolno-spożywczy, finansowanie bankowe, dotacje ☒