

**Article Type: Research paper**

The Impact of Export Control Regimes on Iran's Missile Defense Program

Babak Baharlooei¹, * Mahnaz Goodarzi², Ahmad Azin³

1. PhD Student, Department of International Relations, Isf.C., Islamic Azad University, Isfahan, Iran

2. Department of International Relation, Isf.C., Islamic Azad University, Isfahan, Iran

3. Department of Political Science, Isf.C., Islamic Azad University, Isfahan, Iran

Article Info. Received: 2024/10/26

Accepted: 2024/12/29

Available Online: 2025/6/10

Abstract

The development of Iran's missile program is one of the key military capabilities of the Islamic Republic of Iran, which has significantly contributed to enhancing the country's national security. However, this advancement has also led to increased pressure from adversaries aiming to undermine Iran's national security. Western policies have primarily focused on weakening Iran's deterrence tools, with export control regimes acting as a key countermeasure against the expansion of Iran's missile capabilities. This study investigates the impact of export control regimes on Iran's missile defense program from 1996 to 2022. The theoretical framework incorporates neorealism to analyze U.S. and Western behavior, and deterrence theory to interpret Iran's strategic response. The findings reveal that export control regimes have had both positive and negative effects. On the negative side, they have limited Iran's access

Mahnaz Goodarzi, Ph.D.**Address:** Department of International Relation, Isf.C., Islamic Azad University, Isfahan, Iran**E-mail:** m_goodarzi@iaau.ac.ir

How to Site:

Baharlooei, Babak, Goodarzi, Mahnaz and Azin, Ahmad. (2025). The Impact of Export Control Regimes on the Missile Defense Program of the Islamic Republic of Iran. *Fundamental and Applied Studies of the Islamic World*, 7(1). 5-7.



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to essential missile-related technologies, materials, and financial resources, as well as hindered knowledge exchange. On the positive side, these constraints have incentivized Iran to domestically develop missile technologies and achieve product innovation. The methodology used is descriptive-analytical, and data collection relied on library resources, official documents, and credible online sources.

The Islamic Republic of Iran's missile program constitutes a central pillar of its national defense strategy, playing a crucial role in deterrence and safeguarding national interests. In response to regional and international threats—especially following the Iran-Iraq war—Iran has advanced its missile capabilities despite increasing international restrictions. Among the most significant of these limitations is the Missile Technology Control Regime (MTCR), established to prevent the proliferation of missile technologies.

The bitter experience of the Iran-Iraq war convinced Iranian leaders that survival in an anarchic international system necessitates robust defense capabilities. At the time of Iraq's invasion, Iran was suffering from post-revolution instability and a weakened military, leading adversaries to assume that Iran's deterrent capacity was diminished. This historical lesson prompted Iran to prioritize missile deterrence as a strategic necessity.

Export control regimes have sought to hinder Iran's missile program by restricting access to advanced technologies, raw materials, financial resources, and scientific cooperation. These efforts, however, have not halted Iran's progress; instead, they have reinforced Tehran's resolve to achieve technological self-reliance. Iranian engineers have employed reverse engineering and domestic innovation to design and produce various generations of missiles, including Shahab, Ghadr, Sejil, Fateh, Qiam, Ashoura, and Emad. These missiles have shown significant improvements in range, accuracy, propulsion, and guidance systems. For instance, the transition from liquid to solid fuel has enhanced launch readiness, operational flexibility, and logistical efficiency.

Ironically, the export control regimes have contributed to Iran's technological advancement by compelling the country to invest in domestic R&D and human capital development. Consequently, Iran has emerged as a regional missile power, boasting high-precision ballistic missiles with ranges exceeding 2000 kilometers and equipped with advanced guidance systems.

From a neorealist perspective, the international system lacks a central authority to ensure state security. Hence, states must rely on their own capabilities to deter threats. Iran's missile development is a rational response to the regional insecurity and continuous threats posed by powerful adversaries.

The MTCR, initially founded by seven industrialized nations and now consisting of 35 members, attempts to control missile technology dissemination through legal and political mechanisms. Although Iran is not a member, it has been significantly affected by MTCR provisions. Nevertheless, Iran's ability to achieve indigenous advancements despite these constraints reflects the regime's limited effectiveness in restricting determined developing states.

The dual impact of export control regimes-obstructive and stimulative-is evident in Iran's case. On the negative side, Iran has faced restrictions in acquiring technologies, financial support, and international partnerships. These obstacles have increased R&D costs and delayed innovation. On the positive side, the necessity for self-sufficiency has driven Iran to develop homegrown missile technologies with increased range and accuracy, such as SHAHAB3-, SEJJIL, and EMAD. The development of Iran's missile capabilities is a fundamental component of its deterrence strategy. These weapons serve defensive purposes by deterring potential aggressors and securing Iran's strategic interests. Recognized as one of Iran's "strategic jewels," the missile program has also strengthened Iran's bargaining position in international negotiations. Although export control regimes were designed to curb Iran's progress, they have inadvertently fostered technological independence and resilience. Today, Iran stands as a key regional missile power, with its missile program playing a critical role in maintaining national security and enhancing diplomatic leverage against hostile states.

Key words: Missile Program, Export Control Regimes, Missile Technology Control Regime (MTCR), Neorealism, Deterrence.

Conflict of Interest

The authors declare that there is no conflict of interest in conducting this research study.