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Analysis of the effectiveness of bank credit instruments for agricultural enterprises in Ukraine

Abstract. The purpose of this study was to determine the level of impact of bank credit instruments on the financial stability, profitability, and production efficiency of agricultural enterprises in Ukraine. The study analysed the dynamics of bank lending to the agricultural sector in 2022-2024.

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The total volume of loans provided to agricultural enterprises decreased from UAH 118.9 billion in 2022 to UAH 104.5 billion in 2024. The share of preferential financing under the programme “Affordable Loans 5-7-9%” in 2024 was 46% (UAH 46.9 billion). The study analysed three leading companies – Myronivsky Hliboproduct, Kernel, and Astarta-Kyiv, which actively used bank loans and international financing to stabilise the activities, modernise production and expand export potential. Myronivsky Hliboproduct restored profitability: from a loss of USD 231 million in 2022 to a profit of USD 144 million in 2024. Astarta-Kyiv increased corn yield to 10.35 t/ha, sugar production by 34%, and revenue from agricultural production by 33%. Kernel attracted USD 150 million in syndicated financing, which ensured a 2.3-fold increase in exports in 2024. The study proved that bank loans acted not only as an anti-crisis mechanism, but also as a tool for increasing efficiency, modernisation, and adaptation of enterprises to high-risk conditions. The practical significance of the study laid in substantiating the effectiveness of bank credit instruments as an effective mechanism for supporting the agricultural sector in times of crisis challenges, and in the possibility of using the results obtained to improve state financing programmes

Keywords: financial support; digitalisation; investments; government support; export

INTRODUCTION

The establishment of effective credit support for the agricultural sector is a key factor in ensuring financial stability, modernisation of production and increasing the competitiveness of Ukrainian agricultural enterprises. In the context of increasing external challenges, in particular armed conflict, inflationary pressure and disruption of logistics chains, bank credit instruments are gaining particular importance as a source of mobilising financial resources for seasonal production, updating the technical and technological base, and supporting working capital. Ukrainian agricultural enterprises face a lack of financing of these enterprises, which leads to a high dependence on bank loans. N. Trusova & N. Radchenko (2020) studied the effectiveness of lending taking into account the size of enterprises, the dynamics of loan volumes and revealed the negative impact of the high cost of credit resources on profitability. The authors identified medium-term loans as dominant and also emphasised the importance of cooperation with international financial organisations and the action of the state programme “5-7-9%”. Ukraine’s agriculture, with a significant share in the structure of gross domestic product and export potential, needs stable external financing. This issue was studied by O. Chyhryn & O. Ivakhnenko (2020), who analysed trends in bank lending to agricultural production, identified the dominance of short-term loans and a low share of long-term loans (only

5%), and also assessed the effectiveness of state support. The authors found that when the level of profitability exceeds the interest rate, enterprises reinvest profits, which stimulates development. Despite the availability of preferential lending programmes, only 7.6% of the bank loan portfolio falls on agriculture, and the level of participation in the programmes remains low.

Agricultural enterprises face difficulties in attracting bank loans due to the unstable economic situation, high risks, and limited access to long-term financing. This topic was studied by S. Andros (2024), who focused on the need to reform approaches to agricultural lending, taking into account its specifics. In the mentioned work, the author analysed the volume of bank financing, pointed out the unevenness of access to loans by region and size of enterprises, and also noted the imperfection of risk management mechanisms. Considerable attention was paid to the development of microfinancing and credit cooperation as tools for expanding access to loan resources, in particular for small forms of business. Access to bank financing for agricultural producers is complicated by high rates, lack of collateral, and uneven lending conditions. I. Tomashuk & L. Volska (2024) analysed the dynamics of attracting loans, pointing to the low share of financing for the agricultural sector and the limited effectiveness of government programmes for small and medium-sized farms. The authors highlighted

information barriers and weak financial readiness of borrowers.

Bank lending to agricultural enterprises is limited by high collateral requirements, a lack of specialised programmes, and low flexibility of banking products. A. Osipova (2020) analysed access to credit, noting the advantage of large enterprises due to the availability of collateral, while small producers face barriers. The author noted that large enterprises have better access to loan capital due to the availability of collateral and financial reporting, while small and medium-sized producers experience difficulties due to the lack of collateral and insufficient credit rating. The insufficient level of availability of financial resources for the agricultural sector hinders the development of enterprises and limits the investment activity. A. Bilochenko (2023) analysed current trends in bank lending, in particular the operation of the “5-7-9%” programmes, emphasising the role of these programmes in reducing the credit burden. The author noted the positive dynamics of agricultural producers’ participation in these programmes and the growth in the volume of preferential lending, but pointed out the uneven access between large and small enterprises.

Financial support for agricultural enterprises requires improvement of support mechanisms focused on adaptation to crisis conditions. O. Popelo & A. Zhavoronok (2024) analysed the current state of bank lending in wartime conditions, focusing on limited access to resources and increased risks for creditors. The authors determined that the most effective support instruments were state programmes for compensation of interest rates, which made it possible to maintain credit activity. The complexity of credit support for agricultural enterprises in times of crisis requires the adaptation of financial instruments to modern challenges. N. Tanklevska et al. (2023) examined structural changes in the agricultural financing system, focusing on new forms of public-private partnerships, the role of financial institutions, and increased participation of international donors. The authors noted the positive impact of the integration of insurance mechanisms, the digitalisation of risk assessment processes, and the introduction of targeted financing through banking instruments.

The long-term consequences of the credit burden, the effectiveness of the use of loans in different regions, the role of financial literacy and counselling, the impact of innovative banking products and digital solutions, and the need to adapt credit instruments to the needs of small businesses in conditions of economic instability remain insufficiently studied. Behavioural factors, regional differences in access to financing, and the consequences of reduced state support during the war period are also not covered. The purpose of this study was to assess the effectiveness of the use of bank credit instruments in the activities of agricultural enterprises in Ukraine. To achieve this goal, the following tasks were set: to analyse the volumes, conditions, and dynamics of bank lending to the agricultural sector; to identify the relationship between the use of credit resources and the financial results of enterprises.

MATERIALS AND METHODS

This study was practical in nature and covered the period from 2022 to April 2025. It was based on an analysis of the dynamics of bank lending to agricultural enterprises in Ukraine. The total volume of loans provided to the agricultural sector in 2021-2024 was studied using the descriptive method (Ministry of Agrarian Policy and Food of Ukraine, 2022; Landlord, 2023). Particular attention was paid to the programme “Affordable Loans 5-7-9%” PrivatBank (n.d.), which provided the main share of lending to agricultural producers in the period under study. The analysis of the discount rate of the National Bank of Ukraine (n.d.) was carried out in order to assess the impact of monetary policy on the availability of credit resources for the agricultural sector. The availability and conditions of international support programmes for agricultural enterprises were separately analysed using the descriptive method. The impact of the Prostir (n.d.), World Bank Group (n.d.) and Interfax (2023) programmes was studied. The impact of the programmes was assessed using the following criteria: total funding, areas of use of funds, form of support (grants, investments, material resources) and quantitative indicators of coverage. The analysis covered types of funding, targeted allocation of funds, implementation mechanisms and participants.

The case study method was used to analyse three leading agro-industrial companies of Ukraine – Myronivsky Hliboproduct (n.d.), Kernel (n.d.), and Astarta-Kyiv (n.d.). The selection of objects was justified by the scale of economic activity, a high level of availability of financial reporting, as well as the systematic use of bank lending and external financing mechanisms. The analysis of the activities of Myronivsky Hliboproduct (n.d.) considered sources of financing from international financial institutions, in particular IFC (n.d.) and DFC (n.d.), as well as raising funds through the charitable foundation MHP – Gromadi (n.d.). The company's profitability indicators were taken into account separately (Lati-fundist, 2024a). The analysis of the activities of Kernel (n.d.) involved studying its loan portfolio, including cooperation with international banks, such as ING Bank N.V. (n.d.), Rabobank (n.d.) and BSTDB (n.d.). Additionally, the dynamics of changes in the company's key financial indicators were taken into account (Bizagro, 2025). The analysis of Astarta-Kyiv (n.d.) examined sources of loan financing, in particular cooperation with the Ministry of Finance of Ukraine (n.d.) and the state-owned bank Oschadbank (FRU, 2023). In addition, operational activity indicators were taken into account, in particular production volumes and the seasonal results of agricultural campaigns APK Inform (2024), which are indicators of the efficiency of using the resources involved. The study also took into account the capabilities of digital platforms and fintech solutions in the field of lending to the agricultural sector. The analysis included the three most widely used digital solutions – AgroOnline (n.d.), Soft Farm (n.d.) and Drone UA (n.d.), which were selected according to the criteria of accessibility, level of implementation in agricultural production, integration with banking products and potential for automation of management processes. This stage of the study made it possible to assess the additional capabilities of digital solutions in increasing the efficiency of bank lending to the agricultural sector, which is directly related to achieving the stated goal – assessing the efficiency of using bank credit instruments in the activities of agricultural enterprises in Ukraine. A descriptive method was used to analyse digital platforms, and the results were

processed by summarising information from open sources regarding the functionality, scope, and integration with banking services.

RESULTS AND DISCUSSION

Analysis of the volume and structure of bank lending to agricultural enterprises in Ukraine

In 2022-2024, bank lending to the agricultural sector of Ukraine demonstrated a clear trend towards activation, which was made possible by a combination of state support, demand from agricultural enterprises for working capital and investment resources, as well as the adaptation of the banking system to wartime conditions. The largest growth occurred in 2022, and in 2023-2024, high credit dynamics with a stable loan portfolio structure were maintained (National Bank of Ukraine, 2025). In 2022, the total volume of bank loans granted to agricultural enterprises in Ukraine amounted to about UAH 118.9 billion, which is twice the level of 2021, when this indicator was approximately UAH 82.4 billion. The share of agricultural loans in the total bank portfolio reached 15%, which indicated a high level of financial activity in the sector. About 75% of all loans were issued in national currency, mainly for short-term needs – primarily to finance spring field work (Landlord, 2023). A significant factor in the activation of lending was the state programme “Affordable Loans 5-7-9%” PrivatBank (n.d.), within which farmers attracted more than UAH 38.5 billion by June 1, 2022. The total volume of loans under this programme during 2022 exceeded UAH 57 billion (Ministry of Agrarian Policy and Food of Ukraine, 2022).

In 2023, the high level of lending remained – the total volume of loans reached UAH 78.8 billion. About UAH 44.5 billion of loans were issued under the “5-7-9%” programme (PrivatBank, n.d.). During the year, almost 14 thousand agricultural enterprises took advantage of bank loans, of which 10.9 thousand were under the state programme of the Ministry of Agrarian Policy and Food of Ukraine (2024). In the first half of 2023, the high level of the National Bank of Ukraine (NBU) discount rate (25%) made it difficult to access commercial loans, the rates of which sometimes exceeded 20%. However, thanks to fixed rates within the state programme

(from 5% to 9%), farmers retained the opportunity to receive affordable financing (NBU, n.d.).

In 2024, the growth trend continued. During the year, 13,088 agricultural enterprises received bank loans totalling about UAH 104.5 billion, of which UAH 46.9 billion (i.e. about 46%) were under the “5-7-9%” programme. By the middle of the year alone, more than 9,600 loans had been issued in the agricultural sector, of which 8,500 were preferential (Verkhovna Rada of Ukraine, 2025). The NBU discount rate gradually decreased: from 16% at the beginning of the year to about 13% in the second half, which created the prerequisites for cheaper commercial loans, although the rate within the state

programme remained stable within a 5-9% of financing range (NBU, n.d.). As of April 2025, in a regional breakdown, the main recipients of funds remained Kyiv (up to UAH 21.7 billion), Dnipropetrovsk (UAH 7.5 billion), Vinnytsia (UAH 7.4 billion), Kirovohrad (UAH 6.9 billion), Odesa (UAH 6.4 billion) and Cherkasy (UAH 6.2 billion) regions. In addition to the preferential rate programme, portfolio guarantees were actively used – in Ivano-Frankivsk region alone the volume reached UAH 782.3 million (Ministry of Agrarian Policy and Food of Ukraine, 2025). Figure 1 illustrates the dynamics of the total volume of bank lending to agricultural enterprises in Ukraine in 2021-2024.

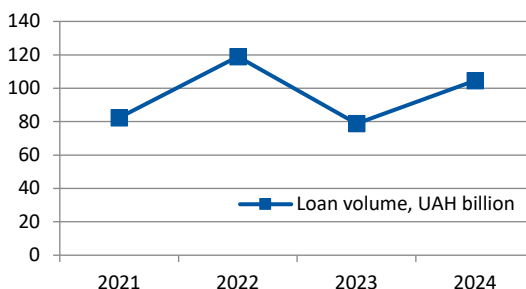


Figure 1. Dynamics of the total volume of bank lending to the agricultural sector of Ukraine in 2021-2024

Source: created by the authors based on Landlord (2023), Ministry of Agrarian Policy and Food of Ukraine (2024), Verkhovna Rada of Ukraine (2025)

Analysis of the graph presented in Figure 1 shows that 2022 became a turning point for the credit provision of the agricultural sector of Ukraine, when, under the influence of state incentives and urgent needs of agricultural producers, bank lending reached a record value. Despite the decline in 2023, a resumption of growth in credit activity is observed in 2024. Such dynamics confirm the importance of financial support programmes and the adaptability of the banking sector to high-risk conditions, which allows agricultural enterprises to stably access financial resources even in crisis periods. Thus, in 2022-2024, bank lending to the agricultural sector of Ukraine became a tool not only for anti-crisis response, but also for stimulating development. Both the absolute volume of lending and the number of enterprises that took advantage of state support programmes increased.

The programme “Affordable Loans 5-7-9%” PrivatBank (n.d.) remained the key mechanism through which up to half of all credit financing for the agricultural sector passed. The participation of different types of banks – state, private, and international – ensured flexibility in lending conditions and coverage of a wide range of farms in all regions of Ukraine.

During 2022-2025, state support for the agricultural sector through preferential credit programmes became a key tool for ensuring financial stability and development of agricultural enterprises in conditions of high risks. One of the main forms of such support is the programme “Affordable Loans 5-7-9%”, which covers both micro, small and medium-sized agricultural enterprises that meet certain criteria (Ministry of Agrarian Policy and Food of Ukraine, 2025). The participation of agrarian

businesses in this programme has increased significantly in response to military challenges, inflationary pressure and rising resource prices, as well as in view of the need for credit financing for seasonal and investment purposes. The right to participate in the “5-7-9%” programme was open to legal entities or individual entrepreneurs registered in Ukraine and who were its residents. The condition for access is conducting economic activity under the Classification of Economic Activities by KVEDs, assigned to section A “Agriculture”, in particular group 01.4 (livestock) and other codes covering crop cultivation, horticulture, viticulture, poultry farming. In addition, the programme allows enterprises engaged in the processing of agricultural products – the production of milk, flour, bakery products, etc. From January 1, 2025, participation in the State Agrarian Register (DAR) is mandatory to receive a preferential loan (Kharkiv Regional Military Administration, 2020).

Financing under the programme covers two key areas: lending for working capital (e.g., purchase of seeds, crop protection products, fuel for the sowing campaign) and investment goals – acquisition and modernisation of machinery, equipment, construction of storage facilities, implementation of development projects. The programme also allowed financing leasing transactions – for example, the purchase of agricultural machinery on lease. Lending rates depended on the type of business: 5% for operating enterprises with an annual turnover of up to UAH 50 million, 7% – for development, 9% – for new projects. The loan was provided in national currency through authorised banks that cooperate with the Entrepreneurship Development Fund (Kharkiv Regional Military Administration, 2020).

In 2024-2025, international financial organisations will play a key role in supporting Ukraine’s agricultural sector, directing significant resources to finance, restore, and modernise agricultural production. One of the most active donors is the United States Agency for International Development (USAID). In total, USAID has already invested more than USD 850 million, attracting an additional USD 510 million from the private sector and other donors. One of the key components of this support was the Prostir programme (n.d.),

which in 2024-2025, provided for investments of about USD 250 million. It is focused on small and medium-sized farms growing grain and oil-seed crops, as well as on developing the export potential of Ukrainian agricultural products. The goal is to increase exports by USD 1.5 billion and attract USD 500 million in private investment. The programme also provides large-scale grant support – about UAH 1.5 billion is provided for the development of innovative solutions and processing, and the grant amounts range from UAH 4 to 198 million. In addition, more than 7 thousand agricultural producers will receive mineral fertilisers (up to 2 tons each) for the spring sowing campaign of 2024 – in total, more than 14 thousand tons of fertilisers will be distributed. USAID also paid significant attention to frontline and de-occupied territories, supporting the restoration and stable activities (Verkhovna Rada of Ukraine, 2023).

The World Bank provided another large-scale area of support through the World Bank Group (n.d.) project – Emergency project to ensure inclusive support for the restoration of agriculture in Ukraine. The total amount of funding reached USD 700 million, of which USD 320 million is provided in the form of grants and USD 230 million in the form of concessional loans, in particular through the Interfax (2023) programme with the support of the Japanese government. The ARISE project aimed to assist more than 90 thousand small and medium-sized farmers through preferential lending, grants, support for horticulture and greenhouse farming. It was expected to mobilise additional working capital of USD 1.5 billion. About USD 50 million in grants will be directed directly to innovative agricultural programmes. A special role in the project was played by the restoration of irrigation systems after the destruction of the Kakhovka Dam – the formation of an irrigation restoration fund according to European standards is one of the priorities. The entire financing system is managed transparently through digital platforms, in particular the State Agrarian Register (DAR) (Interfax, 2025).

Thus, the results of the study indicate the high effectiveness of the combination of state credit support and international financing in ensuring the sustainability of the agricultural sector

of Ukraine in wartime conditions. The resources involved allowed a significant number of agricultural enterprises to maintain production activity, implement investment projects, support exports and modernise infrastructure. In contrast, the study by H. Hamdaoui & M. Cancelo (2024) was of a macroeconomic nature and analysed the relationship between the development of the banking system, GDP growth and commodity prices in France, Spain, and Romania. It was found that the banking sector had a positive impact on economic growth, although excessive debt, inflation and non-performing loans had a restraining effect. Both studies confirmed the key role of banks in stimulating the economy, but differed in scale, methods, and context. The study by J. Wang *et al.* (2024) was devoted to the impact of green lending on the development of agricultural enterprises in China. The authors found that financial support focused on environmental objectives contributed to increased productivity, reduced emissions and the introduction of eco-innovation, especially on large farms. The effectiveness of such loans depended on regional differences and financial accessibility. While that study examined sustainable development, this one examined ensuring financial sustainability through affordable credit, reflecting different strategic approaches to the role of financial instruments in the agricultural sector.

A similar logic to J. Wang *et al.* (2024) was demonstrated by Q. Wang *et al.* (2025), but in a digital context. The study showed that digital financial inclusion – through mobile platforms, online services, etc. – contributed to increasing the productivity of small and medium-sized agricultural producers, especially in regions with low banking infrastructure density. In this case, financing was considered not only as a resource, but also as a tool for overcoming regional inequality. In contrast, this study almost did not cover digital aspects, and the traditional banking system, combined with state support, played a key role. At the same time, both studies pointed out the need for active state participation in ensuring access to credit resources. The importance of systemic solutions in the field of financing was even more underscored by M. Nasir *et al.* (2025), who showed that in developing countries, the main barriers to innovation

remained not only limited credit, but also low financial literacy, information asymmetry and lack of trust in financial institutions. In this context, this study was consistent with the approach of M. Nasir *et al.* as it also underlined the need for government intervention, although it focused not on long-term modernisation, but on anti-crisis adaptation.

The study by C. Ngong *et al.* (2023) highlighted a different type of challenge – a deep structural lack of formal credit in rural areas of Cameroon. The authors argued that farmers were unable to realise the production potential due to limited access to credit resources and weak financial infrastructure. In contrast to this study, where government anti-crisis mechanisms played a key role, the work of C. Ngong *et al.* focused on the need to reform the financial ecosystem and improve the knowledge level of farmers. This indicated that access to financing remained a universal condition for effective development, but the ways to ensure it depended on the specifics of institutional barriers and the depth of structural problems.

In 2022-2024, bank lending to the agricultural sector of Ukraine increased significantly, which was due to a combination of state support, in particular through the programme “Affordable Loans 5-7-9%”, and the adaptation of the banking system to wartime conditions. Both state and private banks acted as key creditors, which ensured diversification of financing sources. The vast majority of loans were provided in national currency to cover short-term needs, but the share of investment loans gradually increased. Such dynamics indicate the preservation of financial activity of the agricultural sector even in times of crisis.

Assessment of the effectiveness of the use of bank loans by agricultural enterprises

In 2022-2024, Ukrainian agro-industrial companies demonstrated the active use of bank loans as one of the main tools for ensuring stable operational activities, investment development and increasing export potential. An analysis of three leading agricultural enterprises – Myronivsky Hliboproduct (n.d.), Kernel (n.d.), and Astarta-Kyiv (n.d.) – allowed defining the peculiarities of the relationship between

lending volumes and the financial performance of enterprises in crisis economic conditions. In 2022-2024, the financial dynamics of the MHP company demonstrated a close relationship between the effectiveness of credit provision, modernisation of production facilities and the gradual restoration of profitability after the crisis period. In 2022, the company recorded a net loss of USD 231 million, which was caused by significant exchange rate losses, the impact of military operations, and a decrease in export activity (APK Inform, 2023). At the same time, in 2023, the situation significantly improved due

to the implementation of anti-crisis financial measures, in particular, the refinancing of part of debt obligations, active attraction of funds from international financial organisations, and the implementation of investment projects to modernise bioenergy complexes. This allowed to increase production efficiency and reduce costs. As a result, MHP received a net profit of USD 142 million (Latifundist, 2024a). In 2024, the company maintained positive dynamics, ending the year with a profit of USD 144 million, which indicated stabilisation after the shock of the previous period (Fig. 2) (Pikalo, 2025).

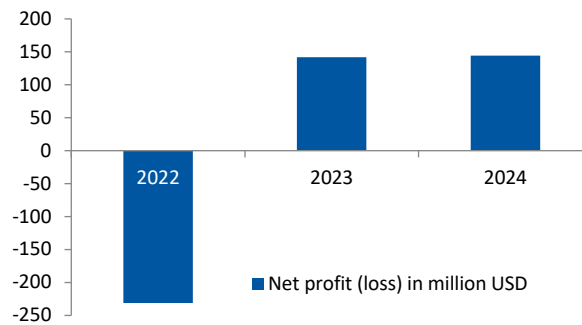


Figure 2. Dynamics of MHP's net profit (loss) in 2022-2024, million USD

Source: created by the authors based on APK Inform (2023), Latifundist (2024a), Pikalo (2025)

The graph in Figure 2 illustrates a clear turning point in MHP's financial results during 2022-2024. After significant losses in 2022, the company managed to quickly restore profitability in 2023 and maintain stable indicators in 2024. Such dynamics indicate effective management of financial risks, effective use of credit resources and gradual strengthening of the company's operational stability against the backdrop of a difficult economic situation. Over the past three years, the debt load has remained high at around USD 1.6 billion. The bulk of it was long-term, while short-term debt, including USD 500 million in Eurobonds due in 2024, was successfully refinanced through new credit lines. Thanks to stable access to international financial institutions, MHP has ensured flexible liquidity management (Agro Portal, 2024). For example, IFC (n.d.) provided USD 30 million for the modernisation of the bioenergy complex and USD 100 million to support financial stability. DFC (n.d.) allocated USD 250 million for

infrastructure improvements, including the construction of backup power supply systems. The Ministry of Finance of Ukraine (n.d.) provided the company with USD 100 million in financing with a commitment to introduce eco-technologies and improve management standards. In addition to international sources, MHP took advantage of the state programme to compensate 25% of the cost of Ukrainian-made agricultural machinery in 2024, which allowed it to update its technical base (DIA, 2024).

Despite the significant debt burden, the company demonstrated a gradual improvement in financial results. In 2023, the operating margin (sales profitability) reached 11%, while in 2022 it was 10%. The return on assets in 2023 was about 4.2%, which corresponded to the average level for agroholdings with high capital intensity. This demonstrated the company's ability to effectively use the resources involved to generate profit, despite the difficult macroeconomic situation (Latifundist, 2024a).

In parallel with bank lending, MHP actively attracted grants and implemented social projects through the MHP – Gromadi charitable foundation (n.d.). During 2022-2024, the fund implemented competitions to support small businesses (for example, “Do Your Own Business”), attracted more than 616 business applications from 15 regions, and the total amount of financing reached UAH 1.5 billion. Such initiatives complemented the company’s economic activities, strengthening its image as a responsible social investor (Forbes, 2025).

Along with MHP, the Kernel agroholding also actively attracted bank financing in 2022-2024 to stabilise operating activities, support export operations, and modernise infrastructure. In 2024, for the first time since the start of a full-scale war, the company attracted a USD 150 million credit line from a syndicate of European banks, including ING Bank N.V. (n.d.), Rabobank (n.d.), and BSTDB (n.d.). At the same time, internal financing was increased – for example, the credit limit of the Druzhba-Nova enterprise from Oschadbank (n.d.) increased to UAH 1.2 billion,

and Kernel’s total loan portfolio in this bank exceeded UAH 2.2 billion (Latifundist, 2024b).

The company’s financial dynamics during these years were unstable: in 2022, the company suffered losses of USD 41 million, which was a sharp contrast to the profit of USD 513 million in 2021. The main reasons were logistical difficulties and the impact of the war (Latifundist, 2022). However, in the 2023 fiscal year, Kernel restored profitability – net profit amounted to USD 299 million, Earnings Before Interest, Taxes, Depreciation, and Amortisation (EBITDA) – USD 544 million (Share UA Potential, 2023). In the 2024 fiscal year, there was a decline: net income decreased to USD 168-204 million, and EBITDA to USD 381-384 million. At the same time, the company’s net debt decreased from USD 453 million to USD 308 million, which strengthened financial stability despite the decline in profitability. However, the increased credit load and the difficult macroeconomic situation caused a decrease in the profitability of assets and equity (Bizagro, 2025). The dynamics of net profit (loss) for 2022-2024 are shown in Figure 3.

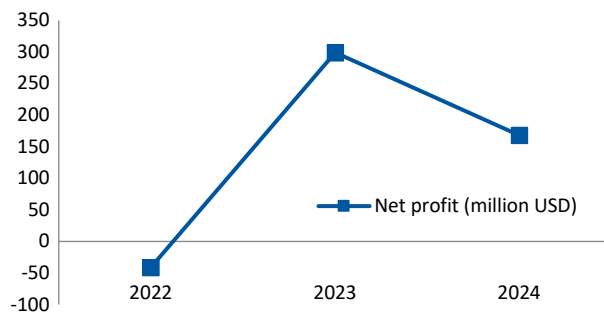


Figure 3. Dynamics of Kernel’s net profit (loss) in 2022-2024 (million USD)

Source: created by the authors based on Kernel Holding S.A. (2022), Kernel Holding S.A. (2023), Kernel Holding S.A. (2024)

Figure 3 reflects the clear dynamics of the company’s financial recovery: after a loss of USD -41 million in 2022, the company demonstrated a sharp improvement in results and achieved USD 299 million in profit in 2023. In 2024, profit decreased to USD 168 million, but remained at a significantly positive level. This trajectory indicates the efficient use of financial resources, the company’s ability to adapt to crisis conditions and the gradual strengthening

of its financial stability. In 2022-2023, Kernel negotiated with creditors to defer payments on the principal amount of the debt, but continued to service interest payments on time. In 2023, the company reached agreements to postpone payments of USD 600 million to 2024 and 2027, and in 2024 it successfully repaid Eurobonds for USD 300 million, which indicates the preservation of creditors’ trust. Loan funds played an important role in increasing export volumes. In the

first quarter of 2024, exports of grain and processed products increased by 2.3 times, and oil-seed processing by 27%. The company increased sales volumes due to the launch of a new oil extraction plant and improved logistics. In the 2023 fiscal year, Kernel exported 4.4 million tons of agricultural products to 70 countries around the world. The raised financing allowed Kernel to maintain stable operating activities, modernise production and expand exports, despite the difficult economic situation (Censor, 2024).

During 2022-2024, Astarta-Kyiv actively attracted credit resources to modernise and expand production capacities, develop the agricultural segment and agro-processing. In 2023, the company repaid loans in the amount of EUR 24 million and had access to unused credit lines in the amount of EUR 42 million as of December 31, 2022. At the same time, the management did not plan new long-term borrowings, focusing on optimising the debt portfolio. In 2024, the financial strategy changed – Astarta-Kyiv concluded a five-year investment agreement with PrivatBank (PrivatBank, n.d.) for USD 10 million, which provided for financing the expansion

of agricultural and sugar production. The funds were directed to the development of livestock, crop production, as well as the purchase of new machinery and equipment. In addition, the company agreed with Oschadbank to provide a loan of USD 60 million for the construction of an agro-processing plant. In 2023, financing was attracted from the IFC (USD 40 million) for the construction of a soy protein concentrate production plant, and from the EBRD – USD 30 million to support sustainable investments in agriculture and processing (FRU, 2023).

The total amount of confirmed financing for this period 2022-2024 exceeded USD 140 million. At the same time, most of the credit resources had a clear investment focus – on the development of production, and not on covering operating costs. In the structure of liabilities as of the end of 2022, short-term liabilities amounted to UAH 4.37 billion, long-term – UAH 4.07 billion, that is, the distribution was almost symmetrical. The company did not increase long-term debt in 2023, which indicates a prudent financial approach (Prasad, 2025). The dynamics of net profit for 2022-2024 is shown in Figure 4.

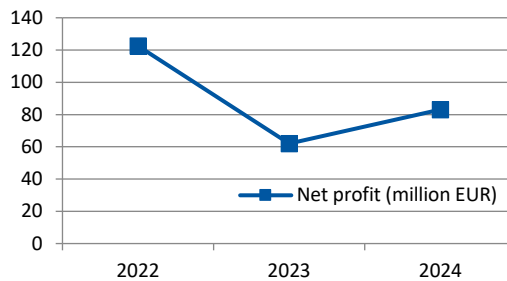


Figure 4. Dynamics of net profit of Astarta-Kyiv in 2022-2024 (million EUR)

Source: created by the authors based on Astarta Holding PLC (2022), Astarta Holding PLC (2023), Astarta Holding PLC (2024)

The graph reflects the dynamics of net profit of the company Astarta-Kyiv in 2022-2024. In 2022, the company demonstrated a high financial result – EUR 122.5 million, however, in 2023, profit significantly decreased to EUR 62 million, which indicates the impact of external risks and changing market conditions. In 2024, there is a partial restoration of financial performance – profit increased to EUR 83 million, which confirms the stabilisation of production activities and effective

cost management. According to financial indicators in 2023, Astarta-Kyiv demonstrated stability. The Debt-to-Equity ratio was 0.29, which is an indicator of low debt burden. The Interest Coverage Ratio at 4.6 indicated reliable coverage of debt service from operating income. This created a stable financial basis for growth (Guru Focus, 2025). Credit resources allowed the company to achieve record yields: in 2023, corn yield reached 10.35 t/ha (16.2% more than in 2022),

which provided 200 thousand tons of harvested products. Sugar production volumes increased by 34%, beet processing by 37%. Agricultural revenue increased by 33%, livestock increased by 10%, and milk production by 12% (APK Inform, 2024). Thus, the effective use of credit collateral had a direct positive impact on the company's productivity, profitability, and growth.

A comparative analysis of the three companies demonstrated a common trend – the effective attraction and use of bank loans made it possible to maintain or increase financial performance, implement investment projects, adapt to the risks of the war period and support export activity. All three enterprises ensured debt service, demonstrating responsible financial behaviour. The difference between these enterprises was in the volume of funds raised, debt structures and financial results, but in all cases a positive relationship was observed between the level of lending and indicators of production and financial efficiency. This confirms the feasibility of supporting access to credit resources for agricultural businesses in conditions of macroeconomic instability.

In the work of S. Aziz *et al.* (2024) the main attention was paid to the comparison of bank and fintech lending in Indonesia. As in Ukraine, access to bank loans remained limited for small farmers due to high collateral requirements and low financial capacity. However, unlike Ukraine, Peer-to-Peer (P2P) platforms were actively operating in Indonesia, offering flexible financing conditions, taking into account social factors and even allowing loans to be repaid with products. In this study, such mechanisms were not recorded – here, state support was implemented mainly through traditional banking instruments. A similar trend was observed in the study by R. Njotoprajitno *et al.* (2022), which confirmed that the growth of the share of problem loans (NPL) negatively affected the profitability of banks. In this aspect, both studies agreed: the effectiveness of banking activities in the agricultural sector directly depended on the structure of the loan portfolio. However, the Indonesian work was more macro-financial in nature and did not reveal the specifics of agricultural lending or the participation of the state in the financing process.

In turn, F. Sun (2022) investigated the problems of access to finance for small farmers in China. It stressed the role of information asymmetry, lack of collateral, and low financial literacy – factors that were also relevant to the Ukrainian context. Both studies recognised the critical need for government support. At the same time, the Chinese study focused on the application of digital technologies (scoring, Big Data), while this study was dominated by the analysis of institutional programmes without an emphasis on digital transformation. A deeper exploration of the topic of credit risk was proposed in the work of W. Deng *et al.* (2023), which assessed the effect of farmers' participation in environmental insurance programmes. The authors argued that insurance instruments reduced banks' risks and improved credit access. This approach partly echoed the Ukrainian experience, in which the level of risk also affected the financing structure. However, the Ukrainian study did not include insurance as an element of government policy, focusing on the credit dynamics of enterprises.

In 2022-2024, the leading agricultural companies of Ukraine – Astarta-Kyiv, Kernel and MHP – actively used both the own resources and external financing to ensure stability and development. Despite the difficult macroeconomic situation, these companies attracted significant amounts of credit funds from state and international banks, investing these funds in the modernisation of production, the development of processing and agricultural infrastructure. The attraction of investments was accompanied by a moderate level of debt burden and an increase in operational efficiency. This indicates a high level of companies' adaptive capacity to the challenges of wartime and the strategic orientation towards long-term sustainability.

Prospects for the application of digital solutions and new banking products in lending to the agricultural sector

In conditions of growing uncertainty in the economy and growing risks in agriculture, the digitalisation of financial services and the emergence of new banking products play a key role in transforming approaches to lending to the agricultural sector. Farmers face high price volatility, climate risks, logistical challenges, and limited

access to financial resources, especially during martial law. Therefore, banking institutions focused on cooperation with the agricultural sector are increasingly implementing digital tools that allow these institutions to reduce transaction costs, accelerate the process of making credit decisions, ensure transparency of financial transactions, and adapt products to the individual needs of agricultural enterprises.

One of the main prospects is the development of online lending and mobile banking for farmers. Such services are already being implemented by some state and commercial banks, in particular through the use of integrations with digital agricultural accounting platforms. For example, the Ukrainian platform Soft Farm (n.d.) offers agricultural producers integrated solutions for maintaining electronic agricultural accounting, field cartography, GPS monitoring of equipment and reporting, which can be linked to banking products for automated creditworthiness checks. Similarly, AgroOnline (n.d.) allows forming crop rotations, calculating a financial model of production and forming documents for submission for bank lending. For example, within the framework of the Ok Agro project, teams of agricultural companies studied the needs for digitisation, in particular working with Kernel (n.d.) and AgroOnline (n.d.). The company was tasked with calculating the economy and time for performing operations on the farm in such a way that this information was understandable not only to managers, but also to all employees. As a result, about 80% of the information has been integrated into a digital system, including land bank data, weather data, and agro-technological operations (Kurkul, 2020). In addition, Drone UA (n.d.) provides remote monitoring of crop conditions via drones and satellite data, which allows banks to assess the actual condition of collateral or predict yield as a factor in risk assessment. This data was used to reduce the time for creditworthiness analysis and minimise fraud risks. In the future, full integration of digital agricultural systems with bank CRMs will ensure continuous information exchange and prompt updating of credit limits in accordance with the actual financial condition of the enterprise.

The direction of applying Big Data technology, artificial intelligence (AI), and machine

learning algorithms for automated risk assessment is also rapidly developing. Banks can analyse large volumes of satellite images, climate data, and market trends to predict possible yields and borrowers' solvency. These tools not only increase the accuracy of forecasts, but also make it possible to create new types of financial products with a differentiated approach to insurance and loan portfolio formation. In particular, more active implementation of weather derivatives and parametric insurance is expected as components of new loan programmes for the agricultural sector, which allows the bank to reduce the risk of non-return in the event of adverse weather conditions. In parallel with the development of digital solutions, a transformation of banking products is observed. If previously classic working and investment loans with fixed rates prevailed, now banks are beginning to develop more flexible instruments. For example, banks developed credit lines with seasonal differentiation of the interest rate or with deferral of payments until harvest. The practice of agricultural receipts in digital format, which are integrated into banking processes as collateral, is also spreading. Such products allow attracting financing quickly, with minimal documentary support, provided there is trust in digital platforms and data transparency (Pattnaik *et al.*, 2024).

Another direction of future development is the expansion of banking ecosystems, which combine not only financial services, but also additional services for farmers: crop monitoring, agricultural exchanges, price analytics, consulting support. Banks' participation in such ecosystems allows banks not only to better understand customer needs, but also to offer integrated solutions, where lending will be only part of a comprehensive approach to farm management. In the future, such ecosystems may become a platform for placing new financial products, in particular, targeted green loans, microcredit for microfarms, products for young farmers, etc. Special attention should be paid to digital guarantee mechanisms that can reduce risks for banks in unstable conditions. This involves the integration of portfolio guarantee systems administered by the Entrepreneurship Development Fund into banks' digital channels. This allows loans to be provided without collateral or

with partial collateral, automating the process of interaction between the bank and the guarantor. In the future, such mechanisms may be expanded through the participation of international financial institutions (e.g., EBRD or IFC), which will contribute to increasing the availability of credit for small and medium-sized agricultural producers (Javaid *et al.*, 2023).

In addition, it is worth expecting the emergence of digital platforms based on open banking, which will provide farmers with full control over the financial profile. In particular, farmers will be able to choose the optimal loan offers from different banks, manage applications, compare rates, and see the lending history in a single digital office. This will increase competition between banks and help improve lending conditions in the agricultural sector. Certain prospects also open up for the introduction of central bank digital currencies (CBDC), which in the future can be used for targeted agricultural payments or control over the use of credit funds. Thanks to smart contracts, it is possible to ensure automated loan write-off only after achieving certain results (for example, purchasing fertilisers, completing the harvest, etc.). This significantly reduces the risk of misuse of resources and facilitates state control over the effectiveness of agricultural support programmes. However, along with the potential of digital solutions, there are also certain limitations. These include low levels of digital literacy among rural populations, weak Information Technology (IT) infrastructure in remote areas, insufficient integration of banking systems with agro-platforms, and cybersecurity risks. For the digitalisation of lending to be effective, government support is needed in the form of grants for digital modernisation of farms, tax incentives for the use of digital solutions, and the development of a single standard for interaction between banks and agro-services (Javaid *et al.*, 2023).

A comparison with the study by S. Mushtaq & S. Mushtaq (2023) revealed a common understanding of the positive impact of lending on agricultural production, but with a fundamentally different analytical focus. The authors considered 53 countries at the macroeconomic level, using econometric models to assess the impact of financial variables. At the same time, this study

focused on practical mechanisms of bank financing in Ukraine in conditions of military instability. While S. Mushtaq & S. Mushtaq found the contradictory role of government spending and foreign direct investment (FDI), this study, on the contrary, emphasised the importance in stabilising the financial condition of agricultural enterprises. Similarly, in the study of J. Kang & M. Zhao (2022), digital technologies were a key factor influencing access to finance. Fintech platforms and online banking in China became tools for attracting financial resources for rural households. In contrast, in the Ukrainian context, traditional banking mechanisms, as well as state and donor support programmes, played a primary role. Thus, digitalisation became a point of divergence, and the general conclusion about the importance of access to finance was a point of contact.

In turn, the study of C. Hu *et al.* (2023) also supported the thesis about the importance of financial inclusion, but in the context of the impact of digital financial services on farmers' incomes. At that time, this study focused on the prospects for the application of digital solutions. At the same time, both approaches agree that effective lending is the basis for sustainable agricultural development. Similarly, Y. Liu *et al.* (2021) emphasised institutional conditions and the quality of local governance as factors affecting the effectiveness of rural financing. In contrast, this study gave the leading role to state anti-crisis policies and the adaptation of banking systems. At the heart of both studies is increasing efficiency through access to resources, although the tools and implementation environment differed. The work of Z. Ding *et al.* (2024) offered an unconventional view, emphasising the connection between agricultural loans, land transfer and the green transformation of agriculture. The authors proved that adequate financing promotes environmentally friendly innovations. In turn, this study considered lending mainly as a mechanism for ensuring the economic sustainability of enterprises.

In summary, it can be argued that the prospects for the application of digital solutions and new banking products in agricultural lending are extremely promising. These innovations pave the way for deeper financial inclusion, reduced credit risks, increased transparency and

efficiency of agricultural financing. Combining digital innovations with adapted financial instruments will allow agricultural enterprises to better cope with challenges, increase production and strengthen the resilience in the long term. The successful implementation of these solutions depended on the cooperation of the state, the banking sector, digital platforms and farmers, who should become active participants in the new digital agrifinance ecosystem.

CONCLUSIONS

In 2022-2024, bank lending became a key tool for stabilising and developing the agricultural sector of Ukraine, as evidenced by a significant increase in the volume of financing and the number of farms involved. In 2022, UAH 118.9 billion in loans were provided to agricultural enterprises, which almost doubled the level of 2021. In 2023, the volume of lending reached UAH 78.8 billion, and in 2024 – already UAH 104.5 billion. A special role in this process was played by the state programme “Affordable Loans 5-7-9%”, within the framework of which UAH 44.5 billion was issued in 2023 alone, and UAH 46.9 billion in 2024. About 75% of all loans were provided in the national currency for the short-term needs of farmers, in particular, spring field work, which indicates a significant adaptation of banks to the needs of the industry.

Financial support covered both large agricultural holdings and small and medium-sized businesses, as evidenced by the increase in the participation of enterprises in the programme – from 10.9 thousand farmers in 2023 to 13,088 in 2024. At the same time, thanks to portfolio guarantees and mandatory participation in the State Agrarian Register, even farms with limited access to collateral were able to attract resources. In 2024, the volume of such guarantees exceeded UAH 782 million in Ivano-Frankivsk region alone. In addition, the participation of international financial institutions (USAID, EBRD, World Bank) provided additional financing channels – the AGRI-Ukraine programme alone attracted

more than USD 850 million, and the ARISE project – USD 700 million, of which USD 320 million in the form of grants.

Analysis of leading companies – MHP, Kernel and Astarta-Kyiv – demonstrated the effectiveness of attracting credit funds: for example, MHP managed to restore profitability from a net loss of USD 231 million in 2022 to a profit of USD 144 million in 2024. Kernel, despite a decrease in profit to USD 168-204 million in 2024, strengthened its financial stability, reducing debt to USD 308 million. Astarta-Kyiv demonstrated the lowest level of debt burden (Debt-to-Equity – 0.29), a high level of yield and an increase in production volumes. All companies successfully serviced debts, modernised production capacities and increased exports. It was found that the prospects for the development of agricultural lending in Ukraine are associated with the further digitalisation of financial services, the introduction of flexible banking products and the expansion of ecosystems that combine financing with agricultural services. Big Data, artificial intelligence, and digital collateral tools will play a crucial role in increasing the accessibility and accuracy of credit risk assessment. A limitation of this study was that behavioural factors in smallholder farmers' decision-making regarding lending were not taken into account, and digital aspects of financing were only partially considered. Future research prospects include in-depth study of the effectiveness of digital financial instruments, behavioural economics in the field of agricultural lending, and the impact of regional characteristics on access to banking resources.

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Аналіз ефективності банківських кредитних інструментів для аграрних підприємств України

Анотація. Метою даного дослідження було визначити рівень впливу банківських кредитних інструментів на фінансову стійкість, прибутковість і виробничу результативність сільськогосподарських підприємств України. У межах дослідження проаналізовано динаміку банківського кредитування агросектору у 2022-2024 роках. Загальний обсяг кредитів,

наданих аграрним підприємствам, зменшився із 118,9 млрд грн у 2022-му до 104,5 млрд грн у 2024 році. Частка пільгового фінансування за програмою «Доступні кредити 5-7-9 %» у 2024 році склала 46 % (46,9 млрд грн). У дослідженні здійснено аналіз трьох провідних компаній – «Миронівський хлібопродукт», «Кернел» та «Астарта-Київ», які активно використовували банківські кредити та міжнародне фінансування для стабілізації діяльності, модернізації виробництва та розширення експортного потенціалу. «Миронівський хлібопродукт» відновив прибутковість: від збитку 231 млн дол. у 2022 році до прибутку 144 млн дол. у 2024-му. «Астарта-Київ» збільшила врожайність кукурудзи до 10,35 т/га, виробництво цукру – на 34 %, а виручку з агровиробництва – на 33 %. «Кернел» залучив 150 млн дол. синдикуваного фінансування, що забезпечило 2,3-кратне зростання експорту в 2024 році. Дослідження довело, що банківські позики виступили не лише як антикризовий механізм, а й як інструмент зростання ефективності, модернізації та адаптації підприємств до умов високих ризиків. Практичне значення дослідження полягає в обґрунтуванні ефективності банківських кредитних інструментів як дієвого механізму підтримки аграрного сектору в умовах кризових викликів та в можливості використання отриманих результатів для вдосконалення державних програм фінансування

Ключові слова: фінансова підтримка; цифровізація; інвестиції; державна підтримка; експорт