Andrii Kucher, Postgraduate Student
National University "Yuri Kondratyuk Poltava Polytechnic"
Poltava, Ukraine

DOI: https://doi.org/10.30525/978-9934-26-717-8-13

MODERN DETERMINANTS OF FORMING THE ECONOMIC SECURITY OF UKRAINE'S OIL AND GAS EXTRACTION INDUSTRY

The oil and gas extraction industry belongs to the basic sectors of the domestic fuel and energy complex and, at the same time, is one of the strategically significant segments of the national economy. Its output – natural gas, oil and gas condensate – is not only a commodity on the energy market but also a critical resource for the functioning of industry, heat power engineering, the housing and utilities sector, and transport. This issue has acquired particular importance since the start of the full-scale war, when domestic hydrocarbon extraction became one of the conditions for preserving the independence of the state.

The formation of the economic security of Ukraine's oil and gas extraction industry takes place under conditions of exogenous and endogenous turbulence, which necessitates the identification of determinants. Determinants define the direction of the industry's development and can either give rise to systemic risks or create preconditions for strengthening its resilience. The economic security of the oil and gas extraction complex should be viewed as a holistic, multi-component system. The matrix of modern determinants can be divided into seven blocks: geopolitical, regulatory-institutional, resource, innovation-technological, financial-economic, social, and environmental.

Geopolitical factors play the dominant role among modern determinants. The full-scale military aggression of the russian federation has shifted the emphasis from classical market risks toward the physical survival of enterprises. The key destructive geopolitical determinants are: the physical destruction of critical infrastructure facilities, which forced JSC "Ukrgasvydobuvannya" and JSC "Ukrnafta" to halt part of their capacities and reformat their logistics [1]; the temporary loss of control over frontline deposits and the impossibility of carrying out planned and capital works; the blocking of traditional logistics routes and the forced shift to European overland supply routes, which increases the cost of

production; and the risks of mine danger and cyberattacks on the technological systems of enterprises.

At the same time, geopolitical shifts have created incentives for Ukraine's integration into the European energy space, in particular the synchronization with ENTSO-G and the use of Ukrainian underground gas storage facilities by European traders. The orientation toward European standards of market transparency and energy solidarity serves as a long-term stabilizing factor.

The regulatory block defines the limits of economic independence and the financial stability of enterprises. Among the key regulatory determinants, the following should be highlighted [2]: the transformation of fiscal policy through differentiated rental payment rates tied to sales prices, which allows the state to withdraw excess profits to finance defense but increases business vulnerability under conditions of falling prices; the ban on natural gas exports, which mitigates the risk of domestic shortages but limits sales markets and the investment potential of independent producers; the reform of licensing and the digitalization of the State Service of Geology and Subsoil, in particular the introduction of electronic auctions and the "single window" principle, which reduces corruption risks and promotes investment attraction; and the role of the guaranteed buyer – NJSC "Naftogaz of Ukraine" – which both strengthens sales stability and creates risks of high market monopolization.

Resource endowment is the natural foundation of the industry's long-term economic security. The risk profile of this block is shaped by: the critical depletion of traditional deposits, which have been exploited for 45–60 years, with the depletion level of initial reserves reaching 75–78%; a shift in the structure of new reserves toward hard-to-recover and non-conventional sources at depths exceeding 5–6 thousand meters, which requires substantial capital investment; low rates of replenishment of the mineral resource base due to restrictions on seismic surveys and exploratory drilling under wartime conditions, which threatens a resource deficit over the next 10–15 years; and the high concentration of extraction at a limited number of giant deposits, which increases the vulnerability of the system. At the same time, prospective resources at great depths, on the Black Sea shelf, and in the Carpathian oil-and-gas-bearing region could, given a stabilization of the situation, transform Ukraine into a net exporter of energy resources.

Technological development determines the industry's competitiveness under conditions of a shift toward the development of depleted and deep-

lying deposits. The current profile of technological determinants is shaped by the following factors: critical dependence on imports of high-tech equipment (drilling rigs, MWD/LWD systems) and services from leading foreign service companies; the scaling-up of production intensification methods at depleted sites; the introduction of digital 3D/4D reservoir modeling based on Big Data, which reduces the risk of drilling "dry" wells; sidetrack and horizontal drilling to restore old wells without fully shutting them down; and the digitalization and automation of production (SCADA, remote field management), which enhances the physical safety of personnel in frontline areas. The technological determinant has a dual character: high import dependence creates vulnerabilities in the short term, while the transfer of Western technologies remains the only instrument for maintaining extraction volumes.

The financial component is an indicator of the viability of the economic security system, since the drilling of new wells and the modernization of infrastructure require capital-intensive, long-term investment. The key determinants are: a deficit of long-term capital due to high sovereign and war-related risks, which forces leading companies to rely primarily on self-financing and limited programs of international financial institutions (in particular the EBRD); a rapid rise in extraction costs resulting from more complex geological conditions, longer logistics chains, and inflation, which reduces business margins; the volatility of energy prices amid the limited capacity of the domestic market caused by the export ban and a decline in industrial consumption, which, when supply exceeds demand, reduces enterprises' return on capital; and the problem of payment discipline stemming from the social function of the state sector in supplying the population and district heating companies at regulated prices. Consequently, financial determinants require enterprise management to shift toward anti-crisis management, optimize the portfolio of investment projects, and maintain constant control over debt burden.

Human capital and safe working conditions are an integral component of the stable functioning of enterprises. An acute shortage of highly qualified personnel, caused by mobilization and migration, forces leading companies to develop in-house training and maintain competitive wages. An additional challenge is the complexity of the procedures for the critical draft deferral of scarce engineering and technical specialists, without whom it is impossible to ensure the continuity of production processes. Ensuring the physical safety of labor under conditions of constant air-raid alerts requires significant expenditure – in particular, the construction of

shelters, the protection of workplaces, and the rapid evacuation of personnel – as well as support for social stability in the company towns where enterprises operate, where financing local infrastructure and preserving jobs remain an important factor of institutional stability.

The environmental dimension of security is determined by the requirements of national legislation and global ESG trends and European integration. The main determinants are: the reduction of greenhouse gas emissions, in particular methane, through the introduction of leak detection and repair (LDAR) systems and the phase-out of associated gas flaring; the disposal of drilling waste and the protection of groundwater through the use of pitless drilling technologies and environmentally safe land reclamation after the completion of works; and the introduction of ESG standards as a mandatory condition for attracting capital from international financial institutions (the EBRD, the World Bank) in financing post-war reconstruction projects.

The analysis carried out made it possible to systematize the modern determinants shaping the economic security of Ukraine's oil and gas extraction industry across seven functional blocks. It was established that wartime destruction of infrastructure, geopolitical constraints, the depletion of traditional deposits, and critical import dependence in the field of high technology form systemic constraints on the functioning of enterprises, while simultaneously creating preconditions for the industry's post-war transformation.

References:

1. Morozova O. S., Zemliakov I. S., Lozinska L. D., Kulyk T. P., Harazdiuk V. V. (2024) Ekonomika hazovoi promyslovosti Ukrainy v umovakh voiennoho stanu. *Aktualni pytannia ekonomichnykh nauk*, no. 6, Available at: https://a-economics.com.ua/index.php/home/article/view/249/273.

2. Novosad I.V. (2026) Pravove rehuliuvannia naftohazovykh vidnosyn v ukraini: yevrointehratsiia ta voienni vyklyky. *Analitychno-porivnialne pravoznavstvo*, no. 01/2. pp. 146–155.