

WARSAW SCHOOL OF ECONOMICS  
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ECONOMIC DETERMINANTS  
OF NUCLEAR DETERRENCE

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## SUMMARY

In this paper, referring to the knowledge of security theory, specialist knowledge of military issues, elements of game theory, and modern economic thought, the problem of nuclear deterrence is analyzed from the point of view of economic sciences.

Analysis, synthesis, temporal and spatial comparisons, scientific criticism as well as the scenario method and individual case studies allowed to answer the research questions posed in the conceptual phase. With the selected methods, it was possible to verify the working hypothesis that, despite changes in geopolitics, nuclear deterrence is and will continue to be an economically correct tool for maintaining long-term balance and security in the world.

The following chapters of the work describe the main phase of the research process, which focuses on the economic justification of the need to have a stabilizer in the form of reliable and effective nuclear deterrence.

The first chapter analyzes the current state of development of nuclear weapons and shows that, in the light of the international treaties it is not possible to enter the group of nuclear states, unnoticed by international opinion. The currently used technologies of inducing a nuclear reaction are always based on the fission reaction of heavy uranium or plutonium nuclei, and which, due to the scarcity of resources, require an expensive enrichment process. Currently, work is underway on the next, fourth generation of nuclear weapons, which are to be based on the so-called cold fusion. The achievement of this goal will inevitably change the way nuclear weapons are viewed due to the likely high scalability of nuclear warheads, and therefore the possibility of building cheap weapons whose explosive power may on the one hand be comparable to the largest conventional bombs, and therefore it will be much easier to justify the will to use them. Technological progress, as it has been shown, is shown, however, mainly in the improvement of delivery capabilities. It is aimed at ensuring the ability to precisely hit the target, stealth maneuver and allowing to bypass anti-access systems. The result of technological development understood in this way is the reduction of the necessary warhead power, which in turn will cause an increase in pressure for possible use in tactical operations, ergo a real reduction in the value of nuclear deterrence.

The second chapter describes the concept of deterrence and presents the chronological evolution of this concept from the first Cold War US operational plans, which were a variation of carpet raids on enemy cities at that time, through the MAD doctrine, flexible response and ending with the strategy of a limited nuclear war, it describes the current state of doctrines held by nuclear states, most of which are retaliatory doctrines aimed at ensuring credibility. Several historically significant conflicts and crises of the Cold War that were at risk of nuclear war were also analyzed. The main difficulty is ensuring efficient communication and thus limiting the information gap, which, as the examples show, could lead to an escalation of conflicts to an unacceptable level. The post-World War II nuclear arms race was not the result of madness on either side, but rather a way to use deterrence as a tool in a geopolitical system, and tens of thousands of nuclear warheads, the combined number of which could have led to multiple deaths on Earth resulted from the calculation and estimation of the probability of achieving the target and resistance to enemy attack. It should be emphasized that in the Cold War era the threshold for launching strategic nuclear activities was very high. The concept of deterrence will evolve, due to the nature of technological progress, towards lowering the threshold for starting nuclear activities. It

should be noted, however, that the nature of these activities will be different from the pictures of Hiroshima and Nagasaki.

Next chapter shows that nuclear strategies are undoubtedly related to game theory. Before it evolved into economic research, this area of research was originally a tool for describing optimal strategies for dealing with conflicts, in particular nuclear ones. The concepts and conclusions drawn from game theory can still be a useful tool of analysis, although it becomes much more complicated in a multipolar space where cooperation and alliances between players are possible. The attempt to describe the current state is much more complicated than the Cold War analyzes of the actions of two major nuclear players. Therefore, there is a possibility of making several errors, which may result in the identification of incorrect nuclear strategies. The problem of information asymmetry is raised because it is assumed by default that all players, if they do not value individual moves in the same way, at least assign them values according to the same rules, which, as it turns out, in a crisis does not have to be true. The analysis of the game tree, to be credible, should consider multidimensional political, economic, social, military etc. analysis. This chapter also shows the use of strategic shifts in nuclear policy used to strengthen the player's position. The tools for maintaining one's own credibility and the conditions under which it will be possible to undermine it on the part of the opponent were also discussed.

The fourth chapter compares the costs of generating nuclear capabilities, their current maintenance and future modernization, mainly on the example of open and published US budget documents, which allow for estimating similar expenditures also by other nuclear states.

In the last chapter, an attempt was made to answer the question in what direction the transformation of the concept of deterrence will take place. It seems that there will be a gradual integration of classical and nuclear deterrence related to the lowering of the high barrier between the two approaches.

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The paper shows that the commonly accepted as correct statements that a complete ban on nuclear weapons should be pursued are not confirmed in an in-depth analysis based on both literature criticism and selected research methods. Moreover, the described opportunity cost comparison to deterrence by conventional means has shown that there is currently no alternative to nuclear weapons.

Nuclear deterrence, despite the geopolitical changes that have occurred, will continue to be an effective tool for shaping global peace. Although this concept was forged in the times of a bipolar vision of the world, based on the rivalry of two different concepts of economic development, it remains valid in the multipolar geopolitical space of the 21st century.