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DOI : 10.14746/ps.2025.1.10

THE EFFECTIVENESS OF SANCTIONS AS A TOOL OF COERCIVE DIPLOMACY: AN ANALYSIS OF THE ISLAMIC REPUBLIC OF IRAN CASE (1979–2025)

INTRODUCTION

Economic sanctions have become the predominant instrument of coercive diplomacy in contemporary international relations, employed by states and international organizations to alter target behavior without resorting to military force. The proliferation of sanctions regimes – increasing from 67 in 1990 to over 350 by 2024 – reflects their perceived utility as a policy tool situated between diplomacy and warfare (Drezner, 2024). However, empirical evidence regarding their effectiveness remains contested, with success rates varying significantly across studies and analytical frameworks.

The Islamic Republic of Iran represents a critical case for evaluating sanctions effectiveness, having been subjected to the most comprehensive and sustained sanctions regime in modern history. Since the 1979 revolution, Iran has faced unilateral U.S. sanctions, multilateral UN Security Council measures, and coordinated Western restrictions targeting its nuclear program, terrorism support, and human rights violations. This more than four-decade experience provides unique analytical leverage for understanding the conditions under which economic coercion succeeds or fails.

RESEARCH QUESTION AND OBJECTIVES

This study addresses the central research question: *To what extent have economic sanctions succeeded as a tool of coercive diplomacy against the Islamic Republic of Iran, and what factors explain their limited effectiveness in achieving strategic objectives?*

The research objectives are: 1. To evaluate the economic and political effectiveness of sanctions against Iran across different periods and policy objectives. 2. To analyze Iran's adaptive strategies for sanctions evasion and resilience-building. 3. To assess the

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impact of third-party cooperation, particularly the Russia-Iran partnership, on sanctions effectiveness. 4. To identify theoretical and policy implications for coercive diplomacy in multipolar contexts.

THEORETICAL FRAMEWORK

This analysis integrates three theoretical perspectives. Liberal institutionalism (Keohane, Nye, 1977) posits that sanctions leverage economic interdependence to enforce international norms, assuming rational cost-benefit calculations by target states. Realist theory (Mearsheimer, 2001) emphasizes that states prioritize security and survival over economic welfare, limiting sanctions effectiveness when core interests are threatened. Institutional theory (Lektzian, Souva, 2007) argues that regime type affects sanctions success, with authoritarian leaders better positioned to redistribute costs to populations while maintaining elite loyalty.

LITERATURE REVIEW

A. Theoretical Foundations of Economic Sanctions

Economic sanctions scholarship has evolved through distinct theoretical phases. Early optimistic assessments by Baldwin (1985) emphasized sanctions' utility as alternatives to military force, while subsequent empirical studies by Hufbauer et al. (2007) documented modest success rates of approximately 34% across 204 cases. This quantitative approach, while influential, has been criticized for methodological limitations including case selection bias and definitional ambiguity regarding "success."

Pape's (1997) influential critique argued that economic sanctions rarely succeed in their stated objectives, achieving success rates of only 5% in major cases. This pessimistic assessment sparked extensive debate, with Drezner (2003) introducing the "hidden hand" concept, arguing that successful sanctions often remain invisible as targets comply before formal imposition. Elliott (1998) offered a middle position, identifying conditional factors affecting sanctions effectiveness including multilateral coordination, clear objectives, and target vulnerability.

B. Regime Type and Sanctions Effectiveness

Institutional theory provides crucial insights into how domestic political structures mediate sanctions effectiveness. Lektzian and Souva (2007) demonstrate that democratic leaders, accountable to broad constituencies, face greater pressure to respond to economic pain than authoritarian rulers relying on narrow elite coalitions. This "selectorate theory" suggests sanctions should be more effective against democracies, contradicting conventional wisdom.

Escribà-Folch (2012) extends this analysis, showing that authoritarian regimes employ diverse strategies – repression, spending, and co-optation – to maintain power under sanctions pressure. Single-party regimes demonstrate particular resilience compared to military or personalist dictatorships. Grauvogel et al. (2017) identify "rally-around-the-flag" effects whereby external pressure strengthens regime legitimacy through nationalist mobilization.

C. Smart Sanctions and Targeted Measures

The 1990s witnessed evolution toward "smart" or targeted sanctions, designed to minimize humanitarian costs while maximizing pressure on decision-making elites. Cortright and Lopez (2000) advocated this approach following criticisms of comprehensive sanctions' civilian impact in Iraq. However, empirical evidence for superior effectiveness remains mixed.

Biersteker et al. (2016) found that targeted sanctions achieve success rates comparable to comprehensive measures while reducing humanitarian costs. Conversely, Nephew (2018) argues that comprehensive pressure remains necessary for significant behavioral change, as targeted measures allow regimes to adapt through elite rotation and economic restructuring.

D. Third-Party Effects and Sanctions Busting

Contemporary sanctions face increasing challenges from third-party circumvention and alternative alliance structures. Early (2015) demonstrates how sanctions "busting" by non-participating states can undermine effectiveness, particularly when targets maintain access to major markets or suppliers. The rise of China, Russia, and other non-Western powers has fundamentally altered this calculus.

Kozhanov (2018) analyzes how Russia's support enabled Iran to maintain economic stability during peak sanctions pressure (2012–2015), while Wang (2019) documents Chinese energy imports that provided crucial revenue streams. These studies suggest that sanctions effectiveness increasingly depends on great power consensus, which may be declining in multipolar contexts.

E. Iran-Specific Sanctions Literature

Iran sanctions have generated extensive specialized literature. Nephew (2018), a key architect of U.S. sanctions policy, provides insider perspective on design and implementation challenges. Katzman (2024) offers comprehensive Congressional Research Service analysis of legal frameworks and economic impacts. Farzanegan and Hayo (2019) provide econometric assessment of sanctions' macroeconomic effects.

Critical perspectives include Kiourktsoglou and Coutroubis (2016) on humanitarian impacts, and Maloney (2015) on regional strategic implications. Recent schol-

arship by Vatanka (2021) emphasizes domestic Iranian perspectives on sanctions as existential threats requiring comprehensive resistance strategies.

F. Literature Gaps and Contributions

Despite extensive scholarship, significant gaps remain. First, most studies predate the current multipolar transition and Russia-Iran strategic convergence. Second, limited attention has been paid to adaptive learning and counter-sanctions innovation by targets. Third, the intersection of nuclear proliferation dynamics with sanctions effectiveness requires deeper analysis.

This study contributes by: (1) extending temporal analysis through 2025 to capture recent developments; (2) systematically analyzing adaptive evasion strategies; (3) integrating theoretical insights from realism, liberalism, and institutionalism; and (4) providing policy-relevant recommendations for sanctions adaptation for more complex reality.

CASE STUDY APPROACH

This study employs a longitudinal single-case design analyzing Iran sanctions from 1979–2025. This method is appropriate given the research question's focus on causal mechanisms and complex interactions over time (Yin, 2018). Iran represents a "critical case" for sanctions theory given the comprehensiveness and duration of measures imposed.

The analysis employs process tracing to identify causal pathways linking sanctions implementation to behavioral outcomes. This method allows examination of intervening variables and alternative explanations while maintaining analytical rigor (Beach, Pedersen, 2019).

A. Data Sources and Collection

Primary sources include: • Official Documents: IAEA (International Atomic Energy Agency) reports (2006–2025), U.S. Treasury OFAC (Office of Foreign Assets Control) designations, UN Security Council resolutions, Congressional Research Service reports • Economic Data: IMF (International Monetary Fund), World Bank, and U.S. Energy Information Administration statistics on trade, GDP, oil exports, and inflation • Policy Documents: National Security Presidential Memoranda, executive orders, diplomatic cables (via declassified sources) • Secondary Analysis: Peer-reviewed articles, think tank reports, and expert interviews

B. Periodization and Variables

The analysis is structured chronologically across five periods: • Foundation Period (1979–1988): Initial U.S. sanctions and Iran-Iraq War context • Expansion Phase

(1995–2006): Comprehensive U.S. measures and terrorism designations • Multilateral Escalation (2006–2015): UN Security Council sanctions and nuclear focus • JCPOA Interlude (2015–2018): Negotiated sanctions relief and implementation challenges • Maximum Pressure Era (2018–2025): U.S. withdrawal, Iranian breakout, and Russia-Iran convergence.

C. Effectiveness Metrics

Sanctions effectiveness is evaluated across multiple dimensions: • Economic Impact: GDP growth, inflation rates, oil export volumes, currency devaluation • Behavioral Change: Nuclear program modifications, regional policy shifts, domestic governance reforms • Strategic Objectives: Achievement of stated U.S. and international policy goals • Unintended Consequences: Humanitarian costs, regional destabilization, alliance formation.

D. Comparative Elements

While primarily focused on Iran, the study incorporates comparative insights from North Korea and Venezuela cases to identify broader patterns in sanctions effectiveness against resilient authoritarian regimes. This controlled comparison enhances external validity while maintaining analytical depth.

E. Limitations and Validity

Key limitations include: (1) reliance on publicly available data may miss classified intelligence; (2) attribution challenges in linking specific sanctions to behavioral outcomes; (3) difficulty isolating sanctions effects from other variables. Validity is enhanced through triangulation across multiple sources and explicit attention to alternative explanations.

HISTORICAL EVOLUTION OF IRAN SANCTIONS

A. Foundation Period: Revolution and Hostage Crisis (1979–1988)

The Iranian Revolution fundamentally transformed U.S.-Iran relations, converting a strategic alliance under the Pahlavi regime into enduring antagonism. The 444-day American hostage crisis (November 1979–January 1981) provided the immediate catalyst for comprehensive economic sanctions, as President Carter invoked the International Emergency Economic Powers Act (IEEPA) on November 14, 1979 (Executive Order No. 12170, 1979).

The initial sanctions package froze $12 billion in Iranian assets held in U.S. financial institutions and imposed comprehensive trade restrictions. Iran's economic vulnerability was substantial – 40% of its imports originated from the United States in 1978, while Iranian oil comprised 10% of U.S. petroleum imports. The Carter administration anticipated rapid Iranian capitulation due to this economic dependence (Hewitt, Nephew, 2019).

However, Ayatollah Khomeini's revolutionary regime proved remarkably resilient, transforming economic pressure into ideological validation. The Iran-Iraq War (1980–1988) further complicated sanctions effectiveness, as military necessity drove innovation in procurement networks and barter arrangements. By 1988, Iran had developed rudimentary sanctions evasion capabilities including Dubai-based intermediaries and triangular trade arrangements with Syria and North Korea (Emami, 2024).

B. Expansion Phase: Terrorism Designation and Comprehensive Measures (1995–2006)

Iran's designation as a state sponsor of terrorism (1984) and subsequent legislative measures expanded sanctions scope beyond the original hostage crisis. The Iran-Libya Sanctions Act (1996) introduced secondary sanctions targeting foreign investment in Iran's energy sector, marking a significant escalation in extraterritorial enforcement (Eizenstat, 2004).

These measures coincided with Iran's nuclear program development under President Rafsanjani's reconstruction efforts. U.S. intelligence agencies detected undeclared nuclear activities by the early 2000s, culminating in the 2002 revelation of the Natanz uranium enrichment facility by the National Council of Resistance of Iran (National Council of Resistance of Iran, 2022).

Economic impacts during this period were moderate but sustained. Iran's GDP growth averaged 3.2% annually (1995–2005), constrained by technological limitations and investment restrictions. However, high oil prices following the Gulf War provided substantial revenue buffers, enabling continued nuclear development and regional proxy support.

C. Multilateral Escalation: Nuclear Focus and UN Security Council Engagement (2006–2015)

The period 2006–2015 represents the zenith of multilateral sanctions coordination against Iran. UN Security Council Resolution 1737 (2006) marked the transition from primarily U.S.-led measures to comprehensive international restrictions targeting Iran's nuclear and ballistic missile programs.

Successive UN resolutions escalated pressure systematically: Resolution 1747 (2007) expanded entity listings and arms embargoes; Resolution 1803 (2008) authorized cargo inspections and financial restrictions; Resolution 1929 (2010) imposed comprehensive sectoral sanctions including energy and shipping restrictions (United Nations Security Council, 2006, 2007, 2008, 2010).

The European Union's 2012 oil embargo and SWIFT banking exclusion represented peak multilateral coordination. Iran's oil exports declined from 2.5 million barrels per day (2011) to approximately 1 million barrels per day (2013), generating revenue losses exceeding $100 billion. GDP contracted 12.4% during 2012–2013, while inflation reached 40% and the rial depreciated 50% against the dollar (Ianchovichina, Devarajan, Lakatos, 2016).

Despite severe economic distress, Iran's nuclear program accelerated during this period. Centrifuge installations increased from 3,000 (2006) to 19,000 (2013), while uranium enrichment reached 20% purity – a significant proliferation concern. This counterintuitive outcome demonstrates sanctions' limitations in halting determined proliferation efforts (Katzman, Kerr, Nikitin, Garcia, 2014).

THE JCPOA EXPERIMENT: SANCTIONS RELIEF AND DIPLOMATIC ENGAGEMENT (2015–2018)

A. Negotiated Framework and Implementation

The Joint Comprehensive Plan of Action, concluded on July 14, 2015, represented the most significant test of sanctions-driven diplomacy in modern history. The agreement exchanged comprehensive nuclear restrictions for phased sanctions relief, creating a unique natural experiment in economic coercion effectiveness.

Iran's compliance measures were substantial: reduction of centrifuge installations from 19,000 to 5,060; limitation of uranium enrichment to 3.67%; redesign of the Arak reactor to minimize plutonium production; and implementation of comprehensive IAEA monitoring. These restrictions extended Iran's nuclear "breakout time" from 2–3 months to approximately one year (Mousavian, Mousavian, 2018).

Economic benefits materialized rapidly following Implementation Day (January 16, 2016). Iran's oil exports increased 25% within twelve months, while GDP growth reached 13.4% in 2016 – the highest rate since the 1979 revolution. The rial stabilized and inflation declined from 40% (2013) to 9% (2016), demonstrating sanctions relief's immediate macroeconomic impacts (Khajehpour, 2020).

B. Implementation Challenges and Structural Limitations

Despite formal sanctions relief, substantial barriers persisted. Primary U.S. sanctions remained in place, prohibiting direct American business with Iran. European banks maintained cautious approaches due to regulatory uncertainty and potential U.S. penalties for inadvertent violations.

The persistence of IRGC-related restrictions proved particularly problematic, as Revolutionary Guard entities controlled an estimated 40% of Iran's economy. Major international corporations – Boeing, Airbus, Siemens – signed preliminary agreements but implementation stalled due to compliance concerns (Reuters, 2018).

Humanitarian exemptions, theoretically protecting food and medicine imports, remained constrained by banking restrictions. Medical supply shortages persisted at approximately 25% of pre-sanctions levels, illustrating the difficulty of targeted relief implementation (Kokabisaghi, 2018).

C. Political Fragility and Domestic Constraints

The JCPOA's political sustainability faced challenges in both Tehran and Washington. Iranian conservatives, led by Supreme Leader Khamenei's office and IRGC leadership, viewed the agreement skeptically as Western deception requiring constant vigilance. Reformist President Rouhani's administration struggled to demonstrate tangible economic benefits to skeptical populations.

American domestic opposition intensified following the 2016 elections, with Republican candidates pledging JCPOA termination. Congressional efforts to reimpose sanctions through non-nuclear pretexts – terrorism, human rights, ballistic missiles – created implementation uncertainty that deterred private sector engagement.

CONTEMPORARY DEVELOPMENTS: MAXIMUM PRESSURE AND STRATEGIC REALIGNMENT (2018–2025)

A. U.S. Withdrawal and Maximum Pressure Campaign

President Trump's May 8, 2018 withdrawal from the JCPOA initiated the most intensive sanctions campaign in modern history. National Security Presidential Memorandum 2 (May 2018) directed comprehensive pressure to "bring Iran's oil exports to zero" while forcing renegotiation of nuclear and regional behavior.

The sanctions architecture targeted Iran's core economic sectors systematically: oil exports declined from 2.8 million barrels per day (April 2018) to approximately 200,000 barrels per day (April 2019) due to secondary sanctions enforcement. Banking restrictions severed Iran from international financial systems, while shipping sanctions targeted the Islamic Republic of Iran Shipping Lines and associated entities (The White House, 2018).

Economic impacts were severe but not decisive. Iran's GDP contracted 10% during 2018–2019, while inflation reached 51% and the rial lost 70% of its value. However, the regime maintained political stability through subsidy programs, repression of protests, and nationalist mobilization against U.S. pressure (World Bank, 2018).

B. Iranian Nuclear Breakout and Strategic Patience

Iran's response combined nuclear escalation with strategic patience, gradually reducing JCPOA compliance while avoiding irreversible proliferation steps. Beginning

May 2019, Iran exceeded uranium stockpile limits, resumed 20% enrichment (January 2021), and ultimately reached 60% purity approaching weapons-grade levels.

The latest IAEA report (May 31, 2025) documents Iran's most concerning nuclear developments: total enriched uranium stockpile of 9,247.6 kg, including 408.6 kg at 60% purity – sufficient for multiple nuclear weapons if further enriched. Iran's installation of advanced IR-6 centrifuges has reduced theoretical breakout time to mere weeks, according to IAEA Director General Grossi's warnings (United Nations Security Council, 2025).

Simultaneously, Iran expanded its regional influence through proxy support despite sanctions pressure. Houthi capabilities in Yemen, Hezbollah's precision missile program, and Iraqi militia coordination demonstrated continued power projection capacity. This suggests sanctions' failure to achieve core strategic objectives despite severe economic costs.

RUSSIA-IRAN STRATEGIC CONVERGENCE: A GAME CHANGER

The most significant development undermining sanctions effectiveness has been Iran's deepening partnership with Russia, accelerated by Moscow's February 2022 invasion of Ukraine and subsequent Western sanctions. This alliance represents a fundamental shift from historical competition to strategic cooperation driven by mutual sanctioning experiences.

Economic cooperation has reached unprecedented levels. Bilateral trade exceeded $15 billion in 2024, facilitated by barter arrangements bypassing dollar-based systems. Iran supplies approximately 400,000 barrels per day of crude oil to Russian-linked intermediaries, while receiving wheat, industrial machinery, and automotive parts. The CNA analysis (January 2025) identifies this cooperation as qualitatively different from previous Iran-Russia relations (Waller, Wishnick, Sparling, Connell, 2025).

Military collaboration has expanded dramatically. Iran has delivered over 4,000 Shahed-136 drones valued at $200 million for Russia's Ukraine operations, while receiving Su-35 fighter jets, S-400 air defense systems, and nuclear technology transfers. This military-industrial cooperation directly contravenes UN arms embargoes while enhancing both countries' capabilities (Grisé, Evans, 2023).

Financial integration represents perhaps the most significant sanctions circumvention mechanism. Iran's adoption of Russia's System for Transfer of Financial Messages (SPFS) and Mir payment system has processed $5.5 billion in bilateral trade (2024), providing alternatives to SWIFT exclusion. Additionally, both countries have instructed each other in sanctions evasion techniques, creating knowledge transfer networks that strengthen overall resilience (Foundation for Defense of Democracies, 2024).

BIDEN ADMINISTRATION'S DIPLOMATIC TRACK AND ITS LIMITATIONS

President Biden's inauguration raised expectations for JCPOA restoration through the Vienna Process negotiations (2021–2022). However, fundamental obstacles pre-

vented successful conclusion: Iran's demands for legally binding guarantees against future U.S. withdrawal; insistence on IRGC delisting from terrorist designations; and compensation for maximum pressure damages.

The talks' ultimate failure by late 2022 reflected deeper structural problems: domestic political constraints in both countries; Iran's reduced confidence in U.S. reliability; and changing regional dynamics including the October 7, 2023 Hamas attacks and subsequent regional escalation.

Biden's retention of Trump-era sanctions while pursuing diplomatic engagement created policy contradictions that undermined both tracks. Iran interpreted continued sanctions as evidence of bad faith, while domestic critics viewed diplomatic outreach as weakness rewarding Iranian intransigence (Fiedler, 2022).

TRUMP'S RETURN: MAXIMUM PRESSURE 2.0 (2025)

President Trump's return to office in January 2025 marked renewed sanctions escalation through a new National Security Presidential Memorandum. The updated "maximum pressure" campaign targets over 1,000 entities including China-based intermediaries and Malaysian shipping networks, while leveraging the 2024 Stop Harboring Iranian Petroleum (SHIP) Act for enhanced enforcement (U.S. Department of the Treasury, 2025).

Early results demonstrate both continuity and evolution in sanctions impact. Iran's oil exports declined from 1.5 million barrels per day (2024) to approximately 800,000 barrels per day by mid-2025, generating significant revenue losses. However, Iran's adaptation capabilities have proven more sophisticated than during the previous maximum pressure campaign.

The June 2025 U.S. proposal for interim nuclear arrangements – allowing limited enrichment while preventing weapons development – suggests recognition of maximum pressure's limitations. Iran's rejection, reflects continued skepticism toward U.S. guarantees following the 2018 JCPOA withdrawal.

IRAN'S ADAPTIVE STRATEGIES AND SANCTIONS EVASION

A. Evolution of Evasion Capabilities

Iran's sanctions evasion capabilities have evolved from rudimentary barter arrangements during the Iran-Iraq War to sophisticated financial networks rivaling those of established trading nations. This evolution represents organizational learning under pressure, with each sanctions escalation spurring innovation in circumvention techniques.

The foundation of Iran's evasion architecture rests on geographic advantages and diaspora networks. The UAE, particularly Dubai, serves as the primary transshipment hub for illicit trade and sanctions evasion (Krylova, 2023), hosting an estimated 500,000 to 800,000 Iranian nationals who facilitate trade through family and busi-

ness connections. Turkish ports provide alternative routes for sanctions circumvention (Janecek, 2013), while Malaysia and Singapore offer flags of convenience for tanker operations as part of the global shadow fleet network (Hilgenstock et al., 2024).

Front company networks have become increasingly sophisticated, employing shell corporations across multiple jurisdictions to obscure beneficial ownership. U.S. Treasury estimates suggest Iran processes $22 billion annually through shadow banking networks, utilizing correspondent banking relationships and trade-based money laundering to maintain international connectivity (U.S. Department of the Treasury, 2025).

B. Maritime and Energy Sector Adaptations

Iran's "shadow fleet" represents perhaps the most visible evasion mechanism, comprising approximately 400 crude oil tankers operating under flags of convenience to export oil despite sanctions (McQue, 2025). These operations employ sophisticated deceptive practices including ship-to-ship transfers in international waters, automatic identification system (AIS) transponder manipulation, and systematic document falsification to conceal cargo origins and destinations (U.S. Energy Information Administration, 2024). The shadow fleet operates beyond traditional regulatory oversight, utilizing aging vessels with murky ownership structures and minimal insurance coverage to circumvent Western sanctions regimes (McQue, 2025).

By 2025, approximately 60% of Iran's shadow fleet was previously registered under Panama's flag registry, though recent maritime authority reforms have significantly reduced this percentage as Panama removed over 650 vessels from its registry since 2019 to strengthen compliance with international sanctions (Federal Maritime Commission, 2025). The fleet now operates under diverse flag states including Liberia, Marshall Islands, and other jurisdictions offering flags of convenience with less stringent oversight mechanisms. Oil routing through Malaysian and Singaporean transshipment hubs adds operational complexity and costs but maintains crucial market access, particularly facilitating deliveries to China, which absorbs approximately 90% of Iranian crude oil and condensate exports, up from 25% in 2017 before sanctions reimposition (U.S. Energy Information Administration, 2024).

Domestic refining capacity expansion has strategically reduced Iran's vulnerability to petroleum product imports while enhancing export capabilities. Iran's total refining capacity reached 2.2 million barrels per day, positioning it as the Organization of the Petroleum Exporting Countries' (OPEC) second-largest refiner with a 16% share of OPEC's total refining capacity ("Tehran Times", 2022). The expansion included significant upgrades such as the 210,000 barrel-per-day crude oil distillation unit added to the Abadan refinery in March 2023 and the phased completion of the Persian Gulf Star condensate refinery with 420,000 barrel-per-day processing capacity (U.S. Energy Information Administration, 2024).

Concurrently, petrochemical production diversification has created alternative revenue streams beyond crude oil exports. The petrochemical sector now accounts for approximately 25% of Iran's non-oil exports, with the country producing over 70 distinct petrochemical products for international markets (TTSE Asia, 2025). This diversifica-

tion strategy has proven particularly valuable as Iran's petrochemical exports can be transported on smaller vessels that evade detection more easily than crude oil cargoes, with liquefied petroleum gas, fuel oil, and diesel oil accounting for more than 70% of total petroleum product exports in 2023 (U.S. Energy Information Administration, 2024).

C. Financial Implications of Evasion Mechanisms

The financial implications of these evasion mechanisms remain substantial, with Iran generating approximately $53 billion in net oil export revenues in 2023, despite operating under comprehensive sanctions regimes (U.S. Energy Information Administration, 2024). However, varying discounts on official selling prices, reaching as high as $11 per barrel to compete with similarly sanctioned Russian crude, have reduced overall oil revenues compared to pre-sanctions levels (U.S. Energy Information Administration, 2024).

D. Financial Innovation and Cryptocurrency Adaptation

Iran's financial sector adaptations represent significant innovation under pressure, demonstrating sophisticated responses to comprehensive banking sanctions. State-backed cryptocurrency exchanges processed approximately $3.5 billion in transactions during 2024, enabling international payments while bypassing traditional banking channels constrained by Society for Worldwide Interbank Financial Telecommunication (SWIFT) restrictions. The Central Bank of Iran has developed digital rial capabilities and implemented blockchain-based trade finance systems as part of its broader financial infrastructure modernization strategy (Clingendael Institute, 2025).

Non-dollar currency adoption has accelerated dramatically as Iran seeks to reduce dependence on U.S. dollar-dominated international financial systems. Trade with China increasingly utilizes yuan settlement mechanisms, with bilateral trade reaching $4.8 billion in 2024, representing a 16.2% increase from the previous year (TASS, 2025). The Russia partnership employs sophisticated ruble-rial arrangements facilitated by the integration of Russia's Mir payment system with Iran's Shetab domestic payment network, enabling direct currency exchanges without dollar intermediation (Krylova, 2023). India's rupee-based oil payment mechanism, though significantly reduced under intensified U.S. pressure, established important precedents for alternative currency systems that other sanctioned economies have subsequently adopted (U.S. Energy Information Administration, 2024).

Barter trade arrangements have reached industrial scales, particularly with Russia, Turkey, and regional partners seeking to circumvent dollar-based transactions. These sophisticated arrangements exchange Iranian oil and gas for manufactured goods, agricultural products, and technology transfers, effectively creating parallel economic systems that reduce dependence on traditional international financial architecture (U.S. Energy Information Administration, 2024). The Iran-Venezuela oil swap agreement

exemplifies this approach, with Iran providing condensates to dilute Venezuela's heavy crude while receiving lighter crude in return, enabling both countries to optimize their respective export portfolios despite sanctions constraints (U.S. Energy Information Administration, 2024).

E. Domestic Economic Resilience: The "Resistance Economy"

Iran's "resistance economy" doctrine, formally adopted following the 2012 sanctions escalation, emphasizes self-sufficiency and import substitution as strategic imperatives for reducing external vulnerabilities. This comprehensive approach has achieved partial success in developing domestic capabilities while imposing significant opportunity costs through reduced efficiency and technological advancement (World Bank, 2025).

Manufacturing localization has expanded across multiple sectors through systematic import substitution initiatives. Automotive production, historically dependent on foreign partnerships with companies like Peugeot and Renault, has shifted toward domestic supply chains and reverse-engineering of foreign technologies, though quality and efficiency gaps remain substantial (Iran International, 2024). Pharmaceutical manufacturing has strategically increased domestic production to approximately 70% of consumption, reducing dependence on imported medicines, though access to advanced medical equipment and specialized pharmaceuticals remains severely constrained by sanctions (World Bank, 2025).

Agricultural self-sufficiency efforts have achieved mixed results despite substantial government investment. Wheat production has increased through improved irrigation systems and enhanced seed technology, significantly reducing import dependence and enhancing food security resilience (U.S. Energy Information Administration, 2024). However, chronic water scarcity exacerbated by climate change impacts and regional drought conditions limits agricultural expansion potential, maintaining strategic vulnerability to food security threats that could be exploited by adversaries (Clingendael Institute, 2025).

The defense-industrial complex has demonstrated particular innovation under sanctions pressure, achieving technological breakthroughs that have transformed Iran from a military technology importer to an exporter. Iran's drone and missile programs, initially dependent on foreign technology transfers from sources including North Korea and China, have achieved sophisticated indigenous production capabilities that now compete internationally. The export of military technologies including Shahed drones to Russia represents a strategic reversal from historical import dependence, with over 4,000 drones delivered to support Russia's operations in Ukraine.

F. Technological Adaptation and Cyber Capabilities

Sanctions have accelerated Iran's technological development in specific sectors while severely constraining advancement in others, creating an uneven technological

landscape with significant implications for national capabilities. Cybersecurity capabilities have expanded rapidly, serving both defensive purposes against foreign cyber operations and as asymmetric tools for retaliation against sanctioning states (Krylova, 2023). Iran's cyber operations have systematically targeted U.S. and allied critical infrastructure including power grids, water systems, and financial networks, demonstrating sophisticated capacity for asymmetric retaliation beyond conventional military means (U.S. Department of the Treasury, 2025).

Domestic technology production has strategically focused on dual-use applications with direct military utility, maximizing return on limited resources under sanctions constraints. Iran's space program, despite comprehensive restrictions on advanced component imports, has achieved multiple satellite launches and developed indigenous launch capabilities that demonstrate technological adaptation despite severe limitations (U.S. Energy Information Administration, 2024). These achievements include the successful launch of reconnaissance and communications satellites that enhance both civilian and military capabilities while showcasing technological independence to domestic and international audiences.

However, advanced semiconductor dependence remains a critical vulnerability that constrains Iran's technological advancement across multiple sectors. Iran's access to cutting-edge microprocessors, specialized manufacturing equipment, and advanced materials continues to be severely restricted, significantly limiting capabilities in artificial intelligence, precision manufacturing, and advanced weaponry development (Clingendael Institute, 2025). This technological gap creates strategic dependencies that sanctions regimes specifically target to maintain long-term pressure on Iran's military and economic capabilities.

COMPARATIVE ANALYSIS: LESSONS FROM NORTH KOREA AND VENEZUELA

A. North Korea: Authoritarian Resilience and Great Power Patronage

North Korea's experience under comprehensive sanctions since the 1950s provides instructive parallels with Iran's situation, demonstrating how determined authoritarian regimes can maintain core strategic objectives despite severe economic pressure, particularly when supported by great power patrons. Both cases illustrate the limitations of economic sanctions in compelling fundamental policy changes when regimes prioritize survival and strategic capabilities over economic prosperity (Haggard, Noland, 2017).

China's role as North Korea's primary economic lifeline mirrors Russia's increasingly important relationship with Iran following the February 2022 Ukraine invasion and subsequent Western sanctions escalation. Chinese trade with North Korea exceeded $2.8 billion annually during the pre-COVID-19 period (2017–2019), representing over 90% of North Korean international commerce and providing essential economic support that enabled regime survival (Park, 2023). This economic dependence cre-

ated potential leverage opportunities, but China has consistently prioritized regional stability and buffer zone maintenance over denuclearization objectives, fundamentally limiting sanctions effectiveness (Lim, 2024).

North Korea's nuclear achievements despite comprehensive sanctions – including six nuclear tests between 2006–2017 and intercontinental ballistic missile (ICBM) development capabilities – directly parallel Iran's continued nuclear program advancement under similar economic pressure (Arms Control Association, 2024). Both cases empirically demonstrate that when authoritarian regimes conceptualize nuclear capabilities as existential survival requirements rather than negotiable assets, economic costs become secondary considerations in strategic decision-making calculus (Sagan, 2016). The achievement of "nuclear threshold" status provides asymmetric strategic leverage that fundamentally complicates traditional sanctions effectiveness calculations and creates deterrent effects against military intervention (Miller, 2023).

Key structural differences include North Korea's greater international isolation and Iran's substantially larger economy and deeper regional integration patterns. Iran's pre-sanctions gross domestic product (GDP) of approximately $400 billion significantly dwarfs North Korea's estimated $30–35 billion economy, providing considerably greater economic resilience reserves and adaptation capacity (World Bank, 2024). However, North Korea's virtually complete autarkic adaptation represents an extreme economic model that Iran has not approached and may be institutionally incapable of replicating given its more complex economy and society (Noland, 2022).

B. Venezuela: Resource Curse and Political Fragmentation

Venezuela under escalating U.S. sanctions since 2017 offers another comparative case of authoritarian regime survival under comprehensive economic pressure, sharing with Iran the strategic advantage of substantial hydrocarbon resources that provide alternative revenue streams despite international restrictions (Rodríguez, 2023). The Venezuelan case demonstrates both the potential resilience and vulnerabilities of resource-dependent economies under sanctions pressure.

Key similarities between Iran and Venezuela include systematic reliance on shadow networks for oil exports, severe currency devaluation accompanied by hyperinflationary pressures, and regime survival through security apparatus loyalty despite widespread popular discontent and economic hardship (Cannon, Brown, 2024). Both countries have strategically cultivated support from China and Russia, creating alternative economic partnerships and financial arrangements that partially mitigate Western pressure while demonstrating the limits of unilateral sanctions regimes (Ellis, 2023). Additionally, both regimes have employed similar strategies including currency controls, subsidized goods distribution, and selective repression to maintain social control during economic crisis periods (Human Rights Watch, 2024).

Critical differences highlight Iran's superior institutional capacity and strategic coherence compared to Venezuela's more chaotic adaptation patterns. While Venezue-

la's economy contracted over 75% between 2013–2020 during the peak crisis period, Iran's maximum economic contraction reached approximately 12% during comparable sanctions intensity, demonstrating greater structural resilience (International Monetary Fund, 2024). Iran's superior technocratic institutional capacity and more diversified economic base provide significantly greater adaptation potential than Venezuela's extreme oil monoculture dependence, which created vulnerability to both sanctions and commodity price volatility (Economist Intelligence Unit, 2023).

Political dynamics also differ substantially between the two cases, with important implications for regime stability and sanctions effectiveness. Venezuela's opposition fragmentation and contested legitimacy contrast sharply with Iran's more institutionally cohesive elite structure, despite ongoing factional competition within the Islamic Republic's power structure (International Crisis Group, 2024). Iran's revolutionary legitimacy narrative and nationalism provide regime mobilization resources that are largely unavailable to Venezuela's increasingly contested government, which faces fundamental legitimacy challenges that Iran's leadership has more successfully managed (Vatanka, 2023).

COMPARATIVE INSIGHTS FOR SANCTIONS THEORY

These comparative cases illuminate several critical patterns that fundamentally challenge traditional assumptions about economic sanctions effectiveness and contribute significant theoretical insights to the scholarly literature on coercive diplomacy and economic statecraft.

A. Great Power Support and Sanctions Circumvention

All three cases empirically demonstrate how major power patronage can decisively undermine multilateral sanctions effectiveness by providing alternative markets, financial systems, and technological support that enable target states to maintain core functions despite international pressure (Baldwin, 2020). China's sustained economic engagement with North Korea, despite United Nations Security Council resolutions, has provided essential lifelines that enabled regime survival and nuclear program continuation (Haggard, Noland, 2017). Similarly, Russian support for both Iran and Venezuela has created parallel economic architectures that bypass Western-dominated financial systems, fundamentally altering the strategic calculus of sanctions implementation (Connolly, 2024).

The theoretical implications suggest that sanctions effectiveness requires near-universal enforcement to achieve maximum pressure, but great power competition systematically undermines such consensus (Drezner, 2021). When major powers view sanctions targets as strategic assets or use sanctions circumvention as tools for broader geopolitical competition, economic coercion becomes significantly less effective and may produce counterproductive outcomes including enhanced target state resilience and alternative institutional development (Farrell, Newman, 2019).

B. Resource Endowments and Economic Resilience

Natural resource wealth, particularly energy resources, provides substantial sanctions resilience through multiple mechanisms including export revenue generation, barter trade capabilities, and strategic leverage over importing nations (Ross, 2012). Iran's oil and gas exports, North Korea's coal and mineral resources, and Venezuela's petroleum reserves have all enabled regime survival despite comprehensive economic pressure, suggesting that resource-rich states possess structural advantages in sanctions resistance (Escribà-Folch, 2012).

The "resource curse" literature typically emphasizes negative governance outcomes from natural resource dependence, but sanctions contexts reveal how resource endowments can paradoxically strengthen authoritarian resilience by providing alternative revenue streams and reducing dependence on sanctioning economies (Ulfelder, 2007). This pattern challenges linear assumptions about economic pressure translating into political change, particularly when target states can leverage resource exports to maintain elite loyalty and security apparatus funding (Wright, 2008).

C. Regime Cohesion and Institutional Adaptation

Authoritarian regimes with strong institutional capacity and elite coordination demonstrate consistently superior adaptation capabilities compared to fragmented or contested governments facing similar external pressure (Weeks, 2008). Iran's relatively cohesive theocratic structure has enabled more effective sanctions response coordination than Venezuela's increasingly chaotic governance patterns, while North Korea's totalitarian system represents the extreme case of centralized adaptation capacity (Gause, 2010).

The theoretical insight suggests that sanctions effectiveness may be inversely correlated with target regime institutional strength rather than directly related to economic pressure magnitude (Allen, 2008). Cohesive authoritarian systems can more effectively redistribute costs, suppress dissent, and maintain elite unity during economic crises, while fragmented systems may collapse under lesser pressure but also prove more difficult to influence through economic incentives (Conrad, 2011).

D. Strategic Priorities and Cost-Benefit Calculations

When regimes conceptualize sanctioned activities as existential requirements – whether nuclear weapons development, territorial control, or political survival itself – economic costs systematically become secondary considerations in decision-making processes (Bapat, Morgan, 2009). This pattern appears consistently across Iran's nuclear program continuation, North Korea's weapons development, and Venezuela's political system maintenance despite severe economic consequences (Nephew, 2018).

The theoretical implication challenges rational choice assumptions underlying sanctions theory, suggesting that when issues involve regime survival or core identity, traditional cost-benefit analysis becomes inadequate for predicting state behavior

(Pape, 1997). Sanctions may actually strengthen regime resolve by validating narratives of external threat and justifying domestic sacrifice, particularly when authoritarian governments can frame economic hardship as evidence of foreign hostility rather than policy failure consequences (Galtung, 1967).

These comparative insights collectively suggest that sanctions effectiveness depends more heavily on target state characteristics – institutional capacity, resource endowments, great power support, and strategic priorities – than on sanctions design or implementation intensity, fundamentally challenging policy assumptions about economic coercion utility in contemporary international relations (Morgan et al., 2014).

CONCLUSIONS

This study addressed the central research question: To what extent have economic sanctions succeeded as a tool of coercive diplomacy against the Islamic Republic of Iran, and what factors explain their limited effectiveness in achieving strategic objectives from 1979 to 2025?

The evidence conclusively demonstrates that sanctions have failed to achieve their primary strategic objectives despite imposing substantial economic costs. While sanctions reduced Iran's GDP by 12.4% during peak pressure (2012–2015) and cut oil exports by 60%, Iran's nuclear program has accelerated rather than diminished. Current uranium stockpiles of 408.6 kg at 60% enrichment represent a 30-fold increase since 2019, reducing breakout time from 12 months to 2–3 weeks (International Atomic Energy Agency, 2025).

This analysis contributes three critical insights to sanctions theory:

1. Authoritarian Advantage Thesis

Authoritarian regimes possess structural advantages in sanctions resistance that traditional liberal theories underestimate. Iran's theocratic system enabled elite coordination, cost redistribution, and nationalist mobilization that democratic governments cannot replicate. The "selectorate theory" receives partial validation – narrow elite coalitions prove more resilient than broad constituencies under economic pressure (Bueno de Mesquita, Smith, 2011).

2. Great Power Circumvention Paradigm

The Russia-Iran strategic convergence since 2022 fundamentally altered sanctions effectiveness calculations. Bilateral trade exceeding $15 billion, integrated payment systems (Mir-Shetab), and technology transfers demonstrate how great power competition systematically undermines multilateral economic coercion. This finding challenges assumptions about international consensus sustainability in multipolar contexts (Waller et al., 2025).

3. Adaptive Resilience Framework

Iran's evolution from rudimentary sanctions evasion (1980s) to sophisticated circumvention networks (shadow fleet operations, cryptocurrency adoption, resistance

economy doctrine) exemplifies organizational learning under pressure. Each sanctions escalation spurred innovation rather than capitulation, contradicting linear pressure-compliance models (Clingendael Institute, 2025).

Policy Effectiveness Assessment

Strategic Objective Failures

Sanctions achieved none of their stated goals:

– Nuclear Rollback: Uranium enrichment increased exponentially during sanctions periods;
– Behavioral Modification: Regional proxy support expanded despite economic pressure;
– Regime Change: Islamic Republic demonstrated remarkable survival capacity over 46 years;
– Diplomatic Compliance: The JCPOA's temporary success required sanctions relief, not pressure intensification.

Sanctions produced several counterproductive outcomes:

– Technological Innovation: Forced development of indigenous military capabilities, including drone exports to Russia;
– Alternative Partnerships: Accelerated Russia-China alignment against Western-dominated systems;
– Regional Influence: Economic isolation drove proxy network expansion as alternative power projection.

Policy Recommendations for Future Coercive Diplomacy:

1. Multilateral Framework

Future sanctions require legally binding international frameworks insulated from domestic political volatility. The JCPOA's collapse following U.S. withdrawal demonstrates how unilateral policy reversals undermine long-term diplomatic agreements (Fiedler, 2022).

2. Targeted Engagement Strategies

Rather than comprehensive pressure, policymakers should pursue issue-specific negotiations that acknowledge Iran's regional role while addressing specific concerns (nuclear proliferation, regional stability, human rights) through separate tracks. This approach recognizes the limits of economic coercion while maintaining diplomatic channels (International Crisis Group, 2024).

3. Technology-Enhanced Enforcement

AI-driven monitoring systems, blockchain transaction tracking, and enhanced maritime surveillance could improve enforcement effectiveness while reducing circumvention opportunities. However, technological arms races favor adaptive targets with sufficient resources, requiring careful cost-benefit analysis (Foundation for Defense of Democracies, 2024).

4. Alternative Incentive Structures

Future frameworks should emphasize positive inducements alongside restrictions, creating sustainable pathways for compliance that do not depend solely on economic pres-

sure. The temporary success of JCPOA implementation (2016–2018) demonstrates the potential effectiveness of comprehensive incentive packages (Khajehpour, 2020).

The Iran case provides crucial insights for broader theoretical debates about power, coercion, and international order. The failure of the world's most comprehensive sanctions regime suggests that economic interdependence may be less effective as a tool of influence in multipolar systems where alternative partnerships can compensate for restricted access to Western markets and financial systems (Farrell, Newman, 2019).

Moreover, the case demonstrates how authoritarian learning networks can emerge among sanctioned states, sharing evasion techniques and creating parallel institutions that reduce Western leverage. This phenomenon has implications beyond Iran, affecting sanctions effectiveness against Russia, North Korea, and other targeted regimes (Connolly, 2024).

Final Assessment: Rethinking Economic Statecraft

The Iran sanctions case fundamentally challenges core assumptions underlying contemporary economic statecraft. After 46 years and hundreds of billions in economic costs, sanctions have neither altered Iran's strategic behavior nor achieved stated policy objectives. Instead, they have accelerated nuclear development, strengthened authoritarian control, and contributed to alternative international system development.

This outcome reflects deeper structural changes in international relations – the emergence of multipolarity, technological disruption of financial control mechanisms, and authoritarian learning networks – that systematically reduce Western coercive capabilities. The era of uncontested Western economic dominance that made sanctions effective during the post-Cold War period is ending.

Policymakers must acknowledge these limitations and develop more nuanced approaches that combine economic tools with diplomatic engagement, technological innovation, and multilateral cooperation. The future of international order may depend less on the ability to coerce through economic pressure and more on the capacity to build inclusive institutions that provide positive incentives for cooperation.

The Iranian case serves as a cautionary tale about the limits of unilateral economic power in an increasingly multipolar world. Future coercive diplomacy must adapt to these realities or risk continued policy failures that strengthen adversaries while weakening international cooperation frameworks. As the international system becomes more multipolar and economically fragmented, the utility of sanctions as a primary tool of statecraft will likely continue to decline, necessitating fundamental rethinking of how democracies project power and influence in the 21st century.

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ABSTRACT

This study examines the effectiveness of economic sanctions against Iran from 1979–2025 through longitudinal case study analysis. Despite imposing substantial economic costs – including 60% reduction in oil exports (2012–2015) and 12.4% GDP contraction – sanctions failed to achieve strategic objectives. Iran's uranium stockpile reached 408.6 kg at 60% enrichment by May 2025, demonstrating continued nuclear advancement. The Russia-Iran strategic partnership since 2022, involving $15 billion in bilateral trade and integrated payment systems, fundamentally undermined sanctions effectiveness. Findings reveal that authoritarian resilience, third-party circumvention, and geopolitical realignment limit economic coercion effectiveness, requiring fundamental revision of traditional sanctions frameworks in multipolar contexts.

Keywords: economic sanctions, coercive diplomacy, Iran, nuclear proliferation, authoritarian resilience, Russia-Iran cooperation, sanctions evasion

SKUTECZNOŚĆ SANKCJI JAKO NARZĘDZIA DYPLOMACJI PRZYMUSU: ANALIZA PRZYPADKU ISLAMSKIEJ REPUBLIKI IRANU (1979–2025)

STRESZCZENIE

Niniejsze badanie analizuje skuteczność sankcji ekonomicznych wobec Iranu w latach 1979–2025, opierając się na trwającym kilkadziesiąt lat studium przypadku. Pomimo znaczących kosztów gospodarczych – takich jak 60-procentowa redukcja eksportu ropy naftowej w latach 2012–2015 oraz 12,4-procentowy spadek PKB – sankcje nie doprowadziły do osiągnięcia zakładanych celów strategicznych. Do maja 2025 roku zapasy uranu w Iranie wzrosły do 408,6 kg przy 60-procentowym poziomie wzbogacenia, co dowodzi kontynuacji rozwoju programu nuklearnego. Dodatkowo strategiczne partnerstwo Rosji i Iranu, rozwijane od 2022 roku i obejmujące handel o wartości 15 miliardów dolarów oraz integrację systemów płatniczych, znacząco podważyło skuteczność sankcji. Wyniki wskazują, że odporność auto-

rytarnych reżimów, mechanizmy omijania sankcji przez państwa trzecie oraz geopolityczna rywalizacja ograniczają efektywność przymusu ekonomicznego. W konsekwencji konieczna staje się fundamentalna rewizja tradycyjnych ram stosowania sankcji w warunkach świata multipolarnego.

Słowa kluczowe: sankcje ekonomiczne, dyplomacja przymusu, Iran, proliferacja nuklearna, odporność autorytarna, współpraca Rosja–Iran, omijanie sankcji

Article submitted: 08.06.2025; article accepted: 17.09.2025.