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ADAPTIVE MODELS AND MECHANISMS OF ENTREPRENEURIAL'S PROJECT FINANCING ACTIVITIES IN UKRAINE IN THE CONDITIONS OF MILITARY UNCERTAINTY

Abstract. *Adaptive models and mechanisms of project financing, which are becoming critical for ensuring the sustainability of entrepreneurial activity in Ukraine in conditions of unprecedented military uncertainty were explored and analyzed in the article. Particular attention was paid to the need to integrate risk-sharing instruments between the public and private sectors. The study focused on transforming traditional approaches to assessing investments that have proven to be unviable in conditions of systematic military risk and mass destruction of capital assets, and to identify factors that minimize fiscal pressure and facilitate the attraction of private capital to critical recovery sectors. The methodology was based on the analysis of empirical cases (the «5-7-9%» program, grant mechanisms) and their critical comparative analysis using the real options theory (ROT) as a strategic framework for assessing managerial flexibility (relocation, expansion options). Global regulatory requirements (IFRS, RDNA4) and institutional risk transfer mechanisms (MIGA and DFC) were also systematized. The hypothesis of a direct proportional dependence of financing efficiency on the synergy between state compensation for systemic risk and the ability of enterprises to quickly adapt was substantiated. The results confirm that business sustainability was achieved through a two-vector mechanism: centralized risk absorption (MIGA/DFC) provides an «external anchor», and decentralized flexibility mechanisms allow the implementation of managerial options at the enterprise level. Empirical analysis showed the effectiveness of state credit risk subsidy programs and identified key challenges, which allowed formulating recommendations for the transition to mechanisms for subsidizing the cost of insurance premiums. The scientific value of the article lies in the substantiation of an adaptive project financing model that integrates ROT and institutional de-risking, as well as in the systematization of requirements for investors and forecasting possible consequences of modern financing models in Ukraine.*

Keywords: *project financing, adaptive project financing models, hybrid financing, political/military risk, international guarantees, DFC, EBRD, MIGA, PPP, first loss fund.*

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АДАПТИВНІ МОДЕЛІ ТА МЕХАНІЗМИ ПРОЄКТНОГО ФІНАНСУВАННЯ ПІДПРИЄМНИЦЬКОЇ ДІЯЛЬНОСТІ В УКРАЇНІ В УМОВАХ ВОЄННОЇ НЕВИЗНАЧЕНОСТІ

Анотація. *У статті досліджено та проаналізовано адаптивні моделі й механізми проєктного фінансування, які набувають критичного значення для забезпечення стійкості підприємницької діяльності в Україні в умовах безпрецедентної воєнної невизначеності. Особливу увагу приділено необхідності інтеграції інструментів розподілу ризиків між публічним та приватним секторами. Дослідження фокусується на трансформації традиційних підходів до оцінки інвестицій, які виявилися неспроможними в умовах систематичного воєнного ризику та масового руйнування капітальних активів, а визначити чинники, які мінімізують фіскальний тиск та сприяють залученню приватного капіталу в критично важливі сектори відновлення. Методологія базується на аналізі емпіричних кейсів (програма «5-7-9%», грантові механізми) та їх критичному порівняльному аналізі з використанням теорії реальних опціонів (ROT) як стратегічної рамки для оцінки управлінської гнучкості (опціони на релокацію, розширення). Також систематизовано світові нормативні вимоги (IFRS, RDNA4) та інституційні механізми ризик-трансферу (MIGA та DFC). Обґрунтовано гіпотезу про пряму пропорційну залежність ефективності фінансування від синергії між державною компенсацією системного ризику та здатністю підприємств до швидкої адаптації. Результати підтверджують, що стійкість бізнесу досягається завдяки двовекторному механізму: централізована абсорбція ризику (MIGA/DFC) надає «зовнішній якір», а механізми децентралізованої гнучкості дозволяють реалізовувати управлінські опціони на рівні підприємств. Емпіричний аналіз показав ефективність державних програм субсидування кредитного ризику та виявив ключові виклики, що дозволило сформулювати рекомендації щодо переходу до механізмів субсидування вартості страхових премій. Наукова цінність статті полягає в обґрунтуванні адаптивної моделі проєктного фінансування, яка інтегрує ROT та інституційний дерискінг, а також у систематизації вимог до інвесторів та прогнозуванні можливих наслідків сучасних моделей фінансування в Україні.*

Ключові слова: *проєктне фінансування, адаптивні моделі фінансування проєктів, гібридне фінансування, політичний/воєнний ризик, міжнародні гарантії, DFC, EBRD, MIGA, ДПП, фонд перших втрат.*

Introduction. Military uncertainty caused by full-scale armed aggression is considered an extreme manifestation of macroeconomic risk. It integrates political, physical (primarily the risk of asset destruction), and operational factors, creating an environment in which classical methods of financial analysis, in particular the calculation of net present value (NPV), lose their relevance. In wartime, it becomes impossible to adequately predict the probability of catastrophic events, as such events do not follow the usual statistical distribution.

One of the most acute problems facing the traditional banking model of project financing is the physical destruction of collateral. Classic long-term lending is largely based on the principle of collateral, but in conditions of military action, this mechanism loses its effectiveness, as assets serving as collateral may be destroyed or lose their liquidity.

Thus, Ukraine's banking sector was forced to make significant provisions for war-related losses, which amounted to UAH 33.5 billion for loans and UAH 7.1 billion for securities in the third quarter of 2024 alone. The National Bank of Ukraine (NBU) actively encourages banks to take a balanced approach to credit risk assessment, including proper valuation of collateral and rational restructuring [1]. This highlights the need to transform traditional collateral financing mechanisms into more adaptive models capable of ensuring flexible response and effective risk management.

Literature review. Analysis of contemporary literature indicates significant development of theoretical approaches to assessing the role of project finance (PF) mechanisms and political/military risk management tools, with an emphasis on the functioning of the regulatory environment, political risk insurance (PRI) models, guarantees for infrastructure projects in high-risk countries, and limited participation of private capital without adequate guarantees and de-risking mechanisms. For example, recent studies focus on how political risk directly affects infrastructure investment: Magwedere M., Marozva G. [2] show that infrastructure investment is cointegrated with the political risk index.

A particularly noticeable trend is that the last two to three years (especially after 2022) have led to an increased focus on the assessment of PF mechanisms (Project Finance mechanisms) as one of the possible tools for mobilizing capital and supporting economic recovery and entrepreneurial activity in post-crisis (military, political) conditions. Thus, an analysis of political risk and capital mobilization mechanisms (in particular through PRI) in the Development Finance Corporation report «Capital Mobilization Impacts Resulting from DFC's Political Risk Insurance Product» [3] notes that it is investments in countries with high political risk that require adapted financing models.

Among current scientific developments, considerable attention is paid to identifying barriers that hinder the

effective use of PF and related instruments (guarantees, insurance) in high-risk countries. Such obstacles most often include: insufficient availability of insurance for political/military risks, weak institutional trust, insufficient transparency of financial instruments in PF agreements, and volatility of the regulatory environment. The work of H. C. Demirel, W. Leendertse, L. Volker [4] examines the mechanisms that private investors use to protect their income on infrastructure projects in complex countries and highlights that without comprehensive coverage of political/military risks, the normal PF structure does not work.

Foreign studies of PF/PRI consider them in the broader context of financial ecosystems, where their effectiveness is closely linked to institutional trust, the quality of regulatory infrastructure, and the ability of states and financial institutions to act as guarantors or insurers of risks. For example, the World Economic Forum (WEF) in its report «Mitigation of Political & Regulatory Risk in Infrastructure» [5] emphasizes that political risks (expropriation, currency conversion, breach of contract) pose a fundamental threat to PF and require adaptive coverage tools.

At the same time, most of these studies are based on economic conditions in peacetime or in a relatively stable political environment, which reduces their relevance for countries experiencing military or post-conflict uncertainty, such as Ukraine.

Thus, a review of the available literature indicates that a theoretical framework has been established, including concepts of PF, political risk guaranteeing/insurance, and the role of institutions in financing infrastructure and entrepreneurial activity in conditions of risk. However, it reveals a significant lack of applied research devoted to the use of adaptive project financing models specifically for entrepreneurial activity in conditions of military uncertainty, as is the case in Ukraine, taking into account the transformation of classical financing models, high systemic risks, and limited internal resources.

Methodology. The methodological basis of the study is based on a combination of systematic, comparative, and statistical analysis, as well as the concept of real options (Real Options Theory – ROT) [6]. ROT allows assessing the value of managerial flexibility – the right, rather than the obligation, to change the parameters of an investment decision depending on the evolution of risk.

This methodology applies empirical cases of state financing programs ("5–7–9%", "eRobota" [7]), international guarantees (MIGA [8], DFC [9]), and innovative private solutions in the field of Defense Tech [10]. In particular, the mechanisms that implement various types of options are analyzed:

– relocation option (reorganization or transfer of production) [11];

– expansion option (investment in growth under conditions of stabilization [12]);

– abandonment option – exit from high-risk markets [11].

ROT is used as a strategic framework for integrating risk into financial decision-making. In wartime, such flexibility becomes critically important: it determines whether a business is capable not only of surviving, but also of recovering through the reorientation of assets and changes in operating models.

The main part. ROA becomes crucial in conditions of extreme uncertainty. It provides a methodology for assessing the value of managerial flexibility in investment projects, which is not available to the traditional NPV method [6]. A real option is a right, not an obligation, to make certain strategic decisions in the future (e.g., the ability to postpone, expand, reduce, or relocate a project). In the highly volatile environment characteristic of a war economy, the value of these options (such as the option to relocate production or the option to re-profile into Defense Tech) increases, which can make a project attractive to investors even if its static cash flows are negative.

That is why adaptive project financing is seen as providing enterprises with financial resources to implement these real options. For example, relocation grants are financing the cost of the relocation option. This points to an internal conflict of standards between different sources of capital. On the one hand, international donors and financial institutions (MIGA, DFC) require high transparency, audited reporting in accordance with international standards (IFRS), and compliance with ESG criteria [8; 9]. This is due to the need to integrate Ukrainian risks into global reinsurance mechanisms. At the same time, such participation criteria effectively prevent most micro, small, and medium-sized businesses (SMEs) from accessing such financial instruments. Therefore, government and donor programs (such as "Affordable Loans 5-7-9%" or "eRobota") act as a critically important mechanism for compensating for the inaccessibility of highly standardized international capital for SMEs, ensuring viability and financial stability at the micro level.

For large infrastructure projects financed through public-private partnerships (PPPs), traditional models (such as BOOT or DBFO) need to be adapted [13]. In wartime, project financing requires a model where the state assumes the function of centralized absorption of military risks. This allows the private partner to focus on financing and operation, reducing the risk premium.

ROT is a modern approach to analyzing investment decisions in conditions of significant uncertainty and high irreversibility. Its theoretical foundations are based on financial option theory, but adapted to the field of real asset management. In this context, real options are interpreted as the right of an economic entity to change the direction of its investment policy – to increase, decrease, or postpone investments – depending on the evolution of risk factors and the reduction of information uncertainty [6].

Renowned economist Paul Collier [14] emphasizes that economic policy in post-conflict countries must differ from standard development strategies, as the risk of renewed conflict is significantly higher. Collier argues that investments should be evaluated not only in terms of financial returns, but also in terms of their impact on social stability, particularly through job creation. Studies show that doubling per capita income reduces the risk of conflict by half, confirming that rapid economic growth is a tool for peacebuilding.

Ukrainian scientific thought [15; 16] emphasizes the need to conceptualize economic stability as a broader category than financial stability alone. Economic stability is defined as the ability of a system to withstand negative phenomena and includes:

– financial stability (insured by MIGA/DFC);

– production stability (ability to quickly resume production);

– personnel stability (retention of key personnel).

For investors, this means that the success of a project in Ukraine depends primarily on operational resilience, which reflects the priority of domestic scientific thought. The NBU's analytical reports, in particular the Financial Stability Report [1], serve as a critically important quasi-regulatory document that assesses systemic risks and the long-term prospects for macro-financial recovery.

The financing of Ukrainian projects is inextricably linked to international regulatory frameworks, which create both transparency and obstacles for investors (Table 1).

In our opinion, the effectiveness of adaptive project financing models in Ukraine in conditions of military uncertainty is directly proportional to the synergistic effect of integrating mechanisms for centralized absorption of catastrophic risks (through state guarantees and international insurance) and decentralized flexibility mechanisms implemented through optional management decisions at the enterprise level.

This view is based on a dualistic approach to risk management. Systematic, catastrophic risks that cannot be insured on the private market or are too expensive to insure should be assumed by supranational or state institutions. They act as an «external anchor» for the financial system. The state and international partners (such as the European Union, G7 countries, MIGA, and DFC) guarantee coverage of political and military risks, reducing systemic risk for private capital. This centralized absorption creates conditions for commercial banks to increase lending to businesses. Thanks to this stability, the net hryvnia loan portfolio to enterprises in April 2025 grew by 29% year-on-year [19].

At the same time, the high reporting and compliance requirements (IFRS, ESG) set by international insurers [8; 9] prevent most companies from using these instruments. To ensure micro-level sustainability, mechanisms of "decentralized flexibility" (internal resilience) are being introduced. State financial mechanisms, such as grants and preferential lending (in particular, the "5–7–9%" program), provide financial resources for rapid economic response. For example, priority financing for the manufacturing industry allows enterprises to exercise management options for re-profiling or modernization. This shows that the effectiveness of financing depends on the ability of businesses to dynamically exercise their management options, supported by state programs.

The "Affordable Loans 5-7-9%" program is a key instrument of state support, implemented through the Entrepreneurship Development Fund (EDF) and authorized banks. Since its launch in February 2020, despite the war, Ukrainian businesses have received 99,300 preferential loans totaling UAH 342,8 billion [20].

The program was significantly reformatted under martial law, shifting the focus from general liquidity support to strategic priorities that create high added value and strengthen economic stability. Lending is currently aimed at developing Ukrainian manufacturers as part of the "Made in Ukraine" policy. A significant portion of the funds is directed specifically toward investment goals and support for the manufacturing sector.

In 2024, within the framework of the "Affordable Loans 5–7–9%" program, 24,746 preferential loans were issued for UAH 93.1 billion, of which UAH 17.4 billion (18.7%) was directed to enterprises operating in areas of increased military risk, for which the preferential lending period was extended to five years. The program demonstrated a reorientation towards the real sector of the economy: the largest amounts of financing went to agribusiness, manufacturing, and trade, with UAH 18.1 billion going to the manufacturing sector, which underscores the state's strategic focus on food security and domestic production [7].

In fact, the program acts as a mechanism for state compensation of credit risk, allowing banks to maintain a balance between profitability and riskiness of operations. It is thanks to this model that the operational stability of the financial system is maintained and the corporate loan portfolio is gradually growing, despite the increase in macroeconomic uncertainty.

Despite the tangible results of the "Affordable Loans 5–7–9%" program, its implementation is accompanied by a number of challenges. The mechanism of state subsidization of interest rates creates potential fiscal risks, as part of the costs are actually shifted to the budget. This increases the relevance of strengthening control over the effective use of funds and improving the financial monitoring system. At the same time, despite banks maintaining their operational efficiency (CIR – 36.5% in Q3) [1], lending growth is occurring against a backdrop of subsidized risk, which requires an asset quality review (AQR) to prevent formal overstatement of portfolio quality and excessive dependence of banks on state guarantees.

Grant programs – both government and donor-funded – provide decentralized financial flexibility, allowing micro and small businesses to adapt to conditions of military uncertainty without incurring excessive credit obligations. They serve as a practical mechanism for implementing real options that enable businesses to reduce risks and take advantage of growth opportunities.

Table 1

International regulatory documents and regulatory requirements

Regulatory aspect / Institution	Key document / Standard	Main requirement / Mechanism	Relevance for investors
Accounting (risk)	IFRS (IAS 10, IAS 2)	Mandatory assessment of ability to continue as a going concern; disclosure of restrictions on access to assets.	Defines reporting requirements and minimizes asset revaluation.
War risk insurance (IFIs)	MIGA War/Civil Disturbance; DFC PRI.	Provision of guarantees against politically motivated losses (total business interruption).	Direct risk transfer mechanism; condition for attracting large FDI.
Recovery policy (IFIs)	World Bank RDNA4; EBRD Strategy.	Loss assessment (USD 524 billion); priority sectors (housing, energy).	Sets investment priorities for institutional support.

Source: constructed by the author based on data from [8; 17; 18; 21]

The flagship program "eRobota" (since July 2022) covers microgrants "Own Business" (up to UAH 250000) for starting or developing a business [7]. At the same time, there are EBRD grants (up to EUR 30000) and regional relocation programs (up to US dollars 4000 in Lviv region) are also available to compensate for transportation, rental, and production restoration costs, supporting options to abandon risk (Option to Abandon) and switch to safer regions (Option to Switch) [5; 6].

The effectiveness of grants is illustrated by a number of successful cases demonstrating the financing of real options:

1. Option for restoration and expansion. Ukrainian clothing and footwear manufacturer Miracle Kids used grant funds to purchase new equipment, which allowed it to resume production, increase business turnover, and expand production capacity [12].

2. Option to abandon risk and re-profile/relocate. Financial support for relocation covers the high operating costs required to implement the Option to Abandon in frontline areas and the Option to Switch in rear areas. The most striking and publicly recognized example of such consolidation and re-profiling is the Lviv Defense Cluster (LDC), which has consolidated production capacities, often unrelated to the defense sector before the war, to manufacture body armor and other military equipment [11].

International institutions play a key role in the centralized absorption of catastrophic risks for large investment projects that are critical to future reconstruction. Table 2 lists the key international mechanisms for insuring military risks in Ukraine. International financial institutions are increasing their participation in insuring military risks in Ukraine. MIGA (Multilateral Investment Guarantee Agency) and DFC (U.S. Development Finance Corporation) provide guarantees for investors against political and military risks [8; 9]. The first project insured by MIGA was M10 Industrial Park in Lviv, which received a guarantee of up to 9.2 million US dollars for a period of ten years, covering the risks of war and civil unrest [8]. This precedent confirms the possibility of safe investment in Ukraine even during active hostilities.

Both structures are expanding their support portfolios: DFC is completing four new projects, and MIGA is completing two new projects, comparable in terms of funding volume [9]. Obtaining such guarantees requires thorough due diligence, including audited financial statements, ESG indicators, and business plan analysis. Completing this procedure effectively means that international capital recognizes the financial stability of Ukrainian projects, which contributes to the standardization of risk management.

Despite the activity of institutions, private insurance remains limited – policies usually do not cover losses within 100 km of the combat zone, and premiums reach 0,5–5% of the investment amount [8]. At the same time, the EBRD is creating a special property insurance fund worth around 200 million EUR, which eight donors have already joined [21]. Together with the programs of export credit agencies of partner countries, this forms a market benchmark for pricing military risks and opens up opportunities for joint insurance of MIGA and DFC projects in strategic reconstruction sectors.

In the pre-war period, the Ukrainian venture market was characterized by high growth rates and the gradual formation of a mature investment ecosystem. Record capital raising volumes in 2021 demonstrated Ukraine's potential as a prominent regional player in the field of technology entrepreneurship. At the same time, the full-scale war caused a sharp decline in investment activity, necessitating a review of capital raising and risk management strategies.

According to Adventures Capital [10], in 2024, the total volume of venture investments in Ukrainian technology companies amounted to approximately 462 million US dollars, of which approximately 59 million US dollars was directed to the defense and dual-use sector (Defense Tech). This trend reflects the structural transformation of the market, which has gradually shifted from a focus on scaling to financing critical technologies for national security.

Among the main trends is the strengthening of the role of early stages of investment (pre-seed and seed), which is evidence of the caution of international investors and the growing importance of local capital. Ukrainian venture capital funds and angel associations have become key institutions supporting the functioning of the startup ecosystem despite the military uncertainty. Increased interest in Defense Tech projects demonstrates a high level of market adaptation and the integration of military risk into private capital business models.

Conclusions. Therefore, the financial stability of Ukrainian business activity in conditions of military uncertainty is achieved through the synergy of two key mechanisms:

1. Centralized risk absorption. Government programs [7] and international guarantees [8; 9] successfully absorb or compensate for systematic military risk, reducing the risk premium for the commercial banking sector.

2. Decentralized flexibility. Guarantee mechanisms and the reorientation of venture capital towards Defense Tech enable companies to exercise management options

Table 2

Key international mechanisms for insuring military risks in Ukraine

Agency/Instrument	Type of Coverage/Risk	Key Project Requirements	Price/Exceptions
MIGA (World Bank)	Political and Military Risks (up to 10 years)	Audited financial statements (IFRS), ESG reporting, due diligence	0.5%–5%+ of investment amount; complex procedures
DFC (US)	Investment insurance and project financing	Complex due diligence procedures, strategic importance	Finalization of four projects
EBRD Special Fund	Property insurance (in transit and in warehouses)	Portfolio approach; donor engagement (200 million EUR)	First contracts already signed
Private insurance companies	Limited war risks (rockets, debris)	High verification criteria, minimum distance from the front line	Exclusion of losses within 100 km of active combat operations

Source: constructed by the author based on data from [8; 9; 21]

(restoration, relocation, re-profiling), which is critical for maintaining business continuity.

Despite successful adaptation, there are systemic challenges that require attention:

1. Credit risk and collateral: the unresolved issue of damaged/destroyed collateral requires the NBU to assess the quality of banks' assets, as high lending occurs against a backdrop of significant reserve deductions.

2. Limited access to international capital: Strict MIGA/DFC requirements (IFRS, ESG) limit access to large guarantees to only a small pool of large companies.

3. Fiscal instability: excessive reliance on state compensation through the "5–7–9%" program creates long-term fiscal pressure, which, as the NBU notes, requires further narrowing the focus of state support to increase its effectiveness.

The following strategic steps are proposed to strengthen adaptive models of project financing:

1. Establishment of a state or specialized military risk insurance fund for medium-sized businesses that are too large for microgrants but do not meet the high criteria of international institutions. This mechanism should be supplemented by a clear definition of military events to minimize legal volatility.

2. Formalization of the assessment of real options in the methodology for selecting state investment projects (through 5–7–9% and PPP). This will allow preference to be given to projects with high management flexibility and resilience.

3. International financial assistance should be directed towards subsidizing the cost of insurance premiums for companies investing in critical sectors (processing, energy) or regions (de-occupied territories). This is a more effective approach than direct interest rate compensation, as it creates a market mechanism for risk sharing.

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