

The Nuclear Issue and Iran-US Relations: Perspectives and Different Natures

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Abstract

Since two decades ago, the Iranian nuclear issue became a full-scale international conflict. Iran's main preference is to guarantee its national security. In fact, the lack of a strategic ally for Iran and the channels of intense conflict around it, the scarcity of conflict management strategies and mechanisms, are forcing Iran to pursue a nuclear program. Furthermore, some severe institutional and structural confinements and limitations on Iran and the immediate need to recover its vulnerable economy have forced Iran to subsidize its fortified attitudes and behave as a rational actor in the international atmosphere. But the United States' preference is to stabilize the regional equation with regard to support of its strategic resources and allies in the Middle East. The lack of similar understandings and different levels of calculation between Tehran and Washington over nuclear politics led to long-lasting conflict. While Iran justifies its political logic with normative paradigm and consistency with international regimes, Washington's political calculations are standing for security, threat and deterrence approaches. Moreover, whereas Iran explains its nuclear activities at the regional and trans-regional levels, the US analyzes it at the international level disordering the global status quo. In this paper, the game theory models will be used to understand the past and current relationship between US-Iran. Furthermore, the possibility of equilibrium movement regarding the Iranian nuclear problem will

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be discussed. This analysis will focus on the preferences and interests of each state, which mainly determine the foreign policy-making process.

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Introduction

Iran's nuclear policy has long been considered as one of the most complex issues at the international level especially after the Iran-Iraq war. Since the Islamic Revolution in Iran in 1979, Iran's adherence to the principles of anti-Americanism and the development of weapons has caused a number of international controversies. After Hassan Rouhani was elected as the seventh president of Iran in 2013, the conflict seems to have settled down. Nevertheless, given the disordered situation in the Middle East such as unstable Saudi Arabia-US relations or chaos caused by ISIS, the orientation of the Iranian nuclear issue is still important for regional situations and is worth a lot of research.

Looking back, the nuclear program in the Islamic Republic of Iran first began in the 1950s with a US initiative called Atom for Peace. In its early stage, Iran's plan on building nuclear plants was mostly linked to the US and some western European countries (Bahgat, 2006: 308-309). Afterward, Iran signed Non-Proliferation Treaty (NPT) in 1968 and ratified it in 1970, and the nuclear program was the goose hangs high. However, Iran's nuclear program was halted with the overthrow of the Shah of Iran. Ayatollah Ruhollah Khomeini abandoned the nuclear program, which had lasted for more than 20 years, because he considered nuclear weapons to be forbidden (sinful). (Melman, 2008: 89-90). In addition, during the Iran-Iraq war, the nuclear program was physically disrupted when two Bushehr nuclear reactors were severely destroyed by an Iraqi air force attack.

Iran's nuclear program, which has been on hold for more than a decade, was reactivated when Iran and Russia agreed in 1995 to

cooperate on Iran's nuclear development, including the reconstruction of Bushehr nuclear power plants. In 2002, the National Council of Resistance of Iran, an opposition group to the Iranian government, revealed the existence of nuclear facilities in Natanz and Arak, and then the International Atomic Energy Agency (IAEA) began its investigation in February 2003. In October, Iran and the European Union (France, Germany and the United Kingdom) agreed to halt Iran's enrichment process, and in December, Iran signed the Additional Protocol to the Non-Proliferation Treaty. In June 2005, Mahmoud Ahmadinejad was elected as Iran's new president and his nuclear policy triggered the full-scale dispute over Iran's nuclear program. In April of 2006, he officially announced that 'Iran has joined the list of countries with nuclear technology' (the CNN Wire Staff, 2012), which brought about the United Nations Security Council (UNSC) resolution and subsequent sanctions on Iran. Since then, a series of clashes have continued and the rift between Iran and the international community has widened. The international community forced itself to continue negotiations, but most of the bargaining process ended in failure. (Perwita and Razak, 2020).

Finally, though the nuclear negotiation between Iran and the international community once even seemed to be never-ending, following the election of Hassan Rouhani as the new president and plans to strengthen relations with the international community and agree on a joint action plan, the negotiation process is showing signs of improvement.

The nuclear program, as Iran's most complex international political issue after eight years of war against Iraq, provoked mixed reactions from various actors. The lack of similar understandings and different levels of calculation between Tehran and Washington over nuclear issues led to long-lasting conflict. While Iran justifies its political logic with normative paradigm and consistency with international regimes at the theoretical level, it legitimizes the program with security paradigm and regional unconventional geopolitics at a practical level. On the other hand,

Washington's political calculations are standing for security, threat and deterrence approaches at the theoretical level and normative pattern and maximal restrictions for Iran and preventing the emergence of new nuclear actors at the practical level. In addition, while Iran describes its nuclear activities at the regional and trans-regional levels and creates deterrence, the United States analyzes it internationally with the irregularity of the global situation.

Historically, the nuclear behavior of Iran and Western countries, especially the United States, has shown different periods.

I- Historical Trend

First, Since the Islamic Revolution in 1979 Until 2002: The spread of Islamic values during the Islamic Revolution, on the one hand, and the treatment of nuclear activities as Western technology, on the other, led to the suspension of nuclear activities in Tehran. But the geopolitical developments, international and regional security, the long-lasting war between Iran and Iraq, the attack on Iranian nuclear installations by Iraq's military forces, and then the attack on Baghdad's nuclear facilities by Tel-Aviv and the passivity of the international community changed the Iranian feelings on security threats. Thereafter, Iran signed a new contract with France over nuclear fuels facilities in Isfahan in 1985 (IAEA, 2007). Moreover, several agreements between Iran and Russia have been signed to complete the Bushehr nuclear installation (Koch and Wolf, 1998: 2). But the new contraction of 123 between the United States and China (Kan, 2011: 9-21) has affected the nuclear cooperation between Iran and a handful of other countries.

Second, the Revelation of Nuclear Activities of Tehran and E-3 Negotiations (2002-2006): Disclosure of Iran's covert nuclear activities led to a behavioral incompatibility between European countries and the United States. While the U.S insisted on sending Iranian nuclear file to the Security Council, Western Countries

emphasized the diplomatic mechanisms in dealing with Tehran's mysterious activities. Finally, Iran signed the protocol in 2003 due to the pressures of international institutions and Regimes which in turn permitted the inspections of IAEA on its nuclear activities and voluntarily canceled the enrichment of Uranium. Thereafter, the enactment of the Paris Agreement in 2004 encouraged Washington to join the European consensus in 2005 (Reardon, 2012: 15). But the European countries' emphasis on the thorough cancelation of Iran's nuclear activities on the one hand and Iran's resistance and assertion on peaceful activity led to rising behavioral tensions between both sides and then the new government in Iran in 2005 restored the nuclear activities.

Third, 5+1 and UN's Sanctions (2006-2008): Behavioral conflicts and lack of consensus between both sides over Tehran's nuclear activities led to the enactment of 1696, 1737, 1747 resolutions against Iran in 2006. Despite the attempts of the international community to control and managing the Iranian nuclear activities, Tehran declared her accession to 3.5 percent enriched Uranium in April 2007. In fact, the failure of the strategy of "containment vs. containment" and the intense objection of Washington enacted the 1803 resolution against Tehran in March 2008. Due to the rising oil revenues, this resolution did not affect Iran's economy so much (Jansen Calamita, 2009: 1420-1433; Khalaf, 2020: 2-3). During this period, the new suggestion of 5+1 powers to Tehran to continue not to expand its nuclear activities faced Tehran's intense reaction.

Fourth, the Incumbency of Democrats in the United States of America in 2008: The behavior of both sides did not change much with the coming to power of the new Obama administration and the change in Washington. Declaration of Iran to full access of the nuclear fuel in April 2009, the revelation of nuclear installations in Fordow, the failure of the fuel exchange with Russia, and Iran's accession to 20 percent enriched Uranium in February 2010 led to the enactment of 1929 resolution against Tehran.

Thereafter, despite the continuity of negotiations in 2010 and 2011, realistic politics was the dominant approach of both sides in negotiations.

Fifth, the Period of Pragmatic Negotiations (2013-2015):

This period coincided with the incumbency of the administration of President Rouhani in Iran and the new communicative approach between Iran and the West. Since the incumbency of the new administration in Tehran, diplomatic management of nuclear policy became the main behavior of the Islamic Republic of Iran in which the ratio of the tensions between both sides has been decreased to some extent. The gradual reduction of tensions between both sides led to a comprehensive agreement in July 2015. Generally speaking, the Islamic Republic of Iran has tried several strategies for nuclear activities from 1987 until 2015.

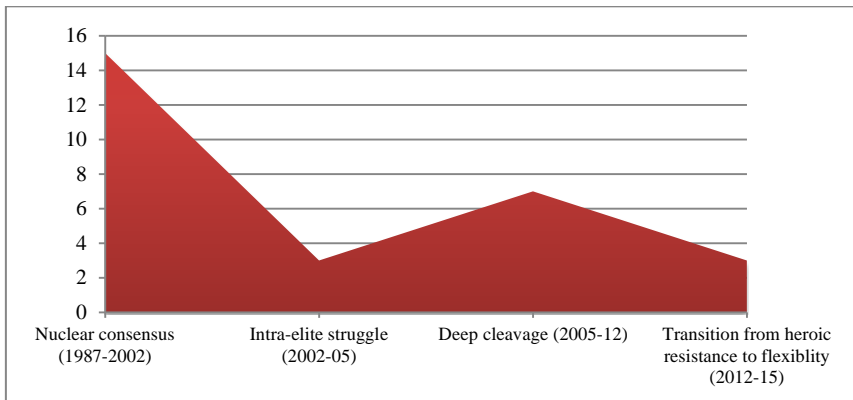


Figure 1. Tehran's Nuclear Behavior Strategy, 1987-2015

I- Tehran and The Logic of its Nuclear Policy

Basically, understanding Tehran's behavioral logic in a nuclear activity should be divided into three levels: micro, medium and macro. At the micro-level, the role of political elites and politicians is very important. According to this level, Iranian leaders have frequently declared that Tehran is not searching for nuclear weapons (Solingen, 2007: 164). Thus, nuclear decisions are the main function of national security from decision-makers'

perspectives. At the intermediate level, public opinion, popular demands, internal tensions, the cost and benefits of nuclear weapons, and technical and scientific factors are key elements that help to understand the motivations for nuclear proliferation policy. According to some researchers, public opinion was not the impetus or constraint on Iran's nuclear program until 2002, but has become a national issue since 2003. (Chubin, 2008: 57). On the other hand, searching for the nuclear policy was a source of legitimacy. In fact, nuclear policy was preferred as a political struggle for power and legitimacy (Cronin, 2008: 8).

In addition, Iran's nuclearization has no security but a political dimension (Chubin, 2006). At the macro-level, gaining prestige at regional and international arenas, bargaining with main powers, and trying to produce security are the main reasons for nuclear proliferation. In fact, the national consensus on Iran's nuclear program stems from being labeled as national pride and resistance to foreign intervention. Traditionally, Iran was a main power in the Middle East and Iranian political leaders and elites opined that its ancient history and culture has played a very important role in the region. But the post-revolutionary Iran and rising new political system forced the political leaders to find an alternative for regional and international prestige. So, having nuclear ability and capability will play an important and influential role for Iran at different levels (Byman, 2001: 8-9). Whereas other researchers believe that the search for nuclear politics and proliferation is due to the Iranian attempt to have better bargaining with the west. According to this module, the United States will take nuclear Iran more seriously than non-nuclear one. Therefore, the analysis of the political behavior of the Islamic Republic of Iran at various levels emphasizes Tehran's legitimate and constitutional right to access nuclear energy, historical experience and national security, Islamic values, and Washington's political behavior toward Iran. But the contradiction between the idea of the United States and the Cold War thinking has exacerbated the security dilemma (Katzman et al., 2020: 7-9). In fact, the failure of recognizing and

managing the sources of conflict led to the persistence of mutual distrust. In this situation, the Iranian authorities believe that the suspension of enrichment will not bring about long-lasting concessions.

II- Western Countries and Iran`s Nuclear Policy

The proposals of the Western countries have not only not been met with the demands and expectations of Iran, but have also been seen as an imbalance between the two sides. So, Iranian emphasis on nuclear enrichment and programs has led to the emergence of different behaviors in western countries. Historically, despite active containment of the United States against Iran from 1995 onward, European Union has emphasized diplomacy and negotiation with Iran. But the Berlin crisis and the killing of the Kurdish opposition on April 10 1997, and the voting of the German court against Tehran suspended mutual negotiations. But the détente and negotiation between civilizations in the foreign policy of Tehran restored the mutual negotiations. Different perceptions of Iran and the West on security and threat led to rising power politics in 2005 (Meier, 2013: 1-2). But the Bush and Obama administrations tried to gain tactical advantages and opportunities on the one hand, and sanctions and coercive diplomacy against Tehran on the other.

The United States imposed unprecedented sanctions on Iran from 1979 to 2012. In fact, Washington tried to persuade Tehran to change its behavior by shifting diplomacy to economic warfare. In fact, Washington tried to persuade Tehran to change its behavior by shifting diplomacy to economic warfare, whereas neither side used the pragmatic approach. But the incumbency of the new administration in Iran in 2013 and prioritizing the foreign policy in general and nuclear policy, in particular, encouraged both sides to reach a comprehensive agreement in 2015. Generally speaking, the behaviors of western countries over Tehran`s nuclear activity have transitioned from different stages.

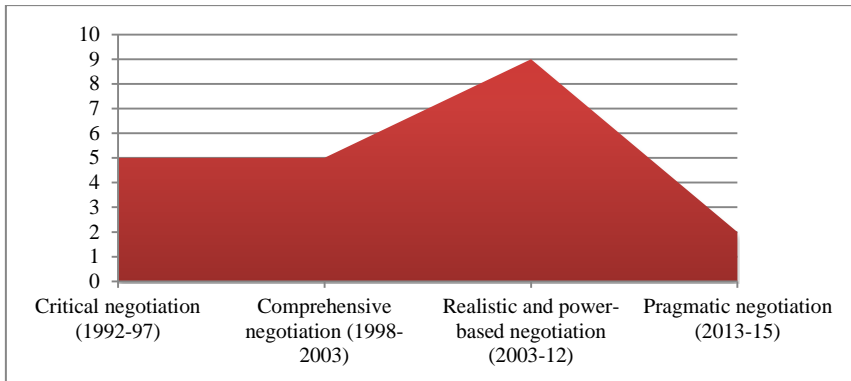


Figure 2. Logic of Western Countries' Nuclear Behavior, 1992- 2015

While the European Union has encouraged Iran to change its nuclear behavior by suggesting Iran the membership of the World Trade Organization (WTO) and economic cooperation, The United States has called EU policy old-fashioned diplomacy and mistakenly linked the WTO and economic cooperation to nuclear policy. (Kaussler, 2014: 22; Singh, 2020: 145-152). The Bush administration has called increasing Russian-Chinese support for Tehran a threat to US-Russian-Chinese relations. In addition, there has been a great deal of innovation between Tehran and Washington in the Bonn talks on post-Taliban rule in Afghanistan, including Tehran attending an international conference in support of the Karzai government in Tokyo And Iran's financial support over the past five years (Rajai, 2004: 166) has not only failed to develop a reciprocal agreement, but the signing of the protocol by Iran has not created a mutual consensus and western actors called Non-Proliferation Treaty (NPT) as insufficient regime to monitor Tehran nuclear activities. In fact, the nuclear talks between Iran and the West were based on a realistic and power-oriented policy. As a result, protracted conflict and coercive diplomacy were the main behaviors of both sides. So, by encouraging both sides to sign a new deal, pursuing the pragmatic negotiations since 2013 finally led to a comprehensive agreement.

Thus, while the Islamic Republic of Iran considers its conduct as its fundamental right under international law and the regimes of

international organizations, and despite the pessimistic approaches of Western countries, considers its nuclear activities to be peaceful and civil. Such attitudes stem from different interpretations of the two sides on geopolitical developments and international regimes at the regional and international levels. In addition, the United States has based its approach on a variety of reasons.

First, proliferation politics will lead to nuclear proliferation. In fact, if the Islamic Republic of Iran reaches nuclear energy, it will lead to nuclear demands and race in the region. Second, with a possible accession to nuclear weapons, Tehran will be more likely to attack its opponents. Third, those countries that take a neutral stance toward Iran will feel threatened if Tehran gains nuclear power. Then they join the Tehran coalition, and as a result, regional and international threats increase (Sherill, 2012: 35-42). Fourth, it will change Iran's nuclear power as an offensive player. This concern reflects the paradox of stability and instability. While nuclear weapons will bring nuclear deterrence but it will increase the asymmetrical risks. Fifth, if Iran accesses nuclear weapons, it may help other countries to do so. Sixth, if Iran reaches the nuclear weapon, it may lose its control over the other weapons and military technologies. Seventh, Iran's access to nuclear weapons will pose a threat to US allies in the region (Reardon, 2012: 3-6).

So, despite the Iranian interpretation of nuclear activities as its legal right and as national sovereignty, the United States calls it a political issue. Thus, the conflict of interpretation over nuclear activities led to different approaches and behaviors on both sides. While the West used hard, soft, and semi-hard strategies to limit Iran's activities, Iran sought to use formal and informal, institutional, and negotiation mechanisms to achieve its nuclear rights.

II- Game Theory and Iran`s Nuclear Policy

In everyday life, we often confront problems where our interests and those of others are conflicted. In such situations, we have to

consider others' possible actions and expect the following outcomes, and adjust our future actions. Game theory is the study of this kind of interaction and defined as, according to Myerson, the study of mathematical models of conflict and cooperation between intelligent rational decision-makers (Myerson, 1991: vii-xi). We begin by proving the equilibrium of John van Neumann's mixed-strategy in relation to the two-player zero-sum game theory which was proposed almost 70 years ago, modern game theory has been applied to a wide range of academic fields including political science, economics and business, biology, and psychology. Although game theory has recently been challenged by the discovery of a winning strategy for the prisoner dilemma, game theory is a very effective tool for analyzing various issues in the political sciences.

Single Matrix form Games: Theoretically, the game theory consists of the following three components: the actors, their strategies, and the payoffs related to the combination of each player's choice (Gates and Humes, 1997: 23-24). Based on the simplest form of the game, there appear two actors with two strategies, which make four different sets of payoffs. This is usually represented in a matrix, as we can see in table 1.

Table 1. The Case of Kidnapping by Gangsters

		Police Agency	
		Negotiation	Suppression
Gangsters	Negotiation	$m-p+1 (80), -m+h-t(40)$	$-m-p-l (-180), m-h+t(-40)$
	Gundown &Resistance	$m+p+l (180), -m-h--160)$	$-m+p-l (-80), m-h+t -40)$

Detailed in Table 1 is a case of kidnapping by gangsters. There exist two actors: gangsters and the police agency. The prior preference of gangsters is to extort money from this hostage-taking and, in addition, they expect to improve their presence in the international society by the terrorism. On the other hand, the police agency's most preferred priority is to rescue the hostages

successfully. In this situation, each player has two possible options. Gangsters can choose their action between negotiation with the police authorities or shooting the hostages down and resisting the police force, while the police agency is going to either negotiate with the gangsters or suppress the disturbance by force. In each cell of Table 1, the four payoffs depending on the combination of different strategies are suggested. Here, each alphabet stands for the following: money(m), presence improvement of gangsters(p), the life of gangsters (l), the life of hostages(h), risk of additional terrorism caused by police agency's soft strategy (negotiation)(t).

If we give different weight to each factor (let's assume $m=50$, $p=50$, $l=80$, $h=100$, $t=10$), we can figure out numerical payoffs that the two actors confront. Given that the third cell (Gundown & Resistance, Negotiation) is a nonsensical strategy combination, which occasionally appears due to the incapability of the matrix to rule out a certain result, the first cell (both Negotiation) is the Nash equilibrium. Nash equilibrium is defined as an equilibrium if no actor has an incentive to change her strategy unilaterally once each player has chosen her component of Nash equilibrium (Gates and Humes, 1997: 35). Of course, if the given weightings are changed, Nash equilibrium can move to another combination of strategies.

Extensive form Games: Now we are going to examine the game of another form, which is called an extensive form game. In this approach, we can design a series of sequential decisions of actors, whereas only a single and simultaneous combination of strategies can be established from the single matrix form game.

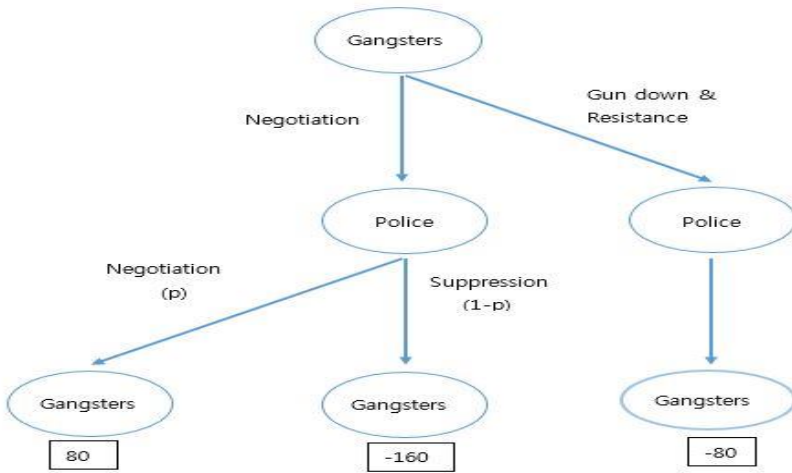


Figure 3. Step One Extensive form Game with Probabilities

In the above figure, three components of the game (actors, strategies, and payoffs) are clearly demonstrated so that we can easily grasp the sequence of the game. Furthermore, in this model, we can analyze the subsequent combinations of strategies that take place after the first stage. An additional and important advantage of this model is that possibilities of other actors' actions can be taken into account. As we cannot fully predict other actors' future actions, it is of great help to speculate the actions with possibilities. When gangsters choose to negotiate with authorities, they are going to expect that the police agency will agree to negotiate with the possibility of p or suppress them with the possibility of $(1-p)$. Then the expected value of gangsters' payoff when they negotiate is

$$E(\text{Negotiate}) = p \times 80 + (1 - p) \times (-160) = 80p - 160.$$

When they choose the option of gun down and resistance, the expected value is $E(\text{Gun down \& Resistance}) = -80$.

As the gangsters will choose the strategy with a higher expected payoff,

$$\text{if } 80p - 160 > -80, \text{ i.e. } p > 1,$$

They will negotiate with the authorities. However, the possibility cannot exceed 1, we can presume that gangsters will

choose the strategy of Gun down & Resistance in this case.

IV- Iran-US Dispute over Nuclear Program

Actors, Preferences and Strategies: As mentioned above, several different countries have participated in the dispute over Iran's nuclear program. Not to mention the United States, Russia, and EU3, many other Middle Eastern countries (e.g. Israel, Iraq, Saudi Arabia, United Arab Emirates and etc.), and international institutions (e.g. International Atomic Energy Agency and the United Nations) are deeply related to this issue. However, in this paper, we are going to focus on the relation between Iran and the United States, as they are considered the two main players in this game.

Before we deal with their strategies, the state preferences of Iran and the US should be discussed. As Andrew Moravcsik argued, taking state preference into account is very important to analyze state behaviors and subsequent aspects of conflicts (or cooperation) between states (Moravcsik, 1997: 516). First, let's take a look at Iran's state preference. The most preferred goal of Iran, even though it sounds obvious, is to guarantee its national security. Surrounded by pro-American states such as Israel, Saudi Arabia –though the relationship between the US and Saudi Arabia is crumbling (Haykel, 2013)–, Iraq and Afghanistan are under the US control, post-revolution Iran has always been concerned about its national security. In that sense, it seems to be a natural consequence that Iran continues its nuclear program, given that Israel is reported to possess between 90 to 200 nuclear warheads (Arms Control Association, 2020) and even Saudi Arabia is developing nuclear weapons (Urban, 2013). Another important preference of Iran is to remain as the most powerful revisionist country in the region. Iran has always proclaimed that it will 'export revolution', challenging the US and Israeli hegemony (Mahdavi, 2014: 166-167) in the region. To abandon its nuclear program can be possibly seen as bowing to US. Pressure, which will cause Iran's status as a revisionist power to be damaged.

Former president Mahmoud Ahmadinejad's remark that "America cannot do a wrong us" (Clawson, 2013) exemplifies Iran's will not to submit to the hard-line foreign policy of the US.

On the other hand, Iran's preference to improve its economy implies the possibility of negotiations and cooperation with the international community. Due to a series of Western sanctions against Iran, Iran has recently faced serious economic crises, its inflation rate in 2013 exceeded 40%. (The CIA World Factbook, 2014). Even worse, the plunging oil price has aggravated the situation, given that Iran needs at least \$ 130 per barrel of oil to be able to meet the national budget milestone (Herszenhorn, 2014). In this context, one of Hassan Rouhani's options is probably to arrange a significant level of dealings with the international community. (Nasser, 2015). When it comes to the preferences of the US, we can point out its traditional preferences in the Middle East after the Cold War: advocating Israel's interest; deterring the proliferation of nuclear weapons as well as radical Islam in the region; enhancing neoliberal globalization; and calling for liberal Western versions of human rights and democracy. In order to uphold the above-mentioned preferences, Washington would take tough strategies against Iran such as sanctions, because Israel regards Iran's possession of a nuclear weapon as one of the greatest threats to its national security; Iran is in fact one of the potential nuclear and Islamic countries, and its human rights and democracy status does not meet the standards of Western societies.

In addition, the US preference for stabilizing the regional situation in the Middle East and the current turbulent situation in the region could be the driving force that will appease Tehran. Now that the Iraqi government is proved to be incompetent to secure regional stability and Islamic State in Iraq and Syria (ISIS) is dominating in broad areas, Iran can be the US partner to stabilize the Middle East, considering that full-scale deployment of ground troops is a heavy choice for the Obama administration. When it comes to repelling ISIS in the region, both countries share common interests (Labott and Sciotto, 2014). However,

military cooperation is unlikely to happen, as it would cause strong backlashes of Israel and Saudi Arabia. In addition, the more stable the circumstance in the Middle East becomes, the more capabilities the US can use on its ‘Pivot to Asia’ strategy.

Single Matrix Modelling of the US-Iran Relation: Based on each actor’s preference examined above, we can form a single matrix model to analyze the relationship between both countries. The strategies that the United States can develop are a policy of appeasement and a strict policy, while Iran's option is to suspend or adhere to its nuclear program. Also, the interests of the two governments can be identified as follows: for Iran, national security (ns), position as a revisionist power (rp) and economic status (ec); Also, the interests of the two states can be marked as follows: for Iran, national security (ns), the position as a revisionist power (rp), and economic status (ec); For the United States, traditional alliances with Israel and Saudi Arabia (to), non-proliferation in the region (np) and regional stability in the Middle East (rs).

Table 1. Single Matrix form Analysis on the US-Iran Conflict Over the Nuclear Program

		U. S	
		Appeasement Policy	Hardline Policy
Iran	Freezing Nuclear Development	-ns-rp+ec(b_i), -ta+np+rs(b_u) <1>	-ns-rp-ec(d_i), +ta+np-rs(d_u)<2>
	Adherence to Nuclear Development	ns+rp+ec(a_i), -ta-np+rs(a_u)<3>	ns+rp-ec(c_i), ta-np-rs(c_u) <4>

Now let’s take a look at each cell. In the case of cell <1>, Iran would improve its economy at the expense of its national security and the status as a revisionist power. The United States can stop the proliferation of nuclear weapons and, in coordination with Iran, can easily secure the region, but they must take into account

the great concerns of their allies. The cell <2> is a hardly selectable option, as Iran loses everything in this case. Also, it is not plausible that the US takes hardline policy when Iran ceases its nuclear development. Cell <3> is an impossible situation, because the interests of the United States are very small compared to what Iran is gaining. In the case of Cell <4>, Iran can provide security and continue to "export the revolution" of its own free will, but it will suffer from the economic crisis caused by the sanctions of the international community. In the case of Cell <4>, Iran can provide security and continue to "export the revolution" of its own free will, but it will suffer from the economic crisis caused by the sanctions of the international community.

The equilibrium that has taken place so far in the real world is closer to the case of cell <4>. As mentioned, after the Iranian revolution, relations between the two governments were always in a state of conflict, although tensions occasionally eased. In general, extremists in Iran have always pursued their nuclear development, formally or covertly, and in response, the United States has imposed economic or diplomatic sanctions on Iran. This kind of ongoing conflict can occur because Iran has not paid much attention to the economic situation in the field of foreign policy. because Iran has a lot of oil that enables it to develop its economy at a steady growth rate. On the other hand, the United States does not need to support Iran in terms of regional security, because it has strong ties with several Middle Eastern governments and has deployed a large military force in the Middle East at the same time. However, changing political and the diplomatic situation in the region implies the possibility of the movement of equilibrium from <4> to <1>. This can be explained as follows: Continued economic sanctions against Iran and the free fall of oil prices, forced Iran to consider the economic factor as much more important during diplomatic negotiations. Also, unlike Ahmadinejad and conservatives who see national security as an absolute value that can never be accepted, , the new president, Rouhani, may consider security as part of the negotiation process. The United States also

had to find other conditions for the region to regain control of the ISIS-held area. Similarly, the balance can change depending on the weight that the actors place on each factor or the circumstances surrounding the actors.

Extensive form Modelling of the US-Iran Relation: Now we are going to apply the case to the extensive form model, based on what we examined in the previous part. The extensive form has the advantage that we can apprehend the sequential choices of actors, which is more plausible in real-world politics because the relationship between countries is the result of continuous interaction between them. In the case of the US-Iran, the interaction has lasted more than several decades.

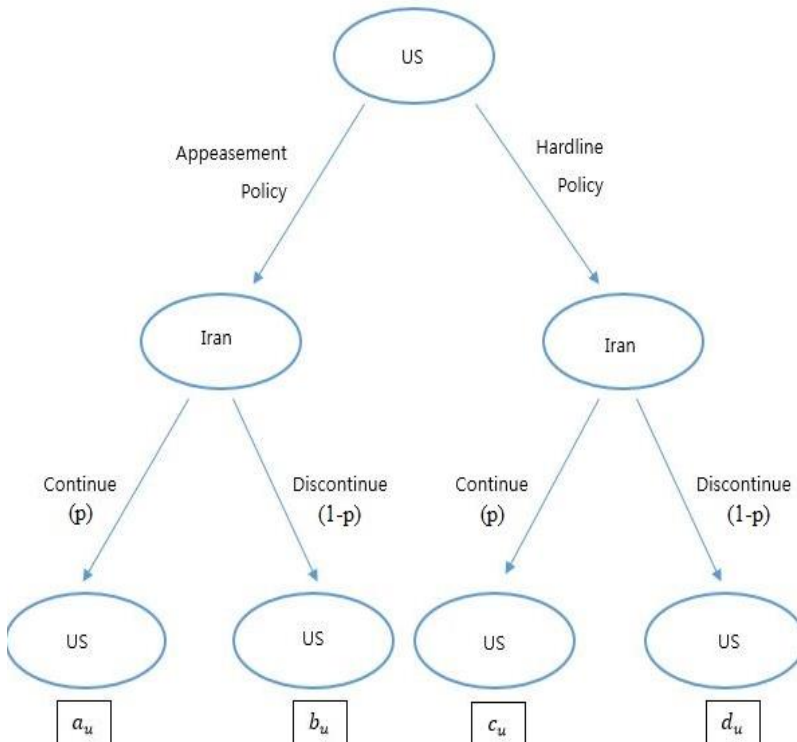


Figure 4. Extensive form Analysis on the US-Iran Conflict from the Perspective of the US

This extensive form model is constructed slightly differently from the single matrix form model. In the single matrix form model, the combination of America's hardline policy and Iran's freezing nuclear development was considered as a non-sensical option, but this option is possible in this model because the cessation of the nuclear program could be done as a result of Iran's response to the strict US policy. Likewise, the easing of tensions between the United States and Iran in the continuation of the nuclear program also appears in this model, because in real politics the possibility of deception is very high. Initially, the United States has two options to choose from: In the initial stage, the US has two options to choose: the appeasement policy or the hardline policy. In turn, Iran's response to any is to continue or suspend its nuclear program. From the US point of view, the probability of Iran's future action is uncertain, so the probabilities of each response are listed as (p) and (1-p). Also, America's possible rewards from the four different situations are marked at the bottom of the figure: $a_u, b_u, c_u,$ and d_u , and each reward is composed of interest factors (such as non-proliferation of nuclear weapons in the region(np), and regional stability(rs)) which we examined in the single matrix form. In this model, we can calculate the expected rewards for each action. For the case of the appeasement policy, the expected value Exp (Appeasement) is calculated as

$$\text{Exp}(A) = a_u(p) + b_u(1 - p).$$

Also, for the case of the hardline policy, the expected value Exp(Hardline) is calculated as

$$\text{Exp}(H) = c_u(p) + d_u(1 - p).$$

Consequently, the US will choose the option with the higher expected value. In other words, we can compare those two expected values like the following inequality:

$$\begin{aligned} \text{Exp}(A) = a_u(p) + b_u(1 - p) &> \text{Exp}(H) = c_u(p) + d_u(1 - p) \\ a_u(p) + b_u(1 - p) &> c_u(p) + d_u(1 - p) \\ p &> \frac{a_u - b_u - c_u + d_u}{a_u - b_u - c_u + d_u} \end{aligned}$$

Hence, we can presume that if the left-hand-side (LHS) of the inequality is smaller than the right-hand-side (RHS), the US will

take the hardline policy over the Iranian nuclear issue. In reality, the fact that the US has applied hardline policy toward Iran for over 30 years implies that the value of the LHS was smaller than the value of the RHS. Furthermore, if the component of each reward is possibly changed, for example, the US evaluates the importance of 'rs' (regional stability) more than before, the inequality can be varied. In that case, the US would choose another option: the appeasement policy, just like we can observe from the current situation of the Middle East.

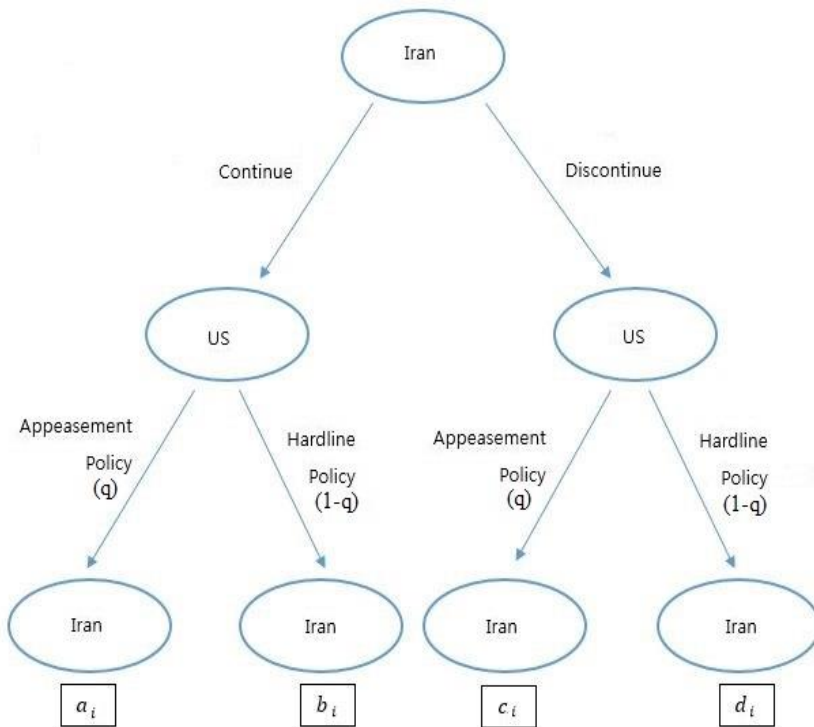


Figure 5. Extensive form Analysis on the US-Iran Conflict from the Perspective of Iran

Now let's turn Washington's view into Tehran's. . The same logic and analytic structure are applied here. In the initial stage, Iran chooses either to continue or discontinue its nuclear program, and

then the US takes subsequent action: the appeasement policy or hardline policy. The possibilities given to two different actions are q and $(1-q)$. Also, the payoffs that Iran can expect are denoted as a_i, b_i, c_i and d_i . These payoffs are composed of the above-mentioned state interests of Iran: ns (=national security), rp (=the position as a revisionist power), and ec (=economic status).

From this payoffs and possibilities, we can again compare the expected value of continuing the nuclear program $\text{Exp}(\text{Continue}) = a_i(q) + b_i(1-q)$ with that of discontinuing the development of a nuclear weapon $\text{Exp}(\text{Discontinue}) = c_i(q) + d_i(1-q)$.

$$\text{Exp}(C) = a_i(q) + b_i(1-q) > \text{Exp}(D) = c_i(q) + d_i(1-q)$$

$$q > (d_i - b_i) / (a_i - b_i - c_i + d_i)$$

In the same logic as we applied to the analysis on the perspective of the US, if the value of the LHS is bigger than that of the RHS, Iran would presumably continue its nuclear development. Iran's long-lasting nuclear program could be explained as the result of Iran's judgment that the expected value of continuing the nuclear program is bigger than the other.

Additionally, given that the Iranian government recently showed its willingness to negotiate with the international community, one can assume that the new Rouhani government has a different view of Iran's national interests than the previous government. That is to say, this government put much more importance on its economic status (denoted as 'ec' in the single matrix form analysis) and the expected value of freezing its nuclear facilities came to be significantly higher than before. As mentioned above, the equilibrium will be automatically changed when players alter their priority of policy-making. This implies, at the same time, the friendly atmosphere recently created by the two nations is not a final stage. When regional stability is achieved, the US will presumably concentrate on the traditional alliance and non-proliferation what they have traditionally regarded as the most important. Meanwhile, when Iran recovers from its economic crisis and the oil price gets back, we can assume that there is somewhat a high possibility of Iran's changed action.

Moreover, in the extensive form of the game, most of the games are not finished in just one or two stages. The game is repeated over and over and this type of game is referred to as 'Repeated Game.' In the repeated game, the credibility of each actor is very important, as to how much one actor (the US) trusts the other (Iran) significantly affects the negotiation process. Since losing credibility in the international society is definitely a huge cost, the Iranian government cannot easily take deceptive actions. Knowing this, the American government can narrow down Iran's possible future actions. One of the most important signs of the 'repeated game' has been shown during the presidency of Donald Trump.

Despite the liberal internationalism in Obama's administration that emphasized multilateralism, international diplomacy, preferring international goals, and struggling to be a multilateral hegemonic actor, unilateralism and pragmatic neo-isolationism became Trump's doctrine of foreign policy. In fact, by focusing on the doctrines of 'America First' and 'Make America Great Again', the one-term presidency of Donald Trump has met with the nationalistic interpretation of the foreign policy. Such an approach, however, was not necessarily principled isolationism, but a selective internationalism. Trump, by criticizing Obama's internationalism, has declared that this behavior weakened the global status of the United States and provided a competitive opportunity for competitors. (Macinnon, 2020: 1-2). In other words, such an inappropriate approach, according to Trump, has risen the politics of free-riding. However, by employing a costless alliance, Trump has attempted to share the costs of protecting regional security. According to this interpretation, by considering the JCPOA as a strategic mistake, Trump abandoned it in May 2018. He has been trying to justify his behavior with double-edged and selective standards. In other words, by overlooking the reports of IAEA and insisting on the non-compliance of Iran, applying maximum pressure on Iran (Barzegar, 2020: 2-3), triggering regional tensions and diplomatic-economic sanctions,

Trump did his best to persuade Iran to renegotiate. In fact, by employing the doctrine of withdrawal and politics of 'weak Iran', Trump has pursued to make a great deal. Moreover, his trip to the countries of the region and the sale of advanced military technologies on the one hand and the promotion of the policy of "Iranophobia" on the other has deepened the mutual distrust. Trump's foreign policy has not only met with maximum resistance from Iran, but has also increased regional tensions and Iran's proxy behavior in the Middle East. Finally, the mutual distrust between Washington and Tehran during Donald Trump's presidency culminated in blaming Iran's disorderly and revisionist behavior and emphasizing US disobedience.

Conclusion

This paper took the advantage of the game theory to analyze Tehran-Washington's decision-making process over Iranian nuclear activities. According to the single matrix form of game theory that considers the long-lasting conflict between the two countries as the equilibrium made by two actors' foreign policy choices, contradictory interpretations between Iran and U.S. over the nuclear activity have turned Iranian nuclear activities into an international issue. While Iran considers its activities as legal behavior based on the non-proliferation treaty and as a national right, the U.S. regards it as a political activity covered by legal coverage. Based on the extensive form of game theory, however, the changed value of preferences of Iran and the United States has provided Tehran and Washington with different interpretations and mechanisms to grasp the continuous decision-making process about nuclear activity. Such paradoxical interpretations about the Iranian nuclear activity encouraged Tehran and Washington to apply different policies.

In fact, the ceaseless mutual discord is an equilibrium of the two countries' policy choices. Accordingly, the US has used hard, soft, and semi-hard mechanisms to limit Iran's nuclear activities. However, Iran tried to achieve its nuclear right based on formal,

informal, institutional, and negotiable mechanisms. Since the ongoing talks between Iran and the United States have not yielded satisfactory results for several years, Iran considered it as national security. However, the United States has pressed Iran with multidimensional sanctions, calling Iran's nuclear activities a potential threat to regional and global security. Although during the presidency of Obama and Rouhani, a new deal was signed, Trump abandoned this deal in order to persuade Iran to renegotiate. This policy has deepened mutual distrust. According to the findings of this article, by distinguishing between Iran and the United States in interests or preferences, their policy options and their foreign policy behaviors towards nuclear activities can be changed.

Finally, a thoroughly prepared analysis of US-Iranian nuclear relations must be carefully considered to see how long the bittersweet relationship can last, when it will end. Finally, a well-prepared analysis of the Iran-US relations over the nuclear activity needs to be considered carefully how far the bittersweet relationship can proceed, when it will come to the end, and what will be the future of the relations between the two countries?

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