

A GAME THEORETIC ANALYSIS OF THE STRATEGIC OPTIONS
AVAILABLE FOR ISRAEL IN RESPONSE TO IRAN'S NUCLEAR
PROGRAM

A Master's Thesis

by
EMİR YAZICI

Department of
International Relations
İhsan Doğramacı Bilkent University
Ankara

July 2014

To my mother

A GAME THEORETIC ANALYSIS OF THE STRATEGIC OPTIONS
AVAILABLE FOR ISRAEL IN RESPONSE TO IRAN'S NUCLEAR PROGRAM

Graduate School of Economics and Social Sciences
of
İhsan Doğramacı Bilkent University

by

EMİR YAZICI

In Partial Fulfillment of the Requirements for the Degree of
MASTER OF ARTS

in

THE DEPARTMENT OF
INTERNATIONAL RELATIONS
İHSAN DOĞRAMACI BILKENT UNIVERSITY
ANKARA

July 2014

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in International Relations.

(Asst. Prof. Özgür Özdamar)
Supervisor

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in International Relations.

(Assoc. Prof. Ersel Aydınlı)
Examining Committee Member

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in International Relations.

(Asst. Prof. Nihat Ali Özcan)
Examining Committee Member

Approval of the Graduate School of Economics and Social Sciences

(Prof. Dr. Erdal Erel)
Director

ABSTRACT

A GAME THEORETIC ANALYSIS OF THE STRATEGIC OPTIONS
AVAILABLE FOR ISRAEL IN RESPONSE TO IRAN'S NUCLEAR PROGRAM

Yazıcı, Emir

M.A., Department of International Relations

Supervisor: Associate Professor Özgür Özdamar

July 2014

Israel is the most concerned actor about Iran's nuclear program due to its geographical position and fragile relations with Iran. Thus, Israel's stance towards Iran's nuclear program is particularly important in the nuclear crisis between Iran and the West. This thesis evaluates the four possible strategic options available for Israel in response to Iran's nuclear program: controlling strategy, deterrence strategy, reassurance strategy, and combination of deterrence and reassurance strategies. Through a game theoretic approach, it is aimed to answer the questions that what are the advantages and limitations of these strategies and which one would be the best option for Israel. Moreover, the underlying dynamics of each strategic option and their influence on the players' choices are also presented through the extensive form game models. As a response to questions mentioned above, this thesis argues that instead of a pure deterrence, controlling, or reassurance strategy, combination of reassurance and deterrence strategies would promise better outcomes for Israel.

Key Words:Iran's Nuclear Program, Israel, Game Theory, Controlling Strategy,
Deterrence Strategy, Reassurance Strategy

ÖZET

İRAN'IN NÜKLEER PROGRAMI KARŞISINDA İSRAİL'İN MEVCUT STRATEJİK SEÇENEKLERİNİN OYUN KURAMI İLE ANALİZİ

Yazıcı, Emir

Master, Uluslararası İlişkiler Bölümü

Tez Yöneticisi: Doçent Doktor Özgür Özdamar

Temmuz 2014

Coğrafi pozisyonu ve İran ile olan kırılgan ilişkileri nedeniyle İran'ın nükleer programı hakkında en endişeli aktör İsrail'dir. Bu nedenle İsrail'in İran'ın nükleer programına yönelik tavrı İran ve Batı arasındaki nükleer krizde özel bir önem teşkil etmektedir. Bu tez İran'ın nükleer programı karşısında İsrail'in kullanabileceği dört muhtemel stratejik seçeneği değerlendirmektedir: kontrol stratejisi, caydırıcılık stratejisi, güven verme (reassurance) stratejisi, caydırıcılık ve güven verme (reassurance) stratejilerinin kombinasyonu. Oyun kuramı aracılığıyla, bu stratejilerin İsrail için avantajları ve kısıtlılıkları nelerdir ve hangisi İsrail için en uygun seçenek olabilir soruları cevaplandırılmaya çalışılmıştır. Ayrıca yaygın biçim oyun modelleri aracılığıyla her bir stratejik seçeneğin temel dinamikleri ve bunların oyuncuların seçimleri üzerindeki etkisi sunulmuştur. Yukarıda bahsedilen sorulara cevaben bu tez, saf bir caydırıcılık, kontrol ya da güven verme (reassurance) stratejisinden ziyade,

caydırıcılık ve güven verme (reassurance) stratejilerinin kombinasyonunun İsrail için daha iyi sonuç verebileceğini savunmaktadır.

Anahtar Kelimeler: İran'ın Nükleer Programı, İsrail, Oyun Kuramı, Kontrol Stratejisi, Caydırıcılık Stratejisi, Güven Veme Stratejisi

ACKNOWLEDGEMENTS

I would like to thank my professors, family and friends for their effort, patience, and trust. This thesis would not have been possible without their assistance and support.

I would like to give my deepest gratitude to my supervisor Assoc. Prof. Özgür Özdamar. Without his support I would never be able to produce such a work.

I would like to extend my appreciation to Assoc. Prof. Serdar Güner who introduced me to the topic of game theory; and Assist. Prof. Nihat Ali Özcan who always supported me in my graduate studies. Additionally, I would like to thank Assoc. Prof. Pınar Bilgin who enlightened me with her comments and remarks at the earlier stages of this thesis. Without her assistance, I would not be able to bring my work into being.

I wish to thank my family members, my mother Şehri Sönmez, my brothers Yunus and Burak, my uncle Sabri Sönmez, my aunt Hamide Balaban, and my cousin Buğra Balaban who were always there for me.

I want to make a special mention of my friends Ahmet Melih Horata, Buğra Bakırel, Erşan Yıldız, Ömer İlhan, Sinan Baran, Ülken İlhan, Berrak Demirağ, Buket Gürdal, Gizem Özkan, and Merve Çizioğlu. They have always supported me when

getting through this thesis required more than academic support. I cannot express how I am grateful for their friendship.

Lastly I would like to thank the administrative assistants, Fatma Toga Yılmaz, and Ekin Fiteni for their support.

TABLE OF CONTENTS

ABSTRACT.....	iii
ÖZET	v
ACKNOWLEDGEMENTS	vii
TABLE OF CONTENTS.....	ix
LIST OF TABLES	xii
LIST OF FIGURES	xiii
CHAPTER I: INTRODUCTION.....	1
1.1. Introduction to Research	1
1.2. Main Findings	3
1.3. Thesis Overview	4
CHAPTER II: ISRAEL AND IRAN’S NUCLEAR PROGRAM	6
2.1. Steps in the Evolution of Iran’s Nuclear Program	6
2.2. Future of Iran’s Nuclear Program	10
2.3. Threat Perceptions of Israel Regarding Iran’s Nuclear Program	11
2.4. Theoretical Discussion: Controlling, Coercion, Reassurance and Combination of Deterrence and Reassurance	13
2.4.1. Controlling	13
2.4.2. Coercion: Deterrence & Compellence	16
2.4.3. Reassurance.....	35
2.4.4. Combination of Deterrence and Reassurance Strategies.....	38
2.4.5. Where do we stand now?	39
2.5. What Do These Strategies Mean For Israel?.....	40
2.5.1. Controlling	41

2.5.2. Coercion: Deterrence & Compellence	49
2.5.3. Reassurance.....	54
2.5.4. Combination of Deterrence and Reassurance	58
2.6. Conclusion for Chapter II	59
CHAPTER III: THE GAME THEORETIC MODELS OF THE STRATEGIC	
OPTIONS AVAILABLE FOR ISRAEL	61
3.1. Why Game Theoretic Methodology?.....	62
3.2. Why Sequential Game Model in Extensive Form?.....	64
3.3. Limitations of the Game-Theoretic Model	66
3.4. Building the Model	67
3.4.1. The Players.....	67
3.4.2. The Domain of the Model.....	68
3.4.3. The Order of Moves.....	68
3.4.4. The Players' Actions.....	69
3.4.5. Outcomes	71
3.4.6. The Actors' Preferences and Payoffs.....	72
3.5. The Game Tree Representations of the Strategic Options Available for Israel in Response to Iran's Nuclear Program	75
3.5.1. Model I: Extensive Form Game Model for the Controlling Strategy of Israel	75
3.5.2. Model II: Extensive Form Game Model for the Deterrence Strategy of Israel....	77
3.5.3. Model III: Extensive Form Game Model for the Reassurance Strategy of Israel	79
3.5.4. Model IV: Extensive Form Game Model for the Combination of Deterrence and Reassurance Strategies of Israel.....	81
3.6. Conclusion for the Chapter III	82
CHAPTER IV: THE SOLUTIONS AND INTERPRETATIONS OF THE MODELS	
.....	84
4.1. Introduction to Chapter IV	84
4.2. Solution of the Model I (Extensive Form Game Model for the Controlling Strategy of Israel)	86
4.3. Interpretation of the Model I.....	88
4.4. Solution of the Model II (Extensive Form Game Model for the Deterrence Strategy of Israel)	92
4.5. Interpretation of the Model II.....	95
4.6. Solution of the Model III (Extensive Form Game Model for the Reassurance Strategy of Israel).....	99

4.7. Interpretation of the Model III	100
4.8. Solution of the Model IV (Extensive Form Game Model for the Combination of Deterrence and Reassurance Strategies of Israel)	102
4.9. Interpretation of the Model IV	104
4.10. Conclusion for Chapter IV	108
CHAPTER V: CONCLUSION	112
SELECT BIBLIOGRAPHY	118

LIST OF FIGURES

1. Extensive Form Game Model for the Controlling Strategy of Israel.....	75
2. Extensive Form Game Model for the Deterrence Strategy of Israel.....	77
3. Extensive Form Game Model for the Reassurance Strategy of Israel.....	79
4. Extensive Form Game Model for the Combination of Deterrence and Reassurance Strategies.....	81
5. Extensive Form Game Model for the Controlling Strategy of Israel.....	86
6. Solution of the Game for the Controlling Strategy of Israel	90
7. Extensive Form Game Model for the Deterrence Strategy of Israel.....	92
8. Extensive Form Game Model for the Deterrence Strategy of Israel with calculated payoffs	95
9. Solution of the Game for the Deterrence Strategy of Israel.....	97
10. Extensive Form Game Model for the Reassurance Strategy of Israel.....	99
11. Solution of the Game Model for the Reassurance Strategy of Israel	101
12. Extensive Form Game Model for the Combination of Deterrence and Reassurance Strategies of Israel.....	102
13. Solution of the Game Model for the Combination of Deterrence and Reassurance Strategies of Israel	106

LIST OF TABLES

1. Comparison of the available strategies for Israel in response to Iran's nuclear program..... 61

CHAPTER I

INTRODUCTION

1.1.Introduction to Research

Iran's nuclear program has been occupying the international actors' agenda for a long time. Despite the numerous attempts, any permanent agreement has not been reached yet. Recently, the nuclear negotiations was started again between Iran and the P5 + 1(EU3 + 3) and a joint plan of action was accepted in 2013. According to both sides there is a significant possibility of reaching a permanent agreement in 2014. However, the statements of the Israeli officials indicate that Israel is not content with this process, since it does not trust Iran's being intentions regarding nuclear technology.

In this sense, the starting point of this research is that Israel is the most concerned actor about Iran's nuclear program, due to its geographical position and fragile relations with Iran. In this research, it is assumed that Israel's role in this issue is underestimated. If Israel succeeds in employing a wise strategy that can reduce the likelihood of conflict, it can pave the way for a solution which would be able to dispel other parties' concerns as well. Thus, it is important to analyze Israel's stance towards Iran's nuclear program and evaluate possible strategic options for Israel. Moreover, analysis of the Israel's strategic options allows us to test and compare the expanded the literature of deterrence theory and other strategies as well (e.g. reassurance) in a current case. Consequently, this thesis attempts to answer the

questions that what are the advantages and limitations of each strategic option available for Israel in response to Iran's nuclear program and which one would be the best option for Israel.

In this research, four strategic options are defined as the possible strategic options: controlling, coercion (deterrence), reassurance, and the combination of deterrence and reassurance strategies. Firstly, it is assumed that Israel would continue to implement a controlling strategy, in the form of economic and financial sanctions, in accord with the international community. Moreover, it can use other forms of controlling strategy, such as limited military operations or covert operations. Secondly, it can attempt to deter Iran by threatening with use of force if it does not comply with the demands of Israel. Thirdly, Israel can reassure Iran regarding its security concerns which would lead it to acquire nuclear weapons capability, if any. Finally, a combination of deterrence and reassurance strategies can be implemented in order to avoid the limitations of each strategy separately. Within this framework, this research aims to present what the conditions are that would make deterrence or controlling strategy efficient; whether Israel can meet the requirements of these strategies against Iran; whether reassurance is a wise strategy that can achieve the desired outcome with lower cost; or whether the combination of deterrence and reassurance strategies would be the ideal option.

A game-theoretic methodology is used in order to analyze these strategic options. Four extensive game form models are designed for each strategic option. It is intended to present the strategic interactions between the actors' decisions at the different stages of the game. Moreover, the wide range of theoretical perspectives, which includes both coercive and consensual approaches, is presented through a disciplined research method. Even though the game-theoretic modelling required

exclusion of the some aspects of the case in order to preserve the simplicity, it provided transparency and reproducibility to the research.

1.2.Main Findings

The main findings underline that the costs of actions and probabilities of success have the capability to change the equilibria of the games. Therefore, the important question is whether Israel can increase the cost of not backing down to Iran and probability of success of its deterrent threat, while decreasing the cost of its actions to itself. In today's conditions, Israel lacks the capability that can balance these costs and probabilities. For instance, lack of intelligence about Iran's nuclear facilities decreases the likelihood of victory of a possible military attack as part of controlling strategy or as a deterrent threat. Also, the lack of international support for a deterrence strategy increases the cost of deterrent actions to Israel. Additionally, Iran's economy of resistance decreases the cost of controlling strategy to Iran. All these negative factors problematize the deterrence and controlling strategies by changing the costs and probabilities of the actions. Moreover, these two strategies are too risky in the sense of provoking Iran and breaking the status-quo irreversibly. This is why there is no "maintain status-quo" option for Iran in the models of these strategies.

On the other hand, reassurance strategy promises better outcomes with lower costs, but it makes Israel vulnerable against Iran if the strategy fails. At this point, the combination of deterrence and reassurance comes up with the claim that it can provide the better outcomes of reassurance without leaving Israel vulnerable in the case that Iran acts in a hostile manner. The findings regarding the model of

combination of deterrence and reassurance strategies indicate that the existence of a deterrent threat in the sub-games increases the capability of reassurance strategy at the beginning. Moreover, since Israel starts with reassurance strategy it avoids provoking Iran, and so the status-quo can be still sustained even if the strategy fails.

The findings of this thesis, firstly, contributes the literature regarding Israel's foreign policy in response to Iran's nuclear program in the sense of both including wide-range of strategic approaches in the same research, and using a game-theoretic approach. Moreover, the model of the combination of deterrence and reassurance strategies, which is introduced as an alternative to deterrence in the literature, is tested in a current case. The findings mostly supported the argument that a combination of deterrence and reassurance strategies would promise better outcomes compared to deterrence strategy.

1.3.Thesis Overview

In the introduction chapter, firstly, I introduce the subject and its importance. I answer the question that why Israel's stance is important in the debate about Iran's nuclear program. Then, the research question, the objective of the research, and the methodology is stated. Additionally, the main findings of the research and contributions to the literature are presented.

Secondly, the steps in the evolution of Iran's nuclear program and its future, and Israel's threat perceptions regarding Iran's nuclear activities are explained briefly. Based on the Israel's threat perceptions, the four strategic options available for Israel – controlling, deterrence, reassurance, and combination of deterrence and

reassurance- are discussed theoretically first. Next, it is explained that what these strategies mean for Israel against Iran.

In the third chapter, firstly, it is explained that why a game-theoretic methodology is preferred and why the models are designed as extensive form game models. Moreover, the extensive form game models for each strategic option are presented in this chapter with the explanations of the components of the models.

Fourthly, the solutions and interpretations of the models are presented. The game-theoretic models are solved through backwards induction technique and these solutions are interpreted in conjunction with the discussion in the literature.

Finally, in the conclusion chapter, the whole thesis is summarized. The main findings of the analyses and their political implications to Iran, Israel and the other actors of the case (P5+1) are discussed. Moreover, contributions of this thesis to the literature and how it can pave the way for some future researches are mentioned at the end.

CHAPTER II

ISRAELAND IRAN'S NUCLEAR PROGRAMME

2.1. Steps in the Evolution of Iran's Nuclear Program

When Iran signed a cooperation agreement with the United States about peaceful nuclear researches in 1957, and established its first thermal reactor again with the assistance of the United States in 1967; it was one of the essential allies of the Western bloc in the Middle East (Albright, 2005: 49). Even during the 1970s, it signed numerous cooperation agreements with not only the U.S. but also some companies from Europe (e.g. French and German companies which provide technical assistance to Iran) (Nuclear Threat Initiative, 2014). Moreover, Iran is a member of International Atomic Energy Agency (IAEA) since 1959 and a party of the Nuclear Non-Proliferation Treaty (NPT) since 1968 (Albright, 2005: 49). In addition to the cooperation with the Western states, Iran also sought different channels to improve its nuclear capacity. For instance, Iran had some agreements with South Africa for uranium enrichment and sent some Iranian scientists to training programs abroad (Albright, Shire, Brannan, 2009: 1).

Interestingly, Shah Mohammad Reza Pahlavi declared Iran's desire for a Middle East nuclear weapon free zone in 1974 which has been maintained as an

important part of the Islamic regime's rhetoric (Bahgat, 2006: 309). Thus, on one hand, Iran was making an effort to develop its nuclear capacity; on the other hand, the official discourse was based upon a Middle East free from nuclear weapons during the 1970s.

However, the 1979 Islamic revolution was the first breaking point in Iran's nuclear history. Even though the Islamic regime paused the nuclear program due to the Islamic precepts in the early years of the revolution, the program was resumed during the Iran-Iraq War (1980-1988) through which Iran recognized how it is vulnerable against weapons of mass destruction and how the international society is incapable (or reluctant) to provide protection in such cases. Another important result of the Islamic revolution was that the U.S. repealed all the nuclear agreements with Iran after the hostage crisis in 1979. Therefore, Iran was no longer an ally and, even worse, was a new and influential enemy in the region.

As mentioned above, during the Iran-Iraq war, Iran restarted the nuclear program and replaced the Western support with new alliances, such as with Pakistan (1987), China (1990) and the Russia (1992). In particular, Iran had received significant support- both technical and political- from the Soviet Union (Russia) and China during the 1990s (Nuclear Threat Initiative, 2014).

The second breaking point of Iran's nuclear history was the revelation of its undeclared uranium enrichment facilities in 2002 which increased the international pressure on Iran. In 2003, the EU-3 (three powerful states of the European Union: United Kingdom, France and Germany) played an important role through its diplomatic attempts. It made effort to dissuade Iran from the nuclear program in return for some incentives by the Western States addressing Iran's reasons the for

nuclear program (Albright, 2005: 51). Iran, in response, signed the additional protocol of NPT in 2003 which prescribes stricter IAEA inspections. More importantly, in 2004, Iran accepted the suspension (not a permanent end) of its uranium enrichment activities by the virtue of the EU-3's pressure. However, Iran clearly informed the EU-3 that it would not accept any demand for a permanent cancellation of its nuclear program. Even though the EU-3 initially assured Iran that it is not pursuing such a goal, it violated this commitment and asked Iranian negotiators to permanently cancel their nuclear program. Iran, which considers the nuclear program as an incontestable right, unsurprisingly, ended the negotiations in response to this demand and resumed its nuclear program again in 2005 (Mousavian, 2006: 77).

When the IAEA reported Iran to the UN Security Council in 2006, Iran suspended the implementation of the Additional Protocol of NPT and took a more aggressive stance. While the U.S. declared that any agreement that prescribes the continuation of Iran's nuclear program in anyway is not acceptable, Iran announced that it succeeded in enriching uranium and will continue until the industrial-scale enrichment level. This situation was a declaration of that Iran became one of the countries which have nuclear technology (BBC News 2006).

A similar process to one initiated by the EU-3 in 2003 has restarted currently, by the virtue of the recent elections in Iran which resulted with the victory of Rouhani, the most moderate candidate approved by the regime. Firstly, Rouhani's article, which is published at the Washington Post in September, gave hope to the international public for a new détente period. In the article, Rouhani(2013a) states that:

...win-win outcomes are not just favorable but also achievable. A zero-sum, Cold War mentality leads to everyone's loss... Rather than focusing on how to prevent things from getting worse, we need to think — and talk — about how to make things better. To do that, we all need to muster the courage to start conveying what we want — clearly, concisely and sincerely — and to back it up with the political will to take necessary action. This is the essence of my approach to constructive interaction.

Following this article, he kept this tone in his speech at the United Nations General Assembly in the same month. Moreover, Rouhani and Obama had a phone conversation before Rouhani's leave from the New York which is the first direct communication between two states' president since 1979.

In this positive political climate, the Geneva talks started between the P5 + 1 (EU3 + 3) and Iran in October 2013. This negotiation process had a great success in November when the sides agreed on a "Joint Plan of Action" that can be considered as the first step of a further comprehensive and permanent solution. According to this plan, basically, Iran will slow down its nuclear activities and accept more enhanced monitoring; while the P5+1 will relief the sanctions gradually and not add new ones (Joint Action Plan 2013). While this deal is embraced as a "historic deal" by most of the actors; Netanyahu, Israeli Prime Minister, described it as a "historic mistake" and added that "Iran is committed to Israel's destruction, and Israel has the right and the obligation to defend itself by itself against any threat. I want to make clear as the prime minister of Israel; Israel will not allow Iran to develop a military nuclear capability." (Jerusalem Post, 2013). Consequently, Israel does not tend to be a part of this accord, but wants the international community to share Israel's threat perceptions regarding the Iranian regime.

2.2. Future of Iran's Nuclear Program

Even though there is no certain evidence that Iran has a secret agenda to develop nuclear weapon, there are different perspectives in the literature on this issue which actually affect the counter-strategy perspectives of the politicians and scholars. It was sixteen years ago when Koch and Wolf explained the findings of their analysis of the Iranian nuclear capacity which pointed out that it is not possible for Iran to have a nuclear weapon capacity for at least 10 to 15 years, technically (1997: 133). Thus, it is reasonable to discuss this possibility today, even though the Iranian regime denies that and there are substantial counter-arguments.

On the other hand, through his analysis of the strategic environment of Iran, Chubin claims that Iran's security strategy does not require a nuclear weapons capacity since it would not be willing to pay the cost of a possible nuclear weapon capacity which would probably remain as a useless and inflexible military tool (2001: 33). This assumption is also mentioned by the Iran's President Hassan Rouhani in his speech at the UN General Assembly in 2013. He said "Nuclear weapon and other weapons of mass destruction have no place in Iran's security and defense doctrine, and contradict our fundamental religious and ethical convictions"(Rouhani, 2013b: 5). Despite this clear official statement, on the other hand, Sagan and Waltz asserts that the U.S.'s active presence in the region replaced the other threats from within the region against Iran, such as Saddam's Iraq. Therefore, Iran would attempt to defend itself, even by venturing the nuclear armament, if necessary (Sagan, 2006: 55; Waltz, 2007: 137).

Finally, differently from these arguments which presume that Iran would certainly succeed in developing nuclear weapons if it decides to do and the outside powers do not prevent, Hymans claims that Iran's nuclear program is likely to fail

itself due to inappropriate scientific and managerial process it involves (2012: 87). Moreover, external interceptions can only motivate the dysfunctional Iranian bureaucracy and scientific team which would fail on their own, he argues (2012: 96).

Nevertheless, despite denial of the Iranian officials, most of the diplomatic efforts and academic studies tend to assume that Iran might have a secret agenda for nuclear armament and it is certainly able to develop nuclear weapons without an external prevention. Thus, the debates concentrated on the possible counter-strategies against this possibility.

2.3. Threat Perceptions of Israel Regarding Iran's Nuclear Program

Based upon the assumption that Iran's nuclear program will end up with a nuclear weapon capacity, the basic threat perception of Israel is a direct nuclear strike by Iran (Greenblum, 2006: 78; Weiss, 2009: 81; Sadr, 2005: 5). Secondly, if Iran has nuclear weapons capacity, it can transfer these nuclear warheads to the terrorist organizations (such as Hamas or Islamic Jihad) which have been fighting against Israel for a long time. This option would also have some catastrophic results for Israel (Sadr, 2005:8). Thirdly, nuclear weapons capability would provide impunity to Iran while sponsoring radical Islamist terrorist organizations. In other words, even if Iran does not transfer nuclear weapons to these terrorist organizations, a nuclear umbrella would reduce Iran's fear of a counter-attack by Israel in response to terrorist attacks sponsored by Iran (Sadr, 2005: 9; Greenblum, 2006: 80). Fourth, a nuclear-Iran might start a nuclear proliferation process in the Middle East which would end up with more nuclear enemies for Israel. Additionally, conventional arms

race can accelerate within the region which would mean more military spending, and so economic problems for Israel (Sadr, 2005: 12).

Apart from these threat perceptions, Weiss(2009: 81) points out a different reference object which is also under threat by Iran's nuclear program: the Zionist project. This project aims to strength democratic Jewish state through the immigration of the Jews all over the world to Israel. Accordingly, he asserts that the Iran's nuclear program, even without a nuclear strike, can easily undermine the Zionist project by dissuading Jews from immigration to Israel because of the fear of a possible nuclear-armed Iran (Weiss, 2009: 82). Thus, the threat perception of Israel is based on not only existential concerns but also some future anxieties.

Even though all of these threats seem reasonable, there are some arguments that point out the other side of the coin. Firstly, it is not plausible to presume that the Iranian decision-makers are not so radical who would neglect the unavoidable results of a nuclear strike to Israel. Iran's non-democratic regime does not necessarily mean that they are irrational and they would act according to their ideological precepts at any cost. Quite the contrary, since the Islamic revolution, the Iranian decision makers have been relying on pragmatism for the sake of the regime survival and they realize that an attack to Israel would receive a great retaliation which could annihilate the regime (Bergman, 2009: 171). Moreover, some analysts argue, no state can be sure that the nuclear weapons, which they transferred to terrorist organizations, will be used as desired by the supplier. Even Iran, as a state which uses proxy war deliberately, would not willing to take such a risk (Sadr, 2005: 12; Weiss, 2009: 79). Therefore, it is possible to claim that the existential threat perception of the Israeli policy makers lacks a strong ground.

2.4. Theoretical Discussion: Controlling, Coercion, Reassurance and Combination of Deterrence and Reassurance

Before the discussion of the Israel's strategy in response to Iran's nuclear program specifically, it would be helpful to evaluate each strategic option theoretically and answer some key questions: What are these strategies? How do we distinguish them? How did they evolve theoretically? What are their advantages and limitations?

2.4.1. Controlling

Freedman(2004: 26) distinguishes the basic strategies of conflict as consensual, coercive and controlling strategies. Even though the coercion and controlling strategies are mostly used interchangeably, they have clear boundaries as distinct strategic alternatives. Thus, it is important to clarify what is not "coercion" before going into details of the coercion debate in the literature. Consensual strategy is "the adjustment of strategic choices with others without the threat or use of force" which would probably be the most desired way of resolving international crisis (Freedman, 2004: 26). Yet, since reassurance strategies, as a kind of consensual strategy, will be discussed later in this chapter, the distinction between the more common strategies -controlling and coercion- will be made clear initially.

Controlling strategy basically refers to goal-oriented use of force in order to eliminate the adversary's strategic choices rather than to influence them. In other words, the crucial distinction is that the controlling strategy prescribes use of force and directly limits the adversary's options while coercion leaves the adversary a capacity to make a choice between the options and it attempts to influence this

choice through the explicit threats of use of force (Freedman, 2004: 26). For instance, when the U.S. realized that Saddam was not a deterrable actor due to its irrational decision making record, threatening Saddam and waiting for his compliance (coercion strategy) was not a wise strategy. Thus, changing the regime in Iraq, which was a controlling strategy in the sense of eliminating target's options, was employed by the U.S government (Freedman, 2004: 100).

The different forms of the controlling strategy may help better to grasp the underlying idea. Freedman asserts that the preventive and pre-emptive wars, which have been used interchangeably again, are both in the scope of the controlling strategy since they aim to decrease the likelihood of an imminent threat through reducing or removing the target's capacity to pose that threat (Freedman, 2004). More specifically, when a state realizes that the other one is improving its capacity that would alter the power balance between them it may decide to prevent this through a "preventive war". This preventive war might carry out the goal of disarming the opponent or changing its political character (and so make sure that it is no longer a threat notwithstanding its capacity) (Freedman, 2004: 85). Differently, if the preventive war has not been preferred initially and the opponent succeed in improving its capacity significantly, then, the former may decide to attack before being attacked by its rising opponent, and this war is labeled as "pre-emptive war" (or "anticipatory self- defense" by the international lawyers) (Freedman, 2004: 86). So, the pre-emptive action takes place between the possession of the capacity by the opponent and the decision of using this capacity. Both of preventive and pre-emptive actions are consistent with the controlling strategy's framework since they include use of force and aim to remove adversary's strategic choices.

The Cold War context may well present how these strategies function at different stages of an enduring rivalry. Until 1957, preventive war had been an option for the U.S in the sense of preventing the Soviets Union from acquiring nuclear weapons capacity and shifting the balance of power. However, the U.S allowed the Soviets Union to have nuclear power, since the risks of a preventive action were unacceptably high. After 1957, when the Soviets Union launched the Sputnik satellite that indicated the capacity to send intercontinental ballistic missiles, and so the U.S lost its superiority against the Soviet Union, the option on the table was a pre-emptive action that would eliminate the Soviets' nuclear capacity before they are used against the U.S. Yet, the risk was that if the Soviets Union absorbs the pre-emptive action and retains even a small nuclear capacity (second strike capability); it would have catastrophic results for the U.S. (Freedman, 2004: 87, 88). Therefore, these two actions separately relevant at the different stages of a crisis and they are out of the scope of deterrence strategy since they contain the use of force and deny the opponent's capacity to make a choice among options. Also it should be noted that the controlling strategy, in general terms, is different from a basic military strike because of its limited and purposeful nature which directly targets the opponent's options regarding a specific issue.

However, both of them have limitations. For the pre-emptive action, it is generally an assumption that the rising opponent would attack and it is difficult, if not impossible, to have convincing evidences for this assumption. On the other hand, insufficient justification of a preventive attack-which is often the case- would result with an isolation from the international community or formation of a new alliance network among potential targets which are concerned and provoked by this preventive action.

2.4.2. Coercion: Deterrence & Compellence

Coercion, as an alternative strategy, can be described as “deliberate and purposive use of overt threats of force to influence another’s strategic choices” (Freedman and Raghavan, 2013: 207). It can be divided to two branches as deterrence and compellence. While “deterrence” coerces the adversary to refrain from acting, “compellence” aims to make the adversary undertake an action (Schaub, 2004: 389). In other words, deterrence demands inaction whereas compellence demands action (Freedman, 1998: 19). In addition to the nature of demand, Schelling asserts that the difference between them lies in the timing and initiative (1966: 69). In deterrence, there is no strict time limit as we threaten the opponent to refrain and wait for its compliance, “preferably forever-that’s our purpose”. In compellence, in contrast, there must be a clear deadline after which the punishment will be implemented unless the opponent acts in the desired way. Secondly, in deterrence, the decisive initiative is up to the opponent whether it will comply or defy the threat. Compellence, on the other hand, involves “initiating an action (or an irrevocable commitment to action) that can cease, or become harmless, only if the opponent responds” (Schelling, 1966: 72). Thus, there is a consensus on that compellence is more difficult to achieve than deterrence since it requires a clear deadline, a strong initiative and causes an overt humiliation for the compelled actor.

However, the prospect theory attributes this relative difficulty to different reasons. The expected utility theory differentiate the difficulty levels of the deterrence and compellence only if some external factors, such as the audience/prestige effect, the possibility of further demands and the costly changes in the status-quo, come into play which are very difficult to measure systematically. However, according to prospect theory, Levy (1992) states that the actors are more

willing to take risk in order to defend their reference points when they feel themselves in the domain of losses. Thus, it becomes “easier to deter an adversary from initiating an action she has not yet taken than to compel her to undo what she has already done or to undertake actions which she would prefer not to do” (Levy, 1992: 290). It means that the prospect theory attributes the relative easiness of the deterrence to endogenous factors (Schaub, 2004). As Schaub states, “prospect theory suggests that a decision- maker will value losses more than gains even if they are essentially equivalent”. (Schaub, 2004: 400). Therefore, the adversary faces with a certain loss in compellence case whereas it contemplates giving up a possible gain in deterrence case (Schaub, 2004: 392). The policy implication is that when the exogenous conditions are equal for both situations, the adversary’s compliance in a deterrence situation is more likely compared to a compellence situation, according to prospect theory (Schaub, 2004: 402).¹

Nevertheless, even though Schelling (1969: 79) attempts to differentiate the defensive and offensive motives in a strategy and so presented “compellence” as a different concept that represent offensive motives, the distinction between neither defense and offense, nor deterrence and compellence works in practice. Particularly, “when the attempt is made to deter continuance of something the opponent is already doing”, the boundary between deterrence and compellence get blurred (Freedman, 1998: 19). Therefore, the deterrence debate below also relevant for such combined situations, and the specific complications for compellence will be neglected for the sake of clarity.

¹For a detailed discussion of the prospect theory in international relations see: Levy, J. S. 1997. Prospect theory, rational choice, and international relations. *International Studies Quarterly*, 41 (1), pp. 87-112; Levy, J. S. 1996. Loss aversion, framing, and bargaining: The implications of prospect theory for international conflict. *International Political Science Review*, 17 (2), pp. 179-195; Farnham, B. 1994. *Avoiding losses / taking risks*. Ann Arbor: University of Michigan Press; Mcdermott, R. 1992. Prospect theory in international relations: The Iranian hostage rescue mission. *Political Psychology*, pp. 237-263.

2.4.2.1. Deterrence

The idea of deterrence seems quite simple, as Morgan states, “people dislike harm, so they shy away from actions which promise harm” (Morgan, 1977: 17). In strategic terms, a rational actor can prevent a certain action through a credible threat that would affect the cost-benefit calculus of a rational opponent. However, such a description is quite restrictive and does not represent all the aspects. The definition that deterrence refers to action that “seeks to prevent an undesired action by convincing the party who may be contemplating such action that its cost will exceed any possible gain” is more comprehensive and more consistent, since it does not restrain the “undesired action” as only a military attack by the opponent, or not solely mention the threats as the way of convincing the opponent (Stein, 1991: 432). Yet, the issue is getting more complicated when we scrutinize the each elements of deterrence strategy.

Even though the classical deterrence theory (rational deterrence theory) has the assumption of rationality for all actors in a deterrent relationship, the characteristic and different motives of an opponent or different understandings of rationality by the actors may impede such an assumption. Moreover, Freedman(2004: 28) asserts that even if the same conceptualization of the rationality is shared by the actors, misperception or misinterpretation of the threats can still pose problems for the strategy. Also, there is no consensus on whether threats and punishments or positive inducements or a combination of them are more effective. Even if we accept the conventional wisdom that the threats are the main instruments of a deterrence strategy, it is not clear what makes a threat effective and credible. Thus, the tactics and the methods to convince the opponent to comply are also problematic. Furthermore, the difficulties to measure the success of deterrence also a

well discussed issue in the literature. It is widely accepted that it is obvious when a deterrent threat fails, but it is difficult, if not impossible, to be certain that the deterrence is the key of success when an opponent refrains from an undesired action, since numerous factors come into play in such decision making processes. Therefore, deterrence is not a simple and smooth strategy of conflict both in theory and practice. However, before continuing this discussion with more details, the different types of deterrence should be noted briefly here, since each of them has a different place in this discussion.

2.4.2.1.1. Classifications of Deterrence Strategy

There are a few classifications of deterrence due to different aspects of the strategy, such as scale of confrontation (general&immediate deterrence), nature of the relationship between parties (central&extended deterrence, unilateral&mutual deterrence), construction and nature of threats (conventional&nuclear deterrence, deterrence by denial&punishment). Each of these categories will be defined briefly here, since they will also be discussed further in this chapter.

a) General and Immediate Deterrence

Immediate deterrence refers to cases in which the defender forecasts a challenge by the initiator and tries to deter him by denial or punishment whereas general deterrence is embedded in the existing power relations which functions through dissuading the initiator from even thinking of use of force (Stein, 1991: 432). Therefore, the immediate deterrence exists only if the general deterrence fails. Morgan (1977: 36) presents four conditions that indicate the immediate deterrence:

- In a relationship between two hostile states the officials in at least one of them are seriously considering attacking the other or attacking some are of the world the other deems important.
- Key officials of the other states realize this.
- Realizing that an attack is a distinct possibility, the latter set of official threaten the use of force in retaliation in attempt to prevent attack
- Leaders of the state planning to attack decide to desist primarily because of the retaliatory threat(s).

When compared these two types, the general deterrence is more common compared to immediate deterrence, while most of the analyses and wisdom based upon the immediate deterrence's framework (Morgan 1977: 29). It is mostly because of the difficulty to substantiate general deterrence's influence on the decisions of actors (Huth & Russett, 1984: 497). Nevertheless, Quackenbush argues, as the existence of immediate deterrence indicates the failure of general deterrence, it is more significant to examine the general deterrence cases to understand the dynamics of international conflicts (2010: 61).

b) Central (Direct) and Extended Deterrence

Another categorization of deterrence is about the nature of the relationship between the actors. If the relationship consists only two actors and one of them attempts to deter other in order to protect its own interests, we can label this strategy as central (direct) deterrence. Extended deterrence, on the other hand, refers to cases in which an actor employs the deterrence strategy to deter a challenger in order to protect an ally (protégé) (Huth, 1988: 16). The situation gets more complicated compared to direct deterrence, because the capacity of the protégé or the relationship between the deterrer and protégé may also affect the success or failure of the strategy.

c) Unilateral & Mutual Deterrence

If we consider the deterrence as a strategy to prevent an actor that challenges the status-quo, there is no deterrent relationship when none of the actors effort to alter the status-quo. In this sense, unilateral deterrence refers to situations in which only one side challenge the status-quo and the other attempts to deter, whereas mutual deterrence refers two actors' reciprocal efforts to both challenge status-quo and deter each other (Quackenbush, 2011: 750). The relationship between the U.S and the Soviets Union during the Cold War is the best example of such a mutual deterrent relationship in which both of them assumed that the other one was trying to alter the status-quo and it has to preserve the status-quo through deterrence. Although it can be argued that the status-quo is a subjective concept, and therefore the roles of "defender" and "challenger" cannot constantly and objectively assigned to parties, this issue will discussed later as it is relevant to other types of deterrence too.

d) Conventional & Nuclear Deterrence

The mutual deterrent relationship between the U.S and the Soviets Union during the Cold War has another important aspect regarding the nature of threats that based upon. Since both superpowers in the Cold War had nuclear weapons, their deterrent relationship had different dynamics compared to others that based on conventional weapons. Most importantly, it was assumed that the nuclear weapons technology provided mutual destructive capacities to both the U.S and the Soviets Union during Cold War and due to the unacceptable costs of a nuclear attack (mutual assured destruction) neither side attempted to initiate a conflict. In other words, the higher destructive capacities they had, the less likely they considered attacking the other. Accordingly, Waltz argued that the destructive capacities of weapons of mass destruction would bring stability to international system, and so the proliferation of WMDs should be encouraged (Sagan, Waltz, Betts, 2007:147).

However, this approach received some critiques. For instance, there was no clear evidence that the nuclear deterrence, as a deliberate and purposeful strategy, was the factor that prevented a catastrophic superpower war (Freedman, 1998: 25). Moreover, according to perfect deterrence theory which argues that only rational threats can be credible, even WMDs (including nuclear weapons) themselves are not rational threats since the target would already know that the deterrer cannot carry out such self-destructive threat and so the strategy would fail automatically (Zagare, 2000: 289). These critiques do not only target the “nuclear” deterrence, so they will be discussed later.

e) Deterrence by denial & punishment

The conventional wisdom of deterrence relies upon deterrence by punishment. It is widely accepted that a credible deterrent threat can only be built upon punishment that would inflict high costs to opponent. However, such a conceptualization is deficient and restrictive in the sense of addressing only one aspect of the opponent’s cost-benefit calculus as Synder argues (cited in Freedman & Raghavan, 2013: 211). Thus, it is also possible to construct a deterrence strategy through defensive measures. To put it simply, deterrence by denial is an attempt to deny a possible attack through strengthening own defensive measures and so increasing the cost for the opponent if it considers attacking. In Freedman’s words, “If moving forward is going to be extremely difficult because of obstacles placed directly in one’s path then the costs overcoming these obstacles- in the form of more troops, better equipment, more robust supply lines- will intermingle in one’s mind with costs resulting from the opponent’s retaliation.” (Freedman, 1998: 26, 27). More specifically, it can be achieved through passive defense (ex. shelters in homeland) or active defense (anti-ballistic missile systems), although the blurred distinction

between offense and defense again problematize such conceptualizations (Freedman, 2004: 37).

Even though the idea of deterrence by denial is harshly criticized because it contradicts with the nature of strategy, Freedman claims that the deterrence by denial is inherently more reliable, because if implementation of threats becomes necessary, it offers a certain control rather than to continue coercion in which the target still has choices and can defy (Freedman, 2004: 39). Therefore, when we considered the goal of deterrence strategy as influencing the calculus of a challenger and manipulating its choices, deterrence by denial remains as a strong alternative to punishment.

2.4.2.1.2. Four Waves of Deterrence Theory

The history of deterrence theory is divided into three waves by Jervis (1979). He asserts that the first wave started with writings of Brodie, Wolfers and Viner (cited in Jervis, 1979: 291) at the early years of the nuclear era, but this wave lacked a systemized framework and remained as immature until the second wave in 1950s and 1960s. The second wave established the general framework of deterrence theory by relying upon a game theoretical model, game of Chicken in which “each side tries to prevail by making the other think it is going to stand firm” (Jervis, 1979: 291). This modelling helped to understand the contexts and nature of the international crises. Even though the traditional definition of deterrence- using threats to manipulate the behaviors of the opponent- was shaped during this wave, however, there are numerous critiques against this wave.

Firstly, the second wave deterrence theorists focused on getting best possible payoff from the crisis while no attention paid how to transform hostile relations to

the peaceful ones. However, it is argued by the second wave theorists that explaining all of the dynamics of international conflicts in such a broader manner has never been the goal of deterrence theory. Thus, they emphasized the need for parsimony in response to this critique. This focus limited the scope of the theory, although it did not damage its validity (Jervis, 1979: 292).

Secondly, it relied upon the role of threats to manipulate the opponent, but ignored the role of “compromise and rewards” that would be more efficient than threats (Jervis, 1979: 294). George’s concept of “coercive diplomacy” addressed and attempted to fill this gap in deterrence theory. He suggests using positive inducements along with punitive threats in order to convince an adversary to “stop and/or undo an action he is already embarked upon” (George, 1991: 5). Coercive diplomacy is distinguished from deterrence since it targets an action that is already undertaken and also from compellence as it differentiates the offensive and defensive threats and is not limited to coercive threats. Therefore, George (1991:5) represents the coercive diplomacy as an “alternative to reliance on military action” and as a third form of coercion, in contrast to Schelling’s classification.

Thirdly, the second wave deterrence theory was ethnocentric in the sense of basing upon in the Western culture, while different actors may read the world and events differently due to their own cultures (Jervis, 1979: 296). Thus, this ethnocentric approach would undermine efforts to construct a general theory of deterrence and leads us to rely on more context-dependent strategies as George suggests (1991: 69). The concept of “tailored deterrence” can be considered as an

effort to refine this aspect currently, but it will not be discussed here since it lacks a well-developed framework and out of the scope of this research.²

Lastly, the pure rationality assumption of the second wave is criticized for neglecting the room for irrational decision-makings in crises times. As emotional or mindless reactions, misperception, and misinterpretation are highly probable during an intense crisis time, it would not be wise to assume a pure rationality for actors (Jervis, 1979: 299; George, 1991: 4). Morgan(1977:13) states that “Deterrence theory takes threat and reaction, a complex psychological phenomenon with obvious emotional equipment of man, and reduces it to the interaction of a set of rational decision makers.”. The problematic nature of the rationality understanding of the second wave is not limited with the complications during the crisis time, yet it will be discussed later with the perfect deterrence theory’s arguments.

The third wave of deterrence theory firstly focused on the empirical studies that attempted to test the theory, provide evidences and answer the main question: under which conditions the deterrence strategy succeeds and when it fails (Jervis, 1979: 303). The most comprehensive empirical research is led by Huth and Russett (1984) in which they examined fifty four cases that involved immediate-extended deterrence strategy. They argue that the characteristic of the tie between the defender and protégé is a more decisive factor than the relative military balance between the defender and challenger (Huth and Russett, 1984: 497). More specifically, it is concluded that “deterrence is more likely to be effective, the greater the defender’s visible and symbolic stake in the protégé” (Huth and Russett, 1984: 516). Another important conclusion of the research is that the previous crisis behaviors of the

² For a recent discussion of the role of strategic culture and need for “tailored deterrence” see: Lantis, J. S. 2009. Strategic culture and tailored deterrence: bridging the gap between theory and practice. *Contemporary Security Policy*, 30 (3), pp. 467--485.

deterrent do not significantly decrease the likelihood of success in further cases, contrary to conventional wisdom (Huth and Russett, 1984:517). In other words, an actor may take step backward in a confrontation in which its “stake in the protégé” is not sufficiently high, but it can stand firm in another confrontation if its interest regarding the protégé are vital.

However, this empirical research is criticized in many respects. First of all, according to the analysis of the same cases by Lebow and Stein(1990: 337), most of them even do not include the strategy of deterrence since the basic elements of a deterrence strategy, such as existence of a challenger with a serious intention to attack, lack. They defend more rigorous definition of the deterrence, strict application of this definition to the empirical cases and strong evidences that indicate the existence of deterrence in those cases. Moreover, Lebow and Stein(1990: 345) stress the difficulty of evaluating success and failure of deterrence in empirical studies and assert that if there is no clear evidence that the challenger’s decision to concede is mainly because of the defender’s threat, then it is not plausible to make a judgment about the success or failure of deterrence. When it is considered that there are numerous economic or political factors that can lead the defender to that decision, absence of strong evidence may lead observer to a subjective analysis. Therefore, they are skeptical about the validity of not only Huth and Russett’s (1984) analysis, but all “the context-free criteria” of deterrence in general terms because of the existence of “subjectivity in the selecting and coding of deterrence cases” (Lebow and Stein, 1990: 353).

On the other hand, Huth and Russett (1990: 468) argue that these critiques are misleading since Lebow and Stein (1990) misunderstand the conceptualization and operationalization in the mentioned research. For instance, they accept that some

economic and political conditions-outside the scope of deterrence theory- may shape the defender's decision and even they can dominate the cost-benefit calculus of the defender, but empirical studies can still explore "relative explanatory power of variables within and outside the scope of deterrence theory" by addressing their effects (Huth and Russett, 1990: 470,471). Moreover, in response to requirement of strong evidences for the intentions of a defender, it is argued that even the "strong evidences" suggests by Lebow and Stein (1990), namely official documentary, may be misleading (perhaps intentionally) or even the actor itself may not be sure about its own intention or its intention can change during the crisis (Huth and Russett, 1990: 481). Additionally, even if the documentary evidence is used for the evaluation of the success or failure of deterrence, it would also be misleading as policy makers hardly accept that they are deterred due to their motive to protect their reputation (Huth and Russett, 1990: 491). Actually, it does not undermine Lebow and Stein's concerns regarding the difficulty of understanding the actors' intentions, but supports. Nevertheless, Huth and Russett(1990:489) claim that insisting on strong and clear evidence-based on official documents- may lead researchers to exclude "many cases of legitimate deterrence", and so it becomes a "greater bias" than using the available evidences to indicate the existence of a defender, its intentions and the success or failure of deterrence strategy.

Another focal point of the third wave theorists was the role of interests in a bargaining situation. Jervis(1979: 314) distinguishes two kinds of interests which are the "intrinsic interest" that refers to "inherent value the actor places on the object or issue at stake"; and the "strategic interest" represents "the degree to which a retreat would endanger the state's position on other issues...". The implication of this distinction for deterrence theory is that the intrinsic interest is more essential for the

success of deterrence. In other words, the side that has more vital interest obviously is more likely to deter other successfully. George(1991: 77) conceptualizes this as “asymmetry of motivation” and claims that if one side can create this in a bargaining situation, it can increase the probability of successful deterrence. Accordingly, asymmetry of motivation can be obtained in two ways; first, it would be aimed to protect only the own vital interests and not to damage the other side’s vital interests, or, positive inducements may be utilized to reduce the opponent’s “motivation to resist the demands” (George, 1991: 77). Moreover, the greater intrinsic interest would bring an inherent and powerful credibility, and so decrease the need for costly commitments (Jervis, 1979:316). The most important implication of this argument is that the overestimation of the role of commitment misleads us to think that the decisions in different crises are interdependent and so each retreats/victories affects the further one (Jervis, 1979:319). However, as the essential factor is the asymmetry of motivation, the only plausible conclusion would be that an actor can examine the previous behaviors of its opponent to infer that whether it is likely or not to stand firm in the current crisis.

In addition to the points mentioned above, there are some views that are skeptical about whether the deterrence strategy is a promising way of managing crisis or not. Although there is variety of criteria for a successful deterrence, such as clarity of the defenders’ goal, credibility of the threat or a healthy communication between actors and it is reasonable to expect a successful deterrence when these basic conditions exist;, the process is not that smooth (Mazarr and Goodby, 2011: 58). Firstly, deterrence does not always work against all the actors. Schelling emphasizes the initiator’s mind and states that some “...mad-men, like small children, can often not be controlled by threats” (Schelling, 1960: 6). In conjunction

with this, Lebow and Stein(1989: 213) assert that when a determined initiator is combined with misperception or miscalculation, the outcome of deterrence strategy becomes quite ambiguous. Thus, it is fair to claim that politicians or leaders cannot rely upon deterrence theory because it is not able to predict the outcome correctly in general and might have unexpected implications.

Lebow and Stein(1989: 220) also state that deterrence fails in most of the empirical tests, because the initiators' calculations shaped by the factors outside the realm of deterrence theory. Moreover, Morgan claims that the factors related to nature of the threat or communication level between the actors present only one dimension of the issue. He points out the "domestic political processes" and "leadership factor" which shape the decision making context of the target actor, such as personality of the leaders or bureaucratic structure (Morgan, 1977: 147). Also, when policymakers believe that a challenge is needed to compensate the crucial needs, even overt and credible threats are not able to deter them because most of the variables mentioned above are not open to manipulation from outside (Lebow, 1983: 334). Thus, it can be inferred that since deterrence does not address the underlying roots of aggression, it is less than a satisfactory way of managing international confrontations (Lebow, 1983: 345).

Differently from Lebow and Stein, MccGwire(1986: 64) points out the problematic nature of deterrence, particularly nuclear deterrence, itself. According to him, the deterrence-based policy of the U.S. was perceived as a security threat by the Soviet Union and drove them to take countermeasures during the Cold War. Therefore, deterrence was the main reason of the security problems and attempts to avoid intransigencies, rather than seeking for best ways of managing them, can serve actors interests and security better.

Even though the classical deterrence theory mostly deals with the Cold War context and the validity of the deterrence strategy has been questioned after the end of the Cold War, the deterrence theory literature keeps expanding in different directions currently. The most significant contribution comes from the Zagare and Kilgour as they introduced the perfect deterrence theory which aims to overcome the limitations of the rational deterrence theory, reconcile rationality and deterrence and reinforce the explanatory power of the deterrence theory. The perfect deterrence theory firstly points out that how the classical/rational deterrence theory is logically inconsistent and empirically implausible (Zagare&Kilgour, 2000: 287). For instance, the rational deterrence mostly relied upon the “unthinkable wars” due to nuclear capacities of the superpowers, however the nuclear weapons are irrational threats since they can never be carried out and the adversary already knows that. In other words, as both sides know that the nuclear war is the worst option in any case, they also know that a rational opponent would never use that threat (Zagare, 2004: 118). Therefore, how can the rational deterrence theory rely upon irrational threats and possibility of irrational behaviors by the rational actors? In addition to this logical inconsistency, rational deterrence theory also lacks a consistent explanatory power, such as while it explains the absence of superpower conflict with the parity conditions between the U.S and Soviets Union’s nuclear capacities, it fails to explain why there was no war until the Soviets Union achieved the equivalence (Zagare, 2004: 111). Thus, the perfect deterrence theory attempted to overcome these problems within the framework of deterrence theory by changing some of the assumptions.

The most important difference of the perfect deterrence theory is about the capability and credibility of the threats in a deterrence strategy. It argues that a

capable threat, which is a threat that hurts the opponent, is the only necessary condition for the success of deterrence (Zagare&Kilgour, 2000: 290). However, a capable threat must be both physically and psychologically capable. Namely, the deterrer must have the material capacity to execute the threat and it must be perceived by the opponent that the cost inflicted by the threat is higher than the gains that can be sought by defying the threat. More specifically, “a threat is capable if only the threatened player prefers status-quo to the outcome that results when and if the threat is carried out” (Zagare, 2004: 123,124). Although it is a part of conventional wisdom, the perfect deterrence theory makes a difference by arguing that there are both a minimum threshold that is “a point of minimum cost” necessary for deterrence to succeed, and a “maximum threshold” that reflects the point above which increasing the cost would no longer increase success probability (Zagare&Kilgour, 2000: 292). Therefore, a capable threat is simply the threat that exceeds the minimum threshold. Yet, the WMDs those may help to exceed this minimum point are favorable as long as they do not exceed the maximum point. The most significant policy implications of this argument are that perfect deterrence theory sets a theoretical ground for arms control efforts and supports a “minimum deterrence policy” rather than increasing overkill capability that would possibly backfire (Zagare&Kilgour, 2000: 292).

Perfect deterrence theory differs from the classical deterrence theory also regarding the credibility aspect of deterring threats. It simply argues that the threats are credible as long as they are rational to be carried out. Therefore, a nuclear war threat, for instance, cannot be considered as credible threat since it is irrational for the deterrer to carry out this threat. Secondly, perfect deterrence theory emphasizes that credibility of threat is not a necessary condition for deterrence to succeed

(Zagare, 2004: 125). Differently from the mainstream deterrence literature, the perfect deterrence theory points out the credibility of retaliatory threat by the challenger and claims that when it is not credible, it is not able to deter defender from carrying out the initial threat or retaliating, and thus challenger is more likely to be deterred even without a credible threat by defender (Zagare, 2004: 125). Lastly, the credibility perspective of perfect deterrence theory suggests “reciprocity norm” in foreign policy making. This norm bases upon the idea that an actor responds the other as it is treated by him (Zagare&Kilgour, 2000: 297). In practice, it refers “avoiding inflexible hardline policies”, such as irrevocable commitment that is suggested by rational deterrence theory, since they would engender negative reactions by the other actors. However, it does not suggest cooperating unconditionally as “unilateral concessions are generally invitations for exploitation” (Zagare, 2004: 136).

Perfect deterrence theory also evaluates the actors’ approaches to status-quo differently. While classical deterrence theorists assume that dissatisfaction with the status-quo is constant, perfect deterrence theory differentiate actors’ preferences. Therefore, it considers the (dis)satisfaction as a variable, not constant, by arguing that some states may be content with the status-quo and some may not (Zagare, 2004: 127). This changed assumption has a significant implication for deterrence theory since it overcomes the limited scope. As mentioned earlier, Lebow and Stein criticize the rational deterrence theory for excluding many other variables that possibly affect the crisis decision-making of an opponent; and in response, Huth and Russett acknowledge these other variables, such as economic and (domestic) political conditions, but asserts that they are out of the scope of deterrence theory. In this

sense, Zagare argues, perfect deterrence theory makes it possible to include these variables which are embedded in the status-quo evaluation of the actors (2000: 295).

Empirical records, Quackenbush(2010: 62) argues, also support the perfect deterrence theory's theoretical propositions. Most importantly, it presents a consistent solution, by reconciling rationality and credibility of threats, to the paradox in rational deterrence theory that is relying upon irrational threats to make deterrence works between rational actors. Therefore, the cases can be explained more properly by this consistent theoretical framework. Quackenbush (2010: 61) argues that general deterrence is more essential than immediate deterrence and perfect deterrence theory provides a better framework for explaining general deterrence situations, and so international conflicts. His statistical analysis of empirical records of general deterrence from 1816-2000 concludes that perfect deterrence theory's theoretical approach described above fits better to behaviors of the actors and outcomes of the cases (Quackenbush, 2010: 75). Consequently, perfect deterrence theory offers a stronger theoretical ground for deterrence theory and paves a better way for further research by making deterrence "perfect" in the sense of overcoming limitations and avoiding paradoxes.

Finally, in addition to the "three waves" of Jervis, a fourth wave of deterrence theory is on the agenda of deterrence theory recently. It basically aims to address "new" asymmetric security threats after the end of the Cold War and points out the need for a new conceptualization of deterrence that does not solely rely upon military terms (Knopf, 2010: 1). Therefore, the idea is that the target and method of the deterrence strategy should be modified to maintain its relevance in the post-Cold War context where controlling strategy (particularly pre-emption) is more favorable against terrorist organizations or rogue states since they are considered as

“undeterrable”. More specifically, it suggests i) relying on deterrence by denial particularly against terrorism; ii) including non-military tools, such as deterring terrorist organizations by delegitimizing their causes or using counter-narrative to balance their propaganda impact; iii) or using deterrence indirectly to deter the third parties from supporting terrorist organizations or WMD proliferation (Knopf, 2010: 25). However, these alternative tactics within the deterrence strategy still lacks a well-developed theoretical ground and empirical testing. Moreover, problematic definitions of some threats, such as “rogue state” as a much-debated term, would undermine a systematic formulation of these strategies.

On the other hand, Lupovici(2010: 721) presents a constructivist agenda for the fourth wave and argues that this constructivist trend can be combined with the new empirical efforts mentioned above, even though they are developed separately. Firstly, the constructivist approach considers deterrence as a learned phenomenon and underlines that learning its practices influences the chance of success. For instance, transforming the technological developments, such as nuclear technology, to deterrent threats was a learning process during the Cold War and the sides’ ability to learn affected their strategies’ successes (Lupovici , 2010: 712,713). Secondly, it is argued that deterrence is a social construction in the sense of depending on ideas, knowledge and the interpretation of them. Most of the concepts regarding the deterrence, such as rationality, threat and security, or credibility are all social constructions, and so it is needed to recognize the intersubjective understandings of these concepts and the social context in which they take place (Lupovici, 2010: 715, 716).

Additionally, the discourses are also crucial in constructivist understanding of deterrence as they not only convey the signals but also construct the reality given the

identity-discourse relationship. In practices of deterrence, actors' self-perceptions as "defender" or "challenger" (role identities), their stronger/weaker commitments regarding to their identity, or their conceptualization of "deterrence" itself are strongly connected to their discourses and require deeper understanding in these senses (Lupovici, 2010: 717). For instance, when Turkey attempted to deter Armenia from attacking Nakhichevan, two identity related issues affected Turkey's credibility significantly: first, the Azeris living in Nakhichevan were also accepted as Turks by Armenians, and secondly the Armenians perceived the threats under the traumatic influence of events in 1915 that shaped the Armenian identity that they have today (Lupovici, 2010: 725). Consequently, the identity, social context and intersubjective understandings may play a significant role in a deterrence strategy and such a constructivist approach can help to develop better strategies of deterrence. Nevertheless, these insights still require empirical testing and support.

Despite all the attempts to reinforce the deterrence theory and keep its relevancy in realpolitik, it cannot be the sole strategy that is employed in all cases. There is still need for alternative theories of strategic choices and "reassurance" is a remarkable alternative at this point.

2.4.3. Reassurance

As discussed earlier, George's "coercive diplomacy" has already considered positive inducements as inherent part of the deterrence strategy. Moreover, Huth and Russett asserted that reassurance strategy, which is presented as an alternative to deterrence, is an "underdeveloped component of deterrence theory" as the rewards and positive inducements are tools of deterrence (Huth&Russett, 1990: 471).

However, as briefly presented below, reassurance strategy is more than offering rewards to the opponent in return for some concession obtained in other areas. It is supposed to address the underlying disagreement and “reassure” the opponent regarding that problem. For instance, if there is a conflict about a security issue, economic rewards can hardly persuade the opponent to concede. Only if the security concerns of the opponent can be addressed and satisfied, the conflict can be resolved without threat or use force. Surely, it would be naive to think that all conflicts can be resolved peacefully, but it is not the goal of reassurance strategy. Rather, the idea is to prevent unintended conflicts in which both sides do not intent to fight, but misperceptions and misunderstandings lead them to a cycle of violence. Thus, even though it is claimed that deterrence strategy already includes, or should include, “reassurance” within its own framework, this strategy has a distinct framework.

In this sense, Kydd describes reassurance as the “flip side of the security dilemma coin” and asserts that the misperception and stereotypes that drive actors to conflict could be eliminated through reassurance (Kydd, 2000: 325). Similarly, Montgomery considers reassurance as a way (and also an outcome) of overcoming security dilemma under uncertainty (Montgomery, 2006: 151). Therefore, reassurance emerges as an alternative strategy which encourages actors to establish a collective security through eliminating the instigator of the conflict.

For the practice of this strategy, Stein(1991) presents some different sub-strategies which can reduce the likelihood of unintended conflicts and make alternatives of using force visible for parties. Firstly, even though the domestic conditions that lead opponent to brinkmanship are not open to exogenous manipulations, exercise of restraint can allow leaders to avoid actions which would exacerbate the pressure on the opponent. Yet, the important point is that verbal

reassurance is necessary but not enough to get a result; clear actions are needed (Stein, 1991: 435, 436). In other words, as Kydd(2000: 326-327) argues, the opponent can be reassured through “costly signals” which prove strong intentions for non-aggression.

Secondly, leaders can promote negotiations and assure their opponents about their benign intentions by making irrevocable commitments, since it would annihilate the misperception and stereotyping. For instance, when Egypt’s president, Anwar el-Sadat, initiated the negotiations with Israel, he was marginalized from the Muslim world which made his action an irrevocable one. In this way, Sadat’s commitments eliminated misperception and distrust between Egypt and Israel and convinced Israel that his intentions were benign. (Stein, 1991: 441,442).

Lastly, collectively accepted informal norms of competition and limited security regimes can shape the borders of the process and provide transparency to some extent. (Stein, 1991: 444). However, undoubtedly, these reassurance strategies are not free from some limitations. Most importantly, Lebow(1983: 345) points out that reassurance strategies require “a degree of freedom from domestic, political, and bureaucratic constraints” which is quite difficult, if not impossible. Moreover, it can be argued that concession without reciprocity is a kind of invitation to be exploited. Therefore, the actors’ sensitivity to avoid such a risk would make this strategy unfavorable. In this sense, a combination of deterrence and reassurance strategies should be considered as another alternative that may overcome the limitations of each of them.

2.4.4. Combination of Deterrence and Reassurance Strategies

Lebow (1983) mentions the difficulty and riskiness of a pure reassurance strategy and discusses a combination of deterrence and reassurance as the ideal conflict management strategy. According to Lebow, such a strategy can reduce the likelihood of conflict by addressing both needs and opportunities regarding confrontation. However, there is a clear trade-off between deterrence and reassurance. The implementation of deterrence which increases the threat perception of adversary can easily hinder reassurance strategy. (Lebow, 1983: 345, 346). Similar to Lebow's points, Montgomery(2006) points out the internal trade-off of reassurance. He claims that reassurance can be achieved through the revelation of benign intentions by an actor through decreasing its own ability to defeat the opponent, because this decrease will scale down the opponents' security concerns and reduce its need for aggression (Montgomery, 2006: 160, 161). However, if the opponent has malign intentions, then reassurance would mean increased vulnerability which can be exploited (Montgomery, 2006: 153). Therefore, a combination of deterrence and reassurance strategies requires taking into account the target's motivation and questioning whether it is a security seeker or an aggressor.

When a would-be challenger is looking for gains/opportunities, a reassurance strategy might be dangerous in the sense of encouraging the challenger. If the adversary is purely motivated by needs, then reassurance strategies become more appropriate options compared to deterrence. However, if a would-be challenger is motivated by a mixture of needs and opportunity, then, a reassurance strategy might work as a complementary to deterrence (Stein, 1991: 449; Montgomery, 2006: 162, 163) On the other hand, Tang (2007) emphasizes the reassurance's role as an "invitation to cooperation" which reduces uncertainty and mistrust. It is stated that

“if you want to know another's true intention you extend an invitation to cooperate on a particular issue (e.g. containing a dispute)” (Tang, 2007: 194). Thus, according to the adversary’s reaction, whether it reciprocates or not, you can understand its mind and reduce uncertainty.

When we remember the deterrence literature, the perfect deterrence theory provides most convenient theoretical ground for such a combination. As mentioned earlier, perfect deterrence theory suggests “reciprocity norm” in which an actor adjust its behaviors according to other’s behaviors. Thus, if an actor attempts to reassure its opponent, it is likely to be treated in the same manner principally, but if the opponent perceive this as a signal of weakness and attempts to exploit, then deterrence strategy can be put into action. In this sense, it can be argued that reassurance is an inherent component of perfect deterrence. However, the crucial point is that if defender starts with the deterrence part initially, it would make the reassurance part of the strategy irrelevant, since the threats would increase the mistrust between them and the opponent can no longer be convinced of goodwill of the defender. Therefore, what make a combination of deterrence and reassurance strategy a distinct alternative is it offers using reassurance strategy initially and keeping deterrence strategy as contingency plan.

2.4.5. Where do we stand now?

As a phenomenon of the Cold War context, the deterrence strategy and theory had a long way up to the present. Although the conventional wisdom had been based upon the rational deterrence theory, it received a wide range of critiques and evolved in order to stay consistent and respond changing conjuncture of world politics. Some

subsequent theories, such as perfect deterrence theory, endeavored to identify and overcome the inconsistencies and limitations of the theory. On the other hand, after the end of the Cold War, it is aimed by the fourth wave theorists to modify the theory according to the new needs of the post-Cold War context. Even constructivist approaches- coming from a different background- take part in deterrence theory today.

Furthermore, some strategies which are discussed separately in this chapter, such as controlling or reassurance, have been considered as components of deterrence strategy for a long time. However, it is more appropriate to recognize their different natures and categorize them differently, since considering all of them as parts of deterrence could undermine the consistency and validity of the theory. Nevertheless, it is not plausible to seek a single strategy that can be carried out in most cases. Thus, it would be wiser for policy makers to take into account the motives behind the confrontations and combine appropriate strategies to manage conflict, if necessary.

In the next part, the strategic options, which are conceptually discussed above, will be evaluated in the context of the Israel-Iran confrontation regarding Iran's ongoing nuclear program.

2.5. What Do These Strategies Mean For Israel?

The four strategic options theoretically discussed above have advantages and limitations for Israel in the case of Iran's nuclear program. Even though some basic tactics of the controlling strategy have been applied already, there are some other tactics that can be contemplated. Moreover, the other strategies still remain as

alternative options on the table and they require further analyses in conjunction with the theoretical discussion in the literature. In this part, the possible advantages and limitations of these strategies are evaluated specifically for the Israel-Iran case.

2.5.1. Controlling

Firstly, different forms of controlling strategy are on the table for Israel in response Iran's nuclear program. Controlling strategy differs from coercion in the sense of including use of force, but it is also different than waging a full scale war due to its limited and purposeful nature. In this sense, some of the strategic options reflected in the literature, such as economic sanctions or limited military operations, can be considered as the tactics of the controlling strategy since they aim to limit Iran's strategic options through using different means of force.

Controlling strategy has been conducted by the international community collectively up until today and Israel has been relying upon this strategy in accord with the international community. Although the pre-emptive or preventive wars are stated as main tactics of controlling strategy in the previous part, economic sanctions are the cornerstone of this strategy in this case. These sanctions mainly includes "prohibition of Iranian oil import, a freeze of all Iranian state assets held by U.S. institutions, and eventually a travel ban and a comprehensive embargo on nearly all forms of trade with Iran." (Maloney, 2011: 1299). All of them undeniably put the Iranian regime into the trouble in the sense of causing more expensive products with lower quality, cancelled financial credits, withheld technical assistance, and shaken business climate for possible investments (Amuzegar, 1997: 24). However, the main goal of the sanctions is not crippling the Iranian economy, but forcing Iran to refrain

from its nuclear program. In this sense, while there is a common understanding that the economic sanctions can force the Iranian policy makers to compromise over its nuclear program by increasing the economic and political cost to Iran of insisting on its nuclear program, the efficacy of the sanctions is open to question. Moreover, the history of the sanctions tells us that the economic sanctions have remained not only inefficient but also counterproductive.

There are several reasons that undermine the success of the economic sanctions. Firstly, the Iranian governments' response to the sanctions, which can be described as "a multifaceted fashion, including defiance, mitigation, aversion, insulation and a self-serving public diplomacy", allowed them to evade the costs to some extent. (Maloney, 2011: 1309). The Iranian leaders declared that the sanctions cannot damage Iran's interests, and even can help to increase Iran's self-sufficiency; while the governments have been taking a set of economic measures (Maloney, 2009: 142; 2011:1306). For instance, minimizing gasoline consumption and encouraging the compressed natural gas fuel for the transportation and increasing its domestic production contributed Iran's self-sufficiency (Maloney, 2009: 142). Iran also broadened its trade network with new partners (e.g. Venezuela and China) which considerably helped to absorb the trade sanctions. In addition, Iran took the advantage of public diplomacy in the sense of attracting the international public's attention to the human rights aspect of the sanctions (Maloney, 2009: 143). Consequently, Iran's reaction to the economic sanctions mitigated the damage on the Iranian economy and politics.

The economic sanctions also overlooked the nature of the Iranian domestic politics. They did not only strengthen the cooperation between the different factions of the Iran's political system but also increased the willingness to resist the costs of

Iran's policy (Maloney, 2009: 143). More importantly, the sanctions missed the point that the security policies have a clear privilege over economic policies in Iran. As an evidence of the privilege of the national security issues for Iranian policy-makers, Maloney reminds the case of Iran-Iraq war during which both the traditionalists and left-wing radicals accepted the implementation of severe economic measures instead of ending war that burdened a considerable cost to the Iranian economy (2009: 144). Therefore, the sanctions could not address the mindset of the Iranian leaders which prescribes economizing the sanctions instead of modifying the strategic calculus of the security affairs.

Beyond the domestic dynamics of Iran, the recent regional developments impeded the sanctions too. Iranian leaders could not neglect the Arab Spring movements which reflected the desire not only for democracy and freedom, but also for getting rid of the Western influence in the region. Thus, the Iranian decision-makers are unlikely to concede on an issue that has been framed as a national cause against the Western powers, in such a political climate in the region (Maloney, 2011: 1308).

Last but not least, the U.S. and Israel failed to establish a unified multilateral sanctions system. Some actors in the international system, particularly Russia and China, are reluctant to embrace the sanctions against Iran due to their crucial relations with Iran and their resentment against the U.S.'s policy (Maloney, 2011: 1310). Therefore, the economic sanctions that can only work when they are universal, unified and consistent have not been working properly in the Iran case (Amuzegar, 1997: 17).

In addition to its operational failure, the sanctions system also produces counterproductive results. Most importantly, the more the international community put pressure on Iran, the more the Iranian decision-makers and public value the nuclear program. In other words, “As severe sanctions devastate Iran, Tehran will surely be encouraged to double down on its quest for the ultimate deterrent” (Maloney, 2012: 146). Barzegar(2012: 160) notes, “The Security Council’s many resolutions against the nuclear program in the past six years led Iran build approximately 8.000 more centrifuges, increase the degree of enrichment by 20 percent, establish a new nuclear site, and move many enrichment activities to a site at Fordo, which is far more hardened than other facilities against attack.”. Hence, the economic and financial sanctions have remained as a set of self-destructive tactics. Even though they could be considered as the elements of a carrot and stick policy, it is not wise to rely upon them as the primary tool.

The other remarkable and much-debated option available for Israel is a preventive military action, still as a tactic of controlling strategy as long as it does not turn into a full scale war. A possible preventive military strike would target the nuclear facilities of Iran, and some other military bases in order to limits Iran’s retaliation. This operation might be conducted unilaterally by Israel or multilaterally by an international coalition with the leadership of the U.S.. However, since the international community, including the U.S., does not tend to embrace such an option, Israel might consider a unilateral preventive military strike to Iran as it did against Iraq in 1981 and Syria in 2007.

Even though one may recall the Begin Doctrine and assert that preventive military action is still the most appropriate option for Israel, there are some obvious differences between the two cases and these differences increase the risks and costs

of the military option for Israel (Pedatzur, 2007: 522; Sadr, 2005: 61). First of all, there is a lack of intelligence about the exact location of the nuclear facilities, but what is known is that they are close by the Iranian settlements and well protected by the Iranian military forces (Pedatzur, 2007:523). Thus, a strike would cause a high collateral damage. Secondly, differently from Iraq, Iran has considerable military capacity for retaliation after absorbing the first strike by Israel (Weiss, 2009: 82; Sadr, 2005: 61). Therefore, the exit strategy is problematic since a preventive strike can easily turn into a full scale or a prolonged war as happened with Lebanon in 2006 (Eiran, 2012: 184). It is implausible to expect Iran to remain silent when being attacked, in contrast to the reactions of Iraq in 1981 and Syria in 2007 which did not respond the Israeli strike with retaliation. Moreover, Israel should be prepared for retaliation from the proxies of Iran, particularly from the Hezbollah (Kahn, 2012: 115). Even if the Israeli Defense Forces are capable to deal with the Hezbollah or any other terrorist organizations, a possible retaliation's psychological effect on the Israeli public would put the Israeli government into huge trouble. Furthermore, Eiran points out Matan Vilnai's (the former Minister for Home Front Defense) speech at the Knesset in 2012 in which Vilnai complained about the lack of homeland preparedness to resist a strike against Israel. Furthermore, he gives a striking data that " a quarter of Israel do not have the most basic physical shelter needed to whether sustained rocket fire. Gas masks, a basic safety measure against a chemical attack, are available to only 60 percent of the population". (Eiran, 2012: 183). Hence, the day after scenarios of the military strike would not be that smooth for Israel.

Apart from the operational risks, a preventive strike would carry significant diplomatic and economic costs. For instance, it would legitimize Iran's further aggression both in conventional and nuclear terms and subvert the international

pressure on Iran's nuclear program (Eiran, 2012: 185). Moreover, a unilateral Israeli strike might end up with the isolation of Israel from the international community. (Pedatzur, 2007: 524; Sanders, 2009: 84; Greenblum, 2006: 98,99; Sadr, 2005: 62). The U.S.-Israel relations would suffer a lot particularly. Additionally, a military strike to Iran would certainly influence the global energy market (Eiran, 2012: 185). Israel would have a bitter experience with this situation due to not only the economic impact of it, but also the wrath of the other actors of the global energy market which can appear in different forms.

On the other hand, Raas and Long (2007) claim that Israel has the capacity to strike Iran with a tolerable cost and reasonable chance of success, in their comprehensive analysis of the Israeli capabilities to attack Iran. They do not deny that there are notable differences between the Iran and Iraq cases, but they emphasize that Israeli military forces also improved their capabilities for such operations (Raas and Long , 2007: 8). Although the locations of the Iranian nuclear facilities (distributed around the country) make it impossible to destroy all of them, the munitions of the Israeli Air Force with "enhanced accuracy and penetration" can remarkably delay Iran's nuclear program (Raas and Long , 2007:12,15). Moreover, even though the targets in Iran are more challenging than the Iraq, Israel still has clear operational advantages in the case of a preventive military strike. Most importantly, the Islamic Republic of Iran Air Force and air defense system are "not capable of competing with a first-class air force such as the Israel Air Force" (2007: 21, 22). Nevertheless, Raas and Long (2007: 31) do not claim that the military strike is the most preferable option or the inevitable end of the story. The day after scenarios of a possible military operation, particularly a strong retaliation from Iran

in any terms, would make decision-makers reluctant to use this option, despite their confidence in their capabilities to delay Iran's nuclear program successfully.

Similarly, Kroenig(2012: 101) asserts that the risks of a military option are quite exaggerated and the U.S. can manage the risks of such operations. He basically claims that if other options fail and result with a war, it would be more costly than a preventive military action that is discussed today and, as time goes on, the likelihood of a successful preventive military action will decrease. Inbar(2006:100) also points out the costs of inaction and inevitability of the radical steps due to the inefficiency of the sanctions and diplomatic efforts. He argues that an intolerant deterrence strategy-and a military operation if necessary- is inevitable. Even though the threat of using force and a military option involve risks and complications, he claims, they are not more dangerous than the possible outcomes of the inaction (Inbar, 2006: 85). Therefore, a preventive military strike clearly has important risks and costs for Israel, but the decisive factor is that whether the costs of inaction exceed these risks or not

More specifically, Abrams(2012: 28) puts emphasis on that Israel faces more danger than any other nation because of Iran's nuclear program and he estimates that the Israeli forces can conduct a preventive military operation without the help of the U.S.. Additionally, he does not think a military action by Israel would cause a regional war, since the other Arab governments are also worried about Iran's nuclear program (Abrams, 2012: 29). Thus, the military options are preferable and achievable for Israel according to Abrams. Yet, in contrast to him, Wexler (2012) argues that Israel should allow the U.S. to try non-military options, including sanctions and deterrence, first. Even if they fail, then a U.S led military strike would be the most preferable option for Israel, not a unilateral military action (Wexler, 2012: 36). Ben Meir (2010) also underscores the centrality of the U.S.'s position in

Israel's strategy. He claims that Israel may act unilaterally only if the negotiations by the international community fails; sanctions and other coercive measures do not yield any results; and the Mossad reports that Iran is too closed to have a nuclear weapon and so the threat is imminent. Accordingly, a unilateral action by Israel seems as a last resort and to avoid this last resort, Israel and the U.S. should synchronize their strategies (Ben Meir, 2010: 75). Nevertheless, some Israelis still suspect about the U.S.'s policy and insist on self-reliance, even though the Israeli officials have enjoyed this alliance many times in the recent history.

Even if it is an inoperative and obsolete one, regime change policy should be noted here, as another alternative which has been implemented by the U.S. for a long time. This strategy aims to overthrow an adversary government and replace it with a friendly, at least a less dangerous one. Haas(2005: 58) states that the "regime change tends to be direct and immediate and to involve the use of military force or covert action, as well as attempts to isolate both politically and economically the government in question". In this sense, it includes numerous risks and difficulties which make it an unfavorable option. Particularly, the second part of the strategy, replacing the old regime, is quite problematic as the U.S. experienced in Iraq after 2003 (Haas, 2005: 59).

Differently from the regime change, Haas mentions the "regime evolution" which "tends to be indirect and gradual and to involve the use of foreign policy tools other than military force" (Haas, 2005: 58). As a more radical version of public diplomacy, the regime evolution strategy specifically includes using the media and internet, assisting the dissident groups in Iran, proposing economic and political incentives, and shifting rhetoric towards the target public (Haas, 2005: 61). However,

it requires too long time and neither the U.S. nor the Israel is willing to accept such long-term strategies.

Leeden(2012: 150) also states that the threats posed by the Iranian regime contains more than its nuclear program, such as terrorism sponsored by Iran. Thus, he suggests a regime change strategy through encouraging a democratic revolution in Iran which would be capable of overcoming all these threats. Supporting the local dissident groups in Iran (such as the Green Movement) to topple the regime, would be a wiser way of eliminating an adversary regime in comparison to the significant costs and risks of a military action that can also achieve the same goal, he argues (Leeden, 2012: 151). Even though such a strategy seems more plausible, it does not address the nature of Iranian domestic politics which is quite sensitive to direct or indirect interferences by the third parties.

Wexler (2012) also points out another form of controlling strategy that can reduce the need for a military strike: “covert tactical operations”. These operations are conducted by the intelligence services mostly, and so do not burden diplomatic costs to governments. They basically include covert attacks to nuclear facilities, assassinations of the nuclear scientists, and cyber warfare (e.g. Stuxnet virus) which have been used against Iran many times (Wexler, 2012: 37). However, the covert operations cannot be considered as a primary tool, but only as a supplementary tactic.

2.5.2. Coercion: Deterrence & Compellence

As stated previously, the distinction between deterrence and compellence is not clear generally. The case here reflects the situation described by Freedman (1998: 19) in which the aim is to deter an undesired action which has been started already.

For example, as the prime minister of Israel demands Iran to stop its nuclear activities and dismantle its nuclear facilities, it includes both deterrence and compellence at the same time (Ho, 2013). Therefore, the deterrence concept, which is preferred in the discussion below, also reflects the compellence even if it is not mentioned specifically each time.

If we assume that it is wiser for Israel to achieve its goal without using military force, deterrence strategy is a notable, but not smooth, alternative. There are numerous types of deterrence strategy and each of them has advantages and risks for Israel. First of all, some assert that it would be the best (or the least bad) option to allow Iran to have a nuclear weapon. In connection with the nuclear deterrence and (non)proliferation theories, Waltz argues that since the nuclear weapons cause a more cautious and moderate stance for the actors who have them, we do not need to worry about Iran's -or any other states'- efforts for developing nuclear weapons. Even Israel will accept to live with a nuclear Iran, he claims (Sagan, Waltz, Betts, 2007:147). Similarly, Pedatzur suggests an unconcealed deterrence strategy to Israel in the case that Iran develops nuclear weapon, so that a mutual deterrence situation between Iran and Israel can be constituted. This bipolar nuclear order in the Middle East would mean a stable security for both sides since neither of them would not be willing to pay the cost of attacking each other (Pedatzur, 2007: 531).

Sanders(2009:85) also points out the “mutual nuclear deterrence” between the U.S. and the Soviet Union during the bipolar Cold War context. The basic principle of the mutual deterrence during the Cold War was that both of the states had a clear destructive capacity, and so both of them were aware of that if one of them strikes the other, the defender would retaliate in a destructive way after absorbing the first strike. Consequently, according to mutual deterrence strategy, both sides would not

tend to strike each other in order to avoid the risk of being destroyed (Sanders, 2009: 86). Yet, the mutual deterrence situation in the Cold War cannot be copied and applied to the Middle East context properly, due to the important differences between the two contexts. Sanders argues that Israel's military capacity is not sufficient for mutual deterrence. More importantly, Iran's and Israel's military capacities (both in conventional and nuclear terms) and political decision making systems are not symmetrical (Sanders, 2009: 89, 90). This asymmetry is an important problem when we consider that the mutual deterrence strategy requires symmetrical capacities that would cause equal existential concerns for both sides, and symmetrical political decision making systems from which we would expect similar reactions in response to the structure. Adamsky also argues that the different strategic cultures may hinder a stable mutual deterrence situation. Thus, he adds, they need to study each other's' strategic cultures and mindsets in order to minimize miscalculations and misconceptions (Sanders, 2012: 192).

In a more comprehensive analysis, Jones(2012: 202) evaluates a possible deterrent relationship between Israel and Iran in the case of Iran succeeds in developing nuclear weapon capability. He describes this relationship as "a form of ongoing negotiation" which requires stability and common understanding of the deterrence as a concept. However, the nature of the Iranian domestic politics is quite problematic for such a relationship. In the Iranian strategic culture, firstly, "concealment and dissimulation" are viewed as the legitimate tools of a discussion while a deterrent relationship strongly requires common understandings of suitable behaviors by all sides. Secondly, Iranians usually use complicated ways to express ideas which would undermine the deterrent relationship that must proceed through well-defined messages. Moreover, they are inclined to seek for a conspiracy under

the things which make them mistrustful against the other sides. Lastly, self-reliant and tough characteristics of Iranians can impede such a relationship that entails compromise to some extent (Jones, 2012: 202, 203). As a result, while a stable deterrent relationship requires clear communication on a common ground, the incompatible strategic cultures of the sides make it more difficult, if not impossible, to manage such a process.

Notwithstanding the applicability of the mutual deterrence option, Israel has several reasons to reject the idea of an Iran with nuclear weapons. Firstly, Israel's conceptions of deterrence impede a mutual deterrence option. Israel has been relying upon an asymmetrical deterrence strategy through which it can deter its adversaries without being deterred thanks to its military and nuclear superiority in the region; whereas a mutual deterrence situation requires two nuclear-armed actors who deter each other (Adamsky, 2012: 188; Jones, 2012: 209). Moreover, Roth(2009: 177) states that the Israeli decision makers consider this unquestionable superiority as the guarantee of the "peace" in the Middle East by deterring Israel's enemies from even thinking of an attack to Israel. Accordingly, in order to maintain this superiority, Israel must prevent any adversary from being capable to threaten Israel's survival (Ben Meir, 2010: 63). In fact, this approach is officially a part of the Israel's defense policy since the President Begin decided to strike Iraq's nuclear reactor in 1981. He formulated the Begin Doctrine which prescribes to stop any adversary developing weapons of mass destruction which are clearly existential threats for Israel (Adamsky, 2012: 187). Thus, referring to the Begin Doctrine, Israel is not willing to accept a bipolar nuclear order in which it has to relinquish its superiority both in conventional and nuclear terms.

General strategic thinking of Israel is not the only reason for rejecting the idea of a nuclear-armed Iran. Israel has understandable anxieties about Iran's intentions with its nuclear program, due to Iran's obvious support to anti-Israel terrorist organizations and the Iranian officials' harsh rhetoric against Israel that denies Jewish holocaust and Israel's presence as a sovereign state (Pedatzur, 2007: 514). Therefore, it seems that Israeli officials do not tend to accept the scenarios of a nuclear-weapon capable Iran, so the strategies that target to deter Iran from using its nuclear weapon capacity are not preferable for Israel.

Israel needs deterrence strategies that can prevent Iran from crossing the line. A direct nuclear deterrence, relying on its own nuclear capability, can be considered as an option. However, interestingly, the nuclear ambiguity policy of Israel has not brought a successful nuclear deterrence capacity until today. As Adamsky(2012: 189) reminds, "it did not deter Egyptians and Syrians from invading Israel in 1973, Iraq from launching missiles on Israel in 1991, the Palestinians from turning to violence during two intifadas, or Hezbollah and Hamas from raining rockets on Israel during the last decade". This ostensible confidence that nuclear capacity provides Israel does not serve its purposes practically.

Also, the "extended deterrence" is another type of deterrence strategy which can be employed in coordination with the U.S. Namely, the U.S. can deter Iran from attacking Israel by the threat of use of nuclear force against Iran, and so Israel can rely on the U.S.'s nuclear umbrella (Pedatzur, 2007: 526). However, Israel might not rely on another state for such a vital issue or the U.S. would not be willing to undertake this risky strategy (Pedatzur, 2007: 527). Thus, even though this strategy seems less costly for Israel, it is not free from limitations.

Although it is a contestable one, Israel might also prefer a deterrence strategy based on denial. Through this strategy, some defensive measures might be taken by Israel in response to a possible nuclear attack from Iran. For instance, as a way of passive defense, Israel can construct atomic shelters in order to be protected against any nuclear attack. It can strengthen its anti-missile systems too, as a way of active defense (Pedatzur, 2007: 529). Some scholars do not classify any of these defensive measures as a type of deterrence since they do not pose a punishment (Waltz, 1981: 5). However, Freedman and Raghavan claim that limiting “deterrence” to the punitive actions is deficient in the sense of considering only one aspect of the adversary’s cost-benefit calculation. In other words, they state, “the adversary might be more willing to risk costs in retaliation. But if moving forward is going to be extremely difficult because of the obstacles erected directly in his path, then the costs of surmounting these- in the form of more troops, better equipment, greater logistical effort- will intermingle in his mind with costs resulting from the opponent’s reprisal. These types of strategies have been called denial” (Freedman and Raghavan, 2013: 211). Therefore, the active and defensive measures can also be considered as different ways of deterrence strategy available for Israel.

2.5.3. Reassurance

Another important strategy available for Israel is using diplomacy and negotiating with Iran in accord with the international community. Although reassurance strategy has not been employed in a consistent manner neither by international community nor by Israel, these instruments can also be accepted as a part of reassurance strategy. In this sense, Weiss(2009: 86) asserts that Israel can pursue its goal by only negotiating and compromising with its neighbors, despite the

well-known difficulties of such a process. Bahgat (2006:20) also advocates that the international community should make use of the “carrots”, rather than “sticks” towards Iran while increasing the pressure on the nuclear material suppliers, not on Iran, in order to slow down Iran’s nuclear program. Indeed, the Iranian leaders would lean to an agreement that could maintain the Iranian economy, guarantee the survival of the regime, and recognize Iran’s legitimate right for peaceful nuclear activities. Such a negotiated agreement can also meet the demands of the international community with a lower cost which makes diplomacy the most promising options on the table currently. However, the international community’s satisfaction does not necessarily mean the same for Israel, as it has greater concerns and demands.

In this context, Parsi (2007) reminds a covert alliance period between Iran and Israel which had been continued even after the Islamic revolution in Iran in 1979. Until the collapse of the Soviet Union and defeat of Saddam in 1991, Iran and Israel had been cooperating against these common enemies. For instance, Israel provided arms to Iran during the Iran-Iraq war and lobbied in Washington to ease the tension; while Iran, likewise, provided intelligence to Israel for the Osirak operation in 1981 (Parsi, 2007: 79). When the end of the Cold War brought a new political climate to the Middle East, the Iran-Israel relations turned into a strategic competition over the regional hegemony (Parsi, 2006: 268). Nevertheless, a military conflict is still avoidable even though a stable and permanent peace is not realistic at this stage. For this outcome, Parsi argues, the Israeli policy makers should avoid undermining the negotiations between Iran and the international community. Rather, they should keep Israel’s security concerns on the negotiation table if they want to serve Israel’s interests (Parsi, 2007: 85). However, such a strategy needs a sophisticated plan and careful management.

More likely way for Israel to conduct such a strategy is relying upon a negotiation strategy which would be led by the U.S.. This strategy may start with conveying the message that the U.S. no longer pursues a regime change in Iran. Then, it could address mutual grievances and emphasize the issues on which they can cooperate, such as stability of Afghanistan and Iraq or transportation of the natural resources of the Central Asian countries to the West. The U.S. and Israel also have to shift their rhetoric and not threaten Iran publicly anymore, since they produce counterproductive results. The international community would certainly allow Iran to enrich uranium under tight controls, since coercing Iran to fully dismantle does not yield any results. Finally, the Iranians should be reassured that the U.S. does not aim to weaken Iran neither politically nor economically, hence the hands of the pragmatists in Iran can be strengthened (Amuzegar, 1997; Ben Meir, 2010; Mousavian, 2012; Takeyh, 2007). Through such a negotiation strategy, Takeyh states, the relations with Iran can be normalized. Yet, he emphasize that normalization of the relations with Iran should not be the end, but the starting point for more manageable discussions on the nuclear program or any other problems in the near future (Takeyh, 2007: 28).

On the contrary, due to lack of direct communication and Iran's determination for reaching the nuclear weapon capacity, Pedatzur(2007: 527) argues, a direct negotiation between Iran and Israel is not realistic. Indirect negotiations via the U.S. are more likely to succeed, yet the ongoing mistrust between Iran and the U.S. and Israel's possible demands including fully dismantling Iran's nuclear facilities would lead to a stalemate (Pedatzur, 2007: 528). Additionally, even though he considers the diplomacy as favorable option, Haas (2005: 66) also underlines that insufficient international support and Iran's determination for the nuclear weapons, if

any, might break a negotiation process. Consequently, the possible negotiations are not free from limitations and obstacles despite the fact that they are quite promising for all parties.

Differently, Chubin and Litwak(2003: 99) propose a different strategy based on the public diplomacy. They state that the Western states should try to influence the Iranian public and inform them about the danger of possible nuclear armament policies. They refer to a public opinion poll in 2002 which points out that 75 percent of Tehran residents favored negotiations and 70 percent of the Iranians desired to compromise with the international community (Chubin and Litwak , 2003: 102). Therefore, Chubin and Litwak(2003: 113) argue, the international community needs to focus on this opportunity through which it might be possible to compel the Iranian regime to compromise. However, even though this can be an element of a multifaceted strategy, it is not wise to expect the U.S. and Israel to rely upon this strategy as a primary tool.

Consequently, even if Israel relies upon the ongoing diplomatic negotiations between Iran and the West, it can only be one aspect of the reassurance strategy. It is necessary for Israel to initiate direct communication with Iran and to enable other means of reassurance. It can be implemented in a few ways. Israeli government can soften its discourse towards Iran and make irrevocable commitments for a peaceful solution at the risk of confronting with the hardliners at home. These verbal acts would be perceived by Iran as costly signals. More importantly than verbal reassurance, Israel would reassure Iran with actions, such as ending the nuclear ambiguity policy and clarifying Israel's nuclear weapons capability. Next, it may sign the treaty on the non-proliferation of nuclear weapons and join the efforts to establish a nuclear-weapon-free zone in the Middle East. Also, Israel may attempt to

establish a collective security understanding with Iran which would cover not only the nuclear technology issue, but also other problems (e.g. terrorism). At the end of the day, even if Iran does not stop its nuclear activities, there would be no room for security concerns for Israel, since such efforts by Israel may reassure Iran and it no longer needs a nuclear weapons capability, if any.

2.5.4. Combination of Deterrence and Reassurance

Neither of the components of this combination has been used by Israel yet. However, such a combination is promising in the sense of enabling reassurance strategy without taking big risk. The main point of this combination is that Israel can apply the tactics of reassurance strategy (explained in the preceding part) firstly, but it does not necessarily omit the deterrent threats those can be used if Iran reacts negatively in the further stages. Thus, the combination compensates the disadvantage of reassurance while some of the limitations of deterrence still exist for Israel. Israel still needs to contemplate the credibility and capability of its deterrent threat. Moreover, the counterproductive results of a deterrent threat may still come into play.

Nevertheless, it can be added to that such a combination can also diminish some negative effects of deterrence strategy. Most importantly, since Israel will convey the message that it is acting with completely defensive motives in the first stage, a deterrent threat is less likely to provoke Iran. Hence, in contrast to risks mentioned in previous part regarding deterrence strategy, a deterrent threat as a part of such combination would not increase the mistrust and hostility between Iran and Israel. However, while the combination of deterrence and reassurance has such extra

advantage for Israel, other problematic aspects of deterrence strategy, which discussed before, still effective.

2.6. Conclusion for Chapter II

In conclusion, most of the literature mentioned above is about the general strategies against Iran's nuclear program by the international community and there is a gap about Israel's strategy which is considerably crucial in this crisis. Most of the studies tend to consider Israel as an ordinary part of the story rather than a key party of the nuclear confrontation with Iran.

Even though there are some studies that particularly focus on Israel's possible strategies against Iran, they generally lack a systematic theoretical framework and disciplined methodology which are certainly required for this complex issue. For instance, when they present possible strategic options for Israel, they neglect reassurance strategy which is one of the main elements of this research. Only Pedatzur(2007: 529) names reassurance strategies partially and states that the concept of "deterrence ad reassurance" might become more of an issue in the future of discussion, but it is a remote possibility. However, as will be discussed further in this research, reassurance strategies are not less notable than the others, and so should be evaluated. Additionally, from the methodological perspective, there is no academic study in the literature that uses a game theoretical approach for Israel's strategy in response Iran's nuclear program.

Consequently, this research can contribute to the literature in two ways. First, it can make room for new considerations through emphasizing the role of reassurance strategies. Secondly, the game theoretical approach would provide a

disciplined picture of the interactive game between Israel and Iran. Thus, the results of this research can attract the attention of both the scholars and policy makers who are interested in coercion and counter-proliferation strategies, the Israeli foreign policy or Iran's nuclear program.

STRATEGY	WHAT DOES IT MEAN?	HOW ISRAEL CAN APPLY?	PROS	CONS
Controlling	goal-oriented use of force in order to eliminate the adversary's strategic choices rather than to influence them	Israel can use economic sanctions, preventive or pre-emptive wars, covert operations, cyber attacks etc. to limit Iran's choices	-promises certain results without relying upon the opponent's intentions	-has costs for Israel too -might engender counterproductive results -less likely to end Iran's nuclear program entirely
Coercion(Deterrence)	deliberate and purposive use of overt threats of force to influence another's strategic choices	Israel can use an overt threat of force to influence Iran's cost-benefit calculus and convince it to stop its nuclear program	-does not require concession -does not require relying upon allies (self-reliance)	-does not address underlying dynamics of Iran's nuclear program -might have counterproductive results
Reassurance	reassurance of the opponent in order to prevent unintended conflicts resulted from mistrust and misperception	Israel can initiate direct diplomatic negotiations; softens its discourse; end the nuclear ambiguity policy and sign the treaty on the non-proliferation of nuclear weapons to reassure Iran; establish a collective security understanding with Iran	-can prevent an unintended conflict -can eliminate uncertainty and misperception -does not provoke Iran -cooperation can be extended for other issues between Iran and Israel	-requires some concessions -might leave Israel vulnerable if Iran reacts negatively
Combination of Deterrence and Reassurance	Combination of two strategies in order to avoid risks of each of them	Israel can apply reassurance firstly, and use deterrent threats if Iran reacts negatively in the further stages.	-compensates the risk of reassurance -diminishes the counterproductive effect of deterrent threat	-requires some concessions -the trade-off between reassurance and deterrence might impede the whole strategy

Table 1. Comparison of the available strategies for Israel in response to Iran's nuclear program

CHAPTER III

THE GAME-THEORETIC MODELS OF THE STRATEGIC OPTIONS AVAILABLE FOR ISRAEL

3.1. Why Game Theoretic Methodology?

In this research, game theoretical models, as method of explaining the strategic interactions between the actors, are used to analyze the available strategic options for Israel in response to Iran's nuclear program. Such a model allows us to analyze the choices the actors have, the outcomes of these choices, and the actors' evaluation of these outcomes in a simple and systematic way. Game theory particularly underlines the interactive nature of the actors' choices in a game and attempt to present the dynamics of such interactive relations. In other words, the outcome of an action cannot be explained solely by that action; but the actions of the other actors in the game or the strategic environment in which they operate are also decisive factors that produce the outcome interactively. In this sense, modelling an international crisis provides us a comprehensive picture in which we can recognize the interaction between the actors and the structure as well.

In the game theory, it is assumed that the players are instrumentally rational actors. They have specified objectives and an order among these objectives that reflects the

preferences of the actor. Secondly, they have a set of available actions and freedom to choice among these actions. Finally, an instrumentally rational actor always chooses the best action, which serves best the specified objective, among the set of available actions in order to reach a specified objective (Morrow, 1994: 17, Zagare&Kilgour, 1990: 39-44). In other words, a rational actor's main concern in game theory is achieving the best action that would lead to the most desired outcome (objective), and so maximizing the expected utility. However, this is not a smooth process due to the own limitations of the actors, the interactivity with others' decisions, and the structure's own dynamics that may facilitate or impede the process.

To put it simply, a game-theoretic model has four basic elements that must be specified prior to the research: the players, a set of available choices, the results of these choices (outcomes), and the utility of each outcome according to player (Zagare and Quackenbush, 2006: 99). Nonetheless, it is obvious that including the strategic interaction between the actors, the structural dynamics, and the other factors that exist in a real world problem in a research is a quite difficult and complicated task. In this sense, game theory basically aims to "simplify and abstract reality" by models for the sake of clarity (Morrow, 1994: 8). It does not attempt to cover whole complexity of the reality, but to get the essence of the situation and obtain generalizable inferences. Secondly, it is generally challenging for readers to follow an author's cognitive map in an academic piece, particularly if it is about such complex and comprehensive issues. However, game-theoretical models force the researcher to discipline his ideas (and even intuitions), to specify the assumptions initially, and to present how the conclusions followed from these assumptions while building a model (Morrow, 1994: 6). Hence, it is easier to follow the way that is used

by the researcher to conduct that research. In other words, the transparent presentation of the research process allows reader to observe and test (reproduce) the logical journey from the assumptions to the conclusions.

In this sense, as the topic of this research is quiet complicated and requires a wide-scale analysis of different strategic approaches, the game theoretical model is more appropriate for the sake of clarity, transparency, reproducibility and consistency of the research (Mesquita, 2002: 69). In fact, my theoretical approach includes some constructivist points which might be considered as inappropriate for the game theoretical method. However, as Cederman asserts, “advocacy of theoretical complexity actually increases the need for models, albeit of a different kind” (Cederman, 1997: 219 -cited in Snidal, 2007:259-). Thus, the wide range of theoretical approaches of this research lead me to use a formal model which can reduce the complexity of analysis through its disciplined nature.

3.2. Why Sequential Game Model in Extensive Form?

The models in this research, firstly, are designed as sequential game models in which the actors’ act in a certain order in contrast to normal form game (a matrix game model) which assumes that the actors act simultaneously and without knowing the other’s action. This aspect of the model is important in the sense of allowing us to observe how an actor’s action would influence other’s action. The context of this research requires a sequential game model in which the actors’ actions are not simultaneous. In this way, it will be possible to analyze the interactions among the actors’ decisions and reflect the reality better.

This sequential game model is presented in extensive form (game tree). A game tree consists of nodes and branches where each node represents one move or endpoint in the game while the branches connect these nodes. The game starts with one player's action/choice and continues with the other player's response, and interaction among these choices as well. However, the essential part of this model is the initial assumptions that shape the game. It is required to specify the players, the decisions they have to make, the order of moves, payoffs of the outcomes, and preferences of the actors that will determine their moves in the game (Morrow, 1994: 58). This initial task of the researcher is the most crucial part of the game since the rest of the game is built upon these assumptions.

Extensive form games provide some significant advantages while analyzing strategic interactions. Such as, through the "counterfactual reasoning", the extensive form games enable us to consider the actions that will never occur but have a notable impact on events (Mesquita, 2010: 97; Snidal, 2007: 257). Also, the extended decision branches in the decision tree, and the "subgame perfection" in the extensive form games, unlikely to normal game models, facilitates detecting and evaluating non-credible commitments (such as threat of use of force) of the actors which have major impacts in the Israel-Iran case. Furthermore, the extensive form games pave the way for (a) making analysis in the context of uncertainty and incomplete information in which the actors do not know each other's decision patterns and intentions; (b) including the important link between the "domestic" and "international" affairs and (c) observing the changes over time, such as the learning processes of the actors.

Lastly, the sequential game model of this research is built with the assumptions of perfect information which means "all players know the history of the

game whenever they make a move” and complete information which reflects the situation that “all players know one another’s pay-offs” (Morrow, 1994: 64). One may argue that the strategic interaction between Iran and Israel would require a model with imperfect or incomplete information due to some uncertainties embedded in the case. However, it is aimed to avoid the inherent complexity of the case and present it as simple as possible. Moreover, since it is an ongoing case and a wide range of strategic options are included, it is more efficacious to use a perfect and complete information model.

3.3. Limitations of the Game-Theoretic Model

Game-theoretic model is not free from some difficulties. First of all, the preference orderings and mindsets of the actors are the decisive factors that determine the solution of the game. Thus, it is quite crucial to justify the preference orderings of the actors, since any mistake in this stage can mislead the rest of the game. Moreover, it would be more difficult to infer actors’ preference orderings if they are not certain about their preference orderings themselves or if they attempt to hide their intentions to deceive other actors. Secondly, it is difficult, if not impossible, to calculate the “pay-offs” of the possible outcomes in the game correctly, particularly when we need to estimate numbers for each pay-off. Nevertheless, the models are not designed to guess the outcomes perfectly, but to estimate the likelihood of specified results. Thirdly, as a general difficulty of the game theory, it is not easy to construct a model that reflects all aspects and details of the interaction between the actors. For instance, as mentioned earlier, when it is assumed that the players have “perfect information” about the game, some aspects of the real case are excluded for the sake of simplicity.

The Iran-Israel case also includes these limitations. Nevertheless, since the extensive form game is the most favorable research method for this research, the difficulties can be overcome through a strong theoretical framework and careful work.

3.4. Building the Model

3.4.1. The Players

The models of this research are designed to evaluate the strategic options of Israel in response to Iran's nuclear program. Thus, they are designed as two-actor games between Israel and Iran. Within the framework of realist international relations theory, states are unitary actors in the sense of being ultimate decision-makers, and rational actors in the sense of being able to evaluate the set of available actions and to choose the best one according to the outcomes they promise (Mearsheimer, 2013: 74; Viotti and Kauppi, 2011: 39,40). Although one may assert that the sub-state actors are also involved in the decision-making processes, representing all of the elements in the states' bureaucratic organizations would damage the simplicity of the models. Therefore, the states of Israel and Iran are assumed as unitary rational players of the games in this research.

More specifically, decision of choosing one of the strategic options specified in this research can be made only by the governments of the Israel or Iran as the executive branches of the state mechanisms. For instance, employing a deterrence strategy by threatening with use of force or a controlling strategy by a covert military operation cannot be carried out by a non-state or sub-state actor. Also reassurance strategies, which can be executed in cooperation with non-state/sub-state actors,

would mean nothing to the other player without the state mechanism's obvious decision to employ this strategy. Even though the non-state/sub-state actors have influence in this confrontation, it is assumed that this influence is reflected in states' final decisions. Therefore, accepting Israel and Iran as the unitary players of the game helps us to preserve the simplicity and consistency of this research.

3.4.2. The Domain of the Model

The models in this research cover the strategic interaction between Iran and Israel at the present situation in which the P5+1 has been negotiating with Iran since 2013 regarding the purposes and limits of its nuclear activities and Israel has been contemplating its response to this new context. When we consider that a joint action plan has already been accepted and the negotiators are quite optimistic about this fresh phase of nuclear talks, Israel's strategic calculus is needed to be analyzed differently from the earlier periods. Thus, the models here deal with the strategic interaction between Iran and Israel in the present context which is in progress since the start of the negotiations in 2013.

3.4.3. The Order of Moves

The models include two actors: Israel and Iran. As the research mainly focuses on Israel's strategy, it is assumed that Israel is the player which moves first and Iran reacts to Israel's strategic choices. According to the nature of the outcomes of the interactions (Israel's move and Iran's reaction), Israel may again make a strategic choice. For instance, when Israel makes a threat to deter Iran and Iran

defies, then, Israel has two options again (implement the threat or not). Thus, the first moves come from Israel whereas Iran reacts to Israel's choices accordingly.

3.4.4. The Players' Actions

The players' actions vary in each model of the strategic options. As Israel is the player which moves first, the first action in each model is application of the strategy by Israel. Firstly, in the model of controlling option, Israel starts with the action of "controlling", which reflects all the tactics of a controlling strategy (as explained in earlier chapters), and Iran can respond by one of two actions: "back down" or "accelerate nuclear efforts". If Iran chooses the "back down" option, which means stopping nuclear activities, it brings players to an endpoint. On the other hand, acceleration of nuclear efforts reflects the situation that Iran is provoked because of Israel's strategies and expands its nuclear program. In 2012, Shlomo Gazit, former IDF Intelligence head and a senior researcher at Tel Aviv University's Institute for National Security Studies currently, stated that "an Israeli attack would not destroy the program, and could even accelerate it, while enabling Iran to legitimize its efforts diplomatically." (Lappin, 2012). Moreover, Iran's Deputy Foreign Minister Abbas Araqchi also stated that "Iran will return to 20 percent enrichment if a deal cannot be reached ... failure to reach a deal will be a disaster for everyone" while the negotiations are still continuing (Reuters, 2014). Thus, particularly deterrence and controlling strategies are provocative inherently, and it is not likely to maintain the status-quo if these strategies are applied but cannot succeed. In this regard, if Iran accelerates its nuclear efforts, Israel can respond in two ways: "continue controlling" or "back down". At this point, Israel's "back down"

option refers to situation that Israel no longer tends to prevent Iran's nuclear activities. These choices by Israel bring players to two different endpoints.

In the model of deterrence option, Israel starts with the action of "deterrence", which reflects the threat of use of force. Next, Iran can respond by two actions again: "back down" or "accelerate nuclear efforts". Similar to previous model, if Iran backs down, it is an endpoint. However, in the case that Iran accelerates its nuclear efforts, Israel has two options: "punishment (use of force)" or "not implement punishment". These options also result with two different outcomes for the players.

In the model of reassurance option, Israel's first move is application of "reassurance" that represents all kind of attempts, including some concessions, to reassure Iran. Iran can react by the actions of "compromise" or "exploit concessions". These two reactions by Iran bring players to two different endpoints directly. Thus, differently from the previous models, Israel does not have the chance to respond Iran after observing its reaction. It is because of the risky nature of reassurance strategy which would result with compromise easily, but also may leave Israel vulnerable against Iran. This is why it is considered necessary to combine reassurance strategy with deterrence in the literature, and so this combination is evaluated with a separate model in this research

Finally, in the model of "combination of deterrence and reassurance", application of the strategy is again the first move of Israel. The important point is that the first action of Israel is announcing that it is committed to implement reassurance strategy unless Iran reacts negatively in response. In other words, Israel starts with reassurance tactics in the first move, but also warns Iran that it still keeps a deterrent threat if Iran exploits the concessions made by Israel.

After the first move by Israel, Iran's options are the same with the reassurance model: "compromise" or "exploit concessions". This time, however, Israel has the opportunity to respond if Iran chooses to "exploit concessions". It can punish Iran by the action of "punishment (use of force)" or it does "not implement punishment" and reaches a different endpoint. Consequently, each model has its own forms of actions, although some of them are same or similar.

3.4.5. Outcomes

There are basically four possible outcomes in the models. The first outcome is the prevention of Iran's nuclear activities (S) which is the main objective and most desirable outcome for Israel, and the least desirable outcome for Iran. The second outcome is a compromise between Iran and Israel regarding Iran's nuclear program (C). Third outcome is the status-quo (SQ) which reflects the continuation of Iran's nuclear activities in a controlled manner through the negotiations with the international community. The last outcome is the acceleration of Iran's nuclear activities without any restriction or control mechanism by international community (A).

However, each of these outcomes should be evaluated with the probabilities of success of actions, and the costs of actions. Thus, each endpoint in the game trees includes players' expected utilities from that outcome according to its preference, probability of success, and the cost of action. For instance, the controlling strategy has some costs for Israel (cc) including time cost, economic cost (arising from economic sanctions to Iran and from Iran's counter-sanctions) and strategic cost (a

stronger Iranian regime which is consolidated in domestic level). Similarly, the controlling strategy has costs for Iran too (dc).

Therefore, costs or probabilities of success actually can change an outcome's expected utility for the actors.

3.4.6. The Actors' Preferences and Payoffs

In addition to Netanyahu's clear statements (Ho, 2013; Jerusalem Post, 2013; Al Jazeera, 2014), statements of the other Israeli officials, such as the statements of Minister of Foreign Affairs (Maloney, 2013) and Minister of Intelligence (Times of Israel, 2013; Armbruster, 2014; Booth, 2013) consistently indicate that the most desirable outcome for Israel is prevention of Iran's nuclear program (S) whereas the least desirable outcome is, naturally, the acceleration of the Iran's nuclear activities without any confrontation (A).

Secondly, the status-quo (SQ) means the continuation of Iran's nuclear activities, even though it will be a covert and slow progress. Even though both Netanyahu's (Jerusalem Post, 2013) and Defense Minister Yaalon's (Ho, 2014) statements are based on the argument that Iran is still accelerating its nuclear activities and buying time through the negotiations, continuation of status-quo is clearly more preferable than acceleration of Iran's nuclear program without any monitoring mechanism by international community. Furthermore, it is reasonable to assume that Israel would prefer a compromise (C), through which it can monitor Iran's nuclear activities and reduce insecurity for Israel, to the status-quo in which uncertainty and risk are high and undesirable for a rational actor.

Consequently, the preference ordering of Israel over the outcomes is as follows:

- 1) prevention of Iran's nuclear program (S) (payoff = 2)
- 2) compromise (C) (payoff = 1)
- 3) status-quo (SQ) (payoff = 0)
- 4) acceleration of the Iran's nuclear activities (A) (payoff = -1)

In order to avoid the complexities arising from the long names and concepts, it is better to assign some numbers to utilities of each outcome for Israel. In this context, the payoffs of the outcomes for Israel are as follows:

$$U(S) = 2, U(C) = 1, U(SQ) = 0, U(A) = -1$$

For Iran, as we can understand from the statements of Rouhani (Khalaf, Barber, and Bozorgmehr, 2013) and deputy foreign minister Araghchi (Gearan, 2014) Iran's redline is maintenance of Iran's peaceful nuclear program. Thus, the least desirable outcome is the prevention of its nuclear program (S). The most desirable outcome for Iran, on the other hand, is a compromise (C) in which Iran can maintain its nuclear activities by accepting some restrictions and a tight control system while avoiding diplomatic and economic pressure by international community. This position is repeatedly stated by Iran's president (Rouhani, 2013a; Rouhani, 2013b; Guardian, 2014) and minister of foreign affairs (Zarif, 2014).

However, if the current negotiations fail and the P5+1 continue to controlling strategy or Israel attacks or threatens Iran, the status-quo would be broken irreversibly. As deputy foreign minister Araghchi stated Iran would prefer accelerating its nuclear activities without facing any restriction (A) (Reuters, 2014).

Accordingly, Iran prefers accelerating its nuclear activities (A) to status-quo (SQ), since the status-quo means the continuation of the sanctions and diplomatic pressure by the international society which burden considerable costs to Iran's economy.

Therefore, Iran's preference ordering is as follows:

- 1) compromise (C) (payoff = 2)
- 2) acceleration of the Iran's nuclear activities (A) (payoff = 1)
- 3) status-quo (SQ) (payoff = 0)
- 4) prevention of Iran's nuclear program (S) (payoff = -1)

In order to avoid the complexities arising from the long names and concepts, it is better to assign some numbers to utilities of each outcome for Iran. In this context, the payoffs of the outcomes for Iran are as follows:

$$U(C) = 2, U(A) = 1, U(SQ) = 0, U(S) = -1$$

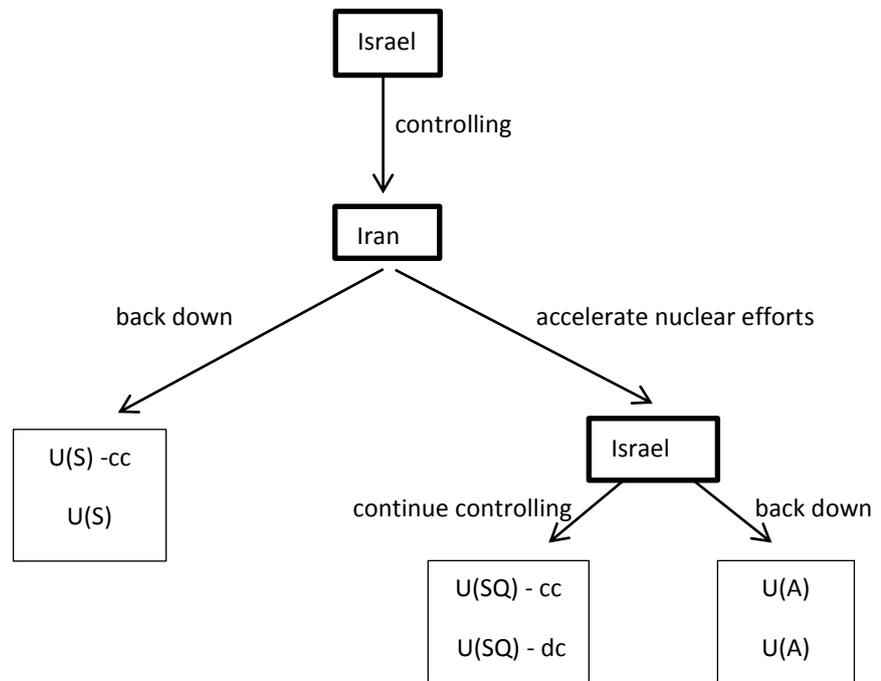
No numbers are assigned to the probabilities of the success and the costs of actions since they are used as independent variables that determine the equilibria of the games. In order to present how any increase/decrease in the probabilities and the costs change the utilities, and so the preference of the actors, only the symbols are assigned to these factors, such as "pm" as the probability of the success of military action or "cm" as the cost of the military action.

3.5. The Game Tree Representations of the Strategic Options Available for Israel in Response to Iran’s Nuclear Program

Four models have been constructed in extensive form for each strategic option available for Israel in response to Iran’s nuclear program.

3.5.1. Model I: Extensive Form Game Model for the Controlling Strategy of Israel

Figure 1. Extensive Form Game Model for the Controlling Strategy of Israel



Note: Payoffs listed as Israel on top and Iran on bottom

In the model of controlling option, Israel starts with the application of the controlling strategy as the first move and Iran responds by backing down or accelerating nuclear efforts. If Iran backs down, the players reach an endpoint. If Iran accelerates nuclear its efforts, then Israel may respond by continuing controlling or backing down.

3.5.1.1. Notation for the Model I

The list below explains the symbols, abbreviations, and payoffs used in the game tree model above:

U(S):Utility of the S (prevention of Iran's nuclear activities)

U(SQ): Utility of the status-quo (continuation of controlling strategy by international community and Iran's nuclear program under inspection of international community)

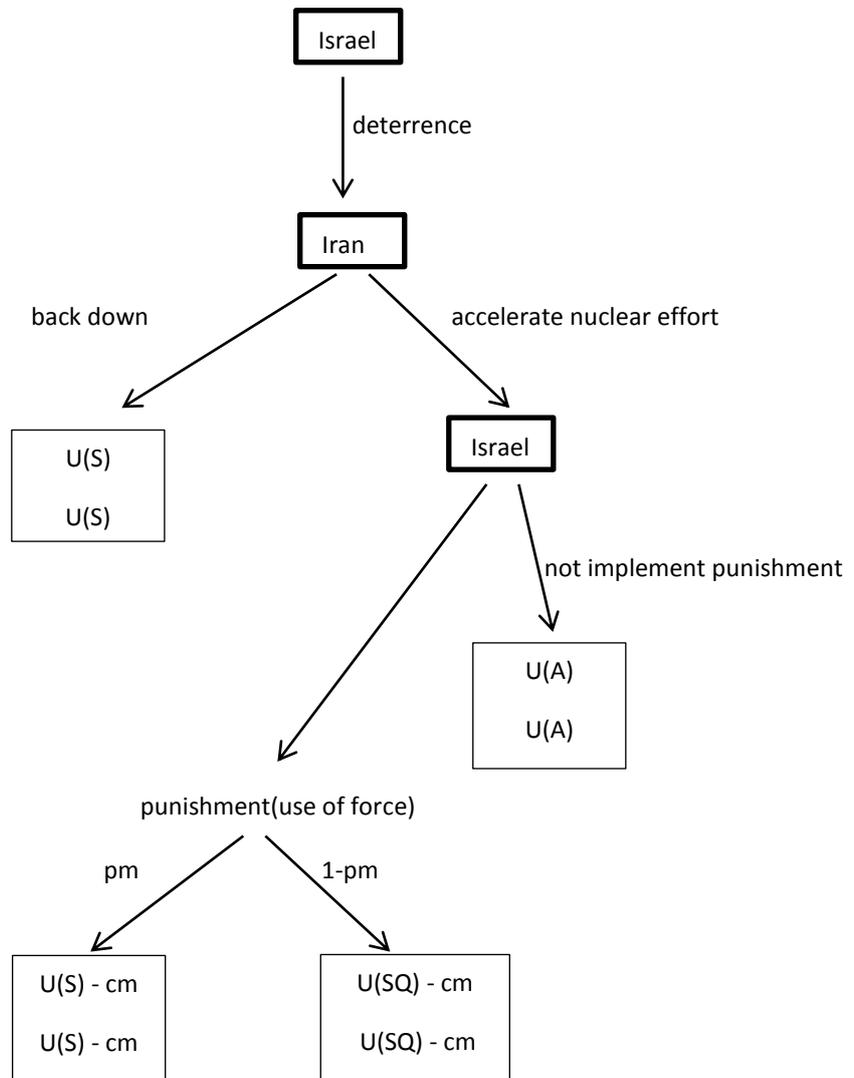
U(A):Utility of the A (acceleration of Iran's nuclear efforts without any restriction)

cc: cost of controlling strategy for Israel

dc:cost of controlling strategy for Iran

3.5.2. Model II: Extensive Form Game Model for the Deterrence Strategy of Israel

Figure 2. Extensive Form Game Model for the Deterrence Strategy of Israel



Note: Payoffs listed as Israel on top and Iran on bottom

In the model of deterrence strategy, Israel starts with the application of deterrence strategy as the first move, then, Iran responds by backing down or accelerating nuclear efforts. If Iran backs down, the players reach an endpoint. If Iran

accelerates its nuclear efforts, Israel may implement the punishment or not.

However, even if Israel decides to implement punishment, which would probably be a military action or another form of use of force, success is not certain. Thus, it is necessary to include the probability of (un)success of the punishment action in the model.

3.5.2.1. Notation for the Model II

The list below explains the symbols, abbreviations, and payoffs used in the game tree model above:

U(S):Utility of the S (prevention of Iran's nuclear activities)

U(SQ): Utility of the status-quo (continuation of controlling strategy by international community and Iran's nuclear program under inspection of international community)

U(A):Utility of the A (acceleration of Iran's nuclear efforts without any restriction)

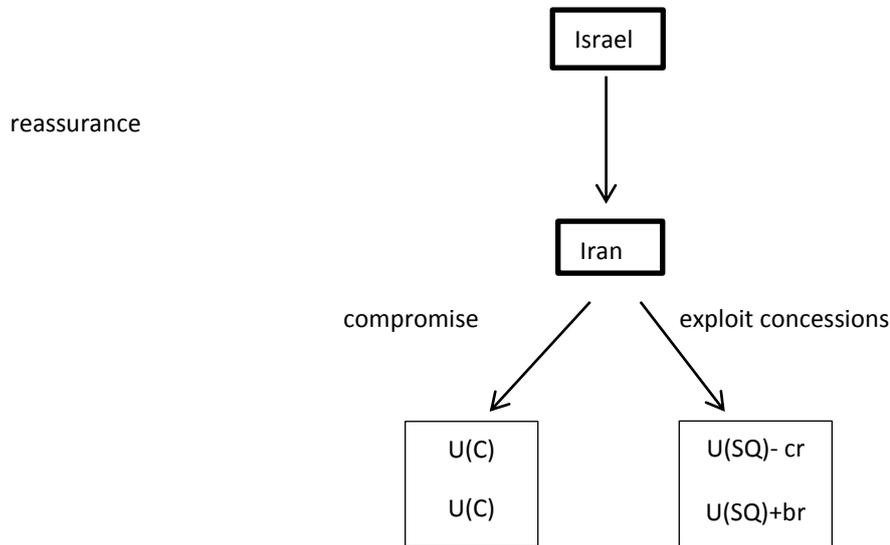
cm: cost of implementation of punishment

pm: probability of success in punishment ($0 < pm < 1$)

1-pm: probability of failure in punishment ($0 < pm < 1$)

3.5.3. Model III: Extensive Form Game Model for the Reassurance Strategy of Israel

Figure 3. Extensive Form Game Model for the Reassurance Strategy of Israel



Note: Payoffs listed as Israel on top and Iran on bottom

The model of reassurance strategy is simpler compared to other models. Israel starts with the application of the strategy and Iran responds by compromising or exploiting concessions made by Israel as a part of reassurance. In the case that the Iran compromises, the players reach an endpoint in which both players get the utility of compromise. If Iran reacts negatively and exploits concessions, it does not end up with a substantial change at status-quo, but come at a price to Israel ($SQ - cr$), and, Iran would get benefits from concessions of Israel accordingly ($SQ + gr$).

3.5.3.1. Notation for the Model III

The list below explains the symbols, abbreviations, and payoffs used in the third game tree model above:

U(C): Utility of the compromise

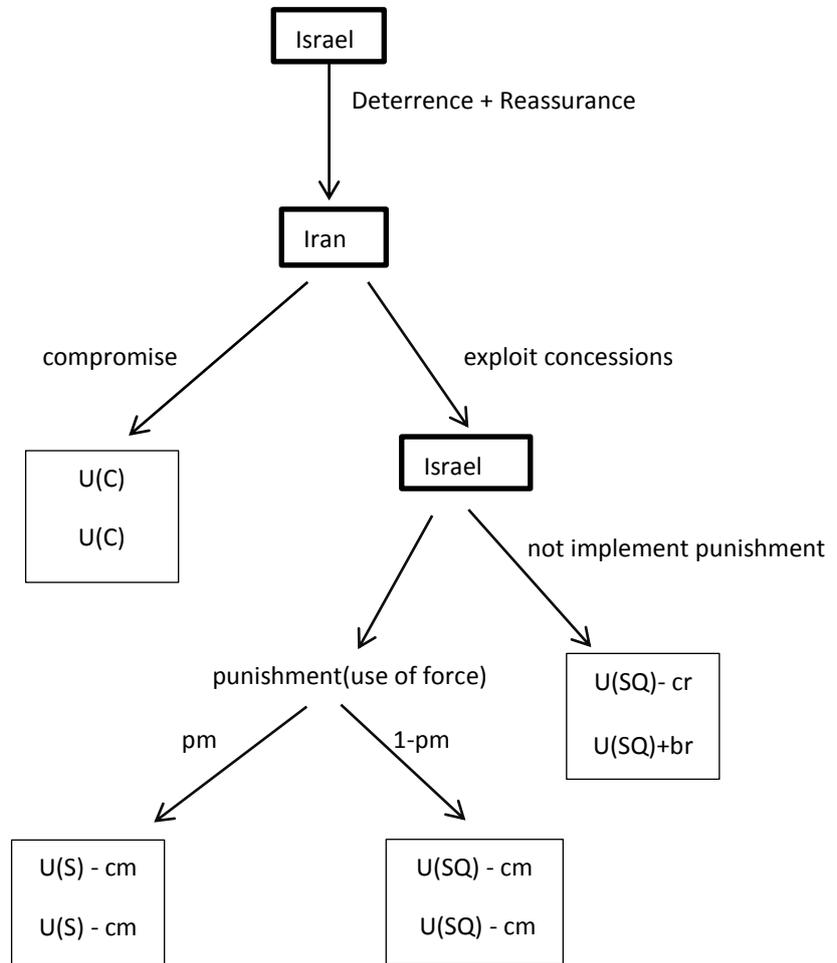
U(SQ): Utility of the status-quo (continuation of controlling strategy by international community and Iran's nuclear program under inspection of international community)

cr: cost of reassurance strategy to Israel (particularly arising from the concession)

br: benefits Iran get from Israel's concessions

3.5.4. Model IV: Extensive Form Game Model for the Combination of Deterrence and Reassurance Strategies of Israel

Figure 4. Extensive Form Game Model for the Combination of Deterrence and Reassurance Strategies



Note: Payoffs listed as Israel on top and Iran on bottom

The model of the combination of deterrence and reassurance starts similar to reassurance model, but the difference is that Israel has the chance to respond if Iran exploit the concessions made during the previous round: implementing punishment (use of force) or not. However, as mentioned in the deterrence model, the

punishment action might be unsuccessful. Therefore two different endpoints are possible according to the probability of success of the punishment action.

3.5.4.1 Notation for the Model IV

The list below explains the symbols, abbreviations, and payoffs used in the fourth game tree model above:

U(C):Utility of the compromise

U(S):Utility of the S (prevention of Iran's nuclear activities)

U(SQ): Utility of the status-quo (continuation of controlling strategy by international community and Iran's nuclear program under inspection of international community)

U(A):Utility of the A (acceleration of Iran's nuclear efforts without any restriction)

cm: cost of implementation of punishment

pm: probability of success in punishment ($0 < pm < 1$)

1-pm: probability of unsuccess in punishment ($0 < pm < 1$)

cr: cost of reassurance strategy to Israel (particularly arising from the concession)

br: benefits Iran get from Israel's concessions

3.6. Conclusion for the Chapter III

In this chapter, it is explained that why a game theoretic methodology is preferred for this research and how it is applied to the case. Firstly, the advantages and limitations of the extensive form game models are stated. Secondly, the elements

of the models (the players, the domain of models, the order of moves, set of actions, outcomes, the players' preferences and payoffs) are explained. Finally, four models are designed for each strategic option (controlling, deterrence, reassurance, and combination of deterrence and reassurance) and it is aimed to present them as simple as possible. These models would be designed in a number of different ways, and numerous actions, outcomes etc. would be added. In this research, however, it is not argued that all aspects of the Iran-Israel relations regarding Iran's nuclear program is discussed with all details. Thus, the limitation of the models here is that some aspects and details of the case might be excluded for the sake of clarity and simplicity.

In addition, in the solution parts of the games, some variables (such as costs and probabilities of the actions) are not represented with specified numbers (payoffs), in order to indicate their role in determination of the equilibria clearly. Therefore, the equilibria of the games and utilities of the players might be represented as combination of numbers and symbols in the solution parts. Nevertheless, in the interpretation parts, they are represented with specified numbers to find specific solutions of the games and show the most likely scenarios.

Next chapter will present the solutions of the models and interpretations. Also, main findings of the research will be evaluated in order to see what kind of theoretical inferences or policy recommendations can be reached.

CHAPTER IV

THE SOLUTIONS AND INTERPRETATIONS OF THE MODELS

4.1. Introduction to Chapter IV

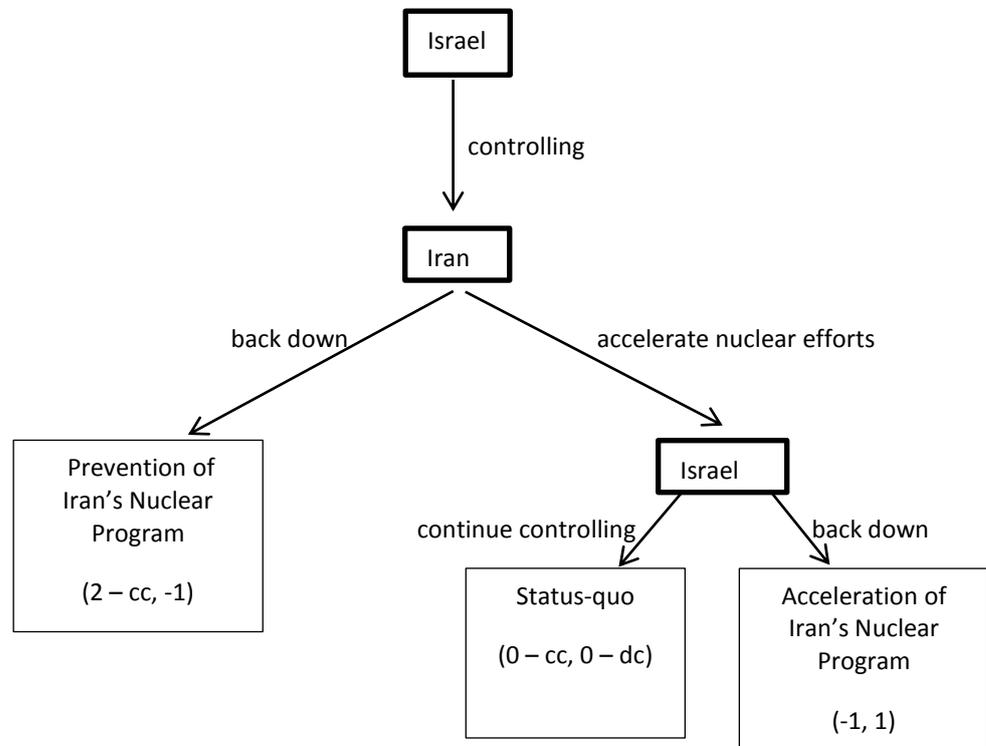
In this chapter, the models presented in the previous chapter are solved and interpreted by using the backwards induction technique. Thus, the games are started to solve from the sub-games at the bottoms of the game trees. Since the players have perfect and complete information about the game here, a player's choice at the sub-game determines the other player's choice in the upper game. In other words, the players have the ability to estimate what the other player's next move will be and make their choices according to this information. Additionally, counterfactual reasoning helps us to evaluate particularly the roles of threats and promises in the models. As the models of this research mostly include a deterrent threat in their sub-games, counterfactual reasoning is helpful in the sense of detecting whether the threat is credible and capable or not.

As stated earlier, the main goal of using game-theoretic model is to present and combine wide-range of arguments in the literature regarding the strategic options available for Israel, by a disciplined method. Even though some aspects of the case are excluded for the sake of clarity and simplicity, most of factors and variables are

included in the models through the concepts such as costs or probabilities. Furthermore, it is assumed that most of the factors in this case cannot be evaluated separately since they influence each other's value or likelihood. In this sense, the solutions of the models help us to underline the interaction between the actions of the actors and other variables. Also, the solutions of the models show that under which conditions which options are more preferable for the players and how the changes in the cost or probabilities of the actions may change the equilibria of the game. Moreover, even the impact of the actions and outcomes in the sub-games, which never occur actually, are analyzed through using the counterfactual reasoning. It allows us to project the possible future results and estimate their influence on the current behaviors of the players. Therefore, the objective of this chapter is to explore the dynamics of the each strategic option and to understand how these dynamics can provide better or worse outcomes to Israel.

4.2. Solution of the Model I (Extensive Form Game Model for the Controlling Strategy of Israel)

Figure 5. Extensive Form Game Model for the Controlling Strategy of Israel



Note: Payoffs listed as Israel first and Iran second

In the model of the controlling strategy, in the sub-game at the bottom, Israel would not continue controlling strategy if the utility of the “back down” option exceeds the utility of the “continue controlling” option $[(-1) > (0 - cc)]$. The most important variable at this point is the cost of controlling strategy (cc). Israel would back down if it is convinced that the cost of continuation would make things worse.

This possible choice of Israel affects Iran’s choice that it would know that Israel would back down if it accelerates its nuclear efforts. Next, this knowledge of Iran affects Israel’s choice at the top of the decision tree and Israel makes a decision

by already knowing that Iran would continue and even accelerate its nuclear activities in response to controlling strategy.

Therefore, if $[(-1) > (0 - cc)]$ Israel backs down in the sub-game. If Iran knows that Israel will back down, Iran accelerates its nuclear efforts in response to controlling strategy. Then, the equilibrium becomes: [CONTROLLING-BACK DOWN; ACCELERATE NUCLEAR EFFORTS]; and Israel gets the payoff “-1” and Iran gets “1”. However, it should be noted that if Israel knows that the controlling strategy will end up with the acceleration of Iran’s nuclear program, it would not be a rational choice for Israel to employ controlling strategy at the top of the decision tree.

On the other hand, if the cost of controlling strategy is tolerable, and so the utility of the “continue controlling” option exceeds the utility of the “back down” option $[(0 - cc) > (-1)]$, then, Israel would continue controlling strategy in the sub-game. Iran, who knows that Israel would continue controlling, compares two outcomes’ expected utilities in the upper game: $U(S)$ (utility of backing down) and $U(SQ - dc)$ (utility of accelerating nuclear efforts). Even though the payoff of S is “-1”, cost of the sanctions to Iran would make “acceleration of nuclear efforts” a worse option by decreasing its utility.

Therefore, if $[(-1) > (0 - dc)]$, Iran would back down in response to Israel’s controlling strategy. Then, equilibrium becomes: [CONTROLLING; BACK DOWN]; and Israel gets the payoff “-2-cc” and Iran gets “-1”.

However, if $[(0 - dc) > (-1)]$, Iran would accelerate its nuclear efforts in response to controlling strategy at the top of the decision tree, despite of its knowledge that Israel would maintain the controlling strategy in the sub-game. This

would mean that Iran can tolerate the cost of controlling strategy. In this case, the equilibrium becomes: [CONTROLLING-CONTINUE CONTROLLING; ACCELERATE NUCLEAR EFFORTS]; and Israel gets the payoff “0-cc” and Iran gets “0-dc”.

4.3. Interpretation of the Model I

There are three sub-game perfect Nash equilibria for the model of the controlling strategy. As can be observed, the cost of the strategy is the decisive variable that determines both players’ choices. In the first equilibrium above, cost of the strategy determines whether Israel should continue or back down in the sub-game and Iran’s response depends upon this choice. Also, in the second and third equilibrium, Iran makes a choice by evaluating the cost of controlling strategy to itself. Therefore, the equilibrium of the game can be changed through the players’ estimations of the cost of the strategy.

It is assumed that the most preferable outcome for Israel is S (prevention of Iran’s nuclear program), and so the objective of Israel is convincing Iran to back down. This outcome corresponds the equilibrium that [CONTROLLING; BACK DOWN] where Israel gets the payoff “2-cc” (and Iran gets “-1”). In order to expect this equilibrium, firstly, Israel should make it clear that cost of the controlling strategy to Israel (cc) is tolerable, and so it would continue controlling if Iran accelerates its nuclear efforts. So, Iran would have to make a decision between two outcomes “-1” and “0 – dc”. At this point, Israel should convince Iran that it would get a worse payoff than “-1” by choosing accelerating its nuclear efforts which would result by continuation of controlling strategy and the payoff “0 – dc”. The only way

to convince Iran to “back down” by using controlling strategy is, then, decreasing the cost of the controlling strategy for Israel and increasing for Iran, or at least make Iran to believe that. This finding supports the conventional argument in the literature that controlling option can succeed if it burdens intolerable costs to adversary and tolerable cost to “defender”.

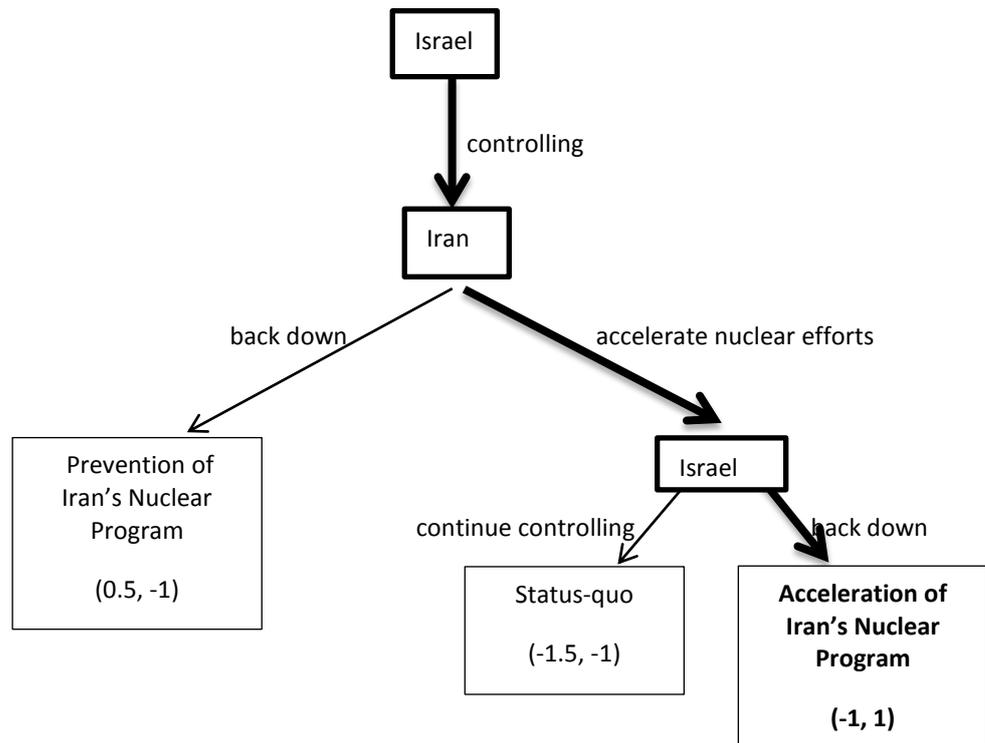
However, as discussed in the second chapter, even if it is obvious that Iran has been paying a certain price because of the controlling strategy, it is questionable whether this cost is intolerable for Iran when we consider the value of the nuclear program for Iran. In other words, as Iranian policy makers give priority to the nuclear program in terms of both material benefits and prestige, it is not overstatement to say that Iran would tolerate a high cost rather than stopping its nuclear activities. Secondly, Iran has been struggling with the controlling tactics of the international community, particularly the economic sanctions and cyber-attacks, and apparently it has learned how to resist them. In response to oil embargo, for instance, Iran has been diversifying the sorts of its commercial activities which remained limited with oil and natural gas export until the embargo. Additionally, Iran has been diversifying its trading partners and exploring new markets because of the economic sanctions that damaged the commercial relations with the Western market. Therefore, it can be argued that Iran has the ability to keep costs of the sanctions at a tolerable level which decreases the likelihood of the preferable outcome for Israel.

Even if Israel considers other forms of controlling strategy, such as a limited military operation, its cost to Iran is still uncertain. Moreover, such an operation’s costs to Israel are more striking than its impacts on Iran. As stated in the second chapter, i) lack of intelligence about the locations of the nuclear facilities, ii) problematic exit strategy that can easily turn into a total war, iii) high probability of

retaliation from the proxies of Iran, and iv) diplomatic and economic costs would increase the cost of controlling option for Israel (cc), and so decrease the likelihood of preferred equilibrium for Israel.

Therefore it is reasonable to argue that the cost of controlling strategy for Israel is quite high, while it is relatively low for Iran. In this sense, in order to represent how these high costs impede the controlling strategy of Israel, it would be better to assign payoffs to cost of controlling strategy for both players. Thus, if we suppose that the payoff of cost of controlling to Israel (cc) is equal to “1.5”, and the payoff of cost of controlling to Iran is equal to “-1”, then the game tree becomes:

Figure 6. Solution of the Game for the Controlling Strategy of Israel



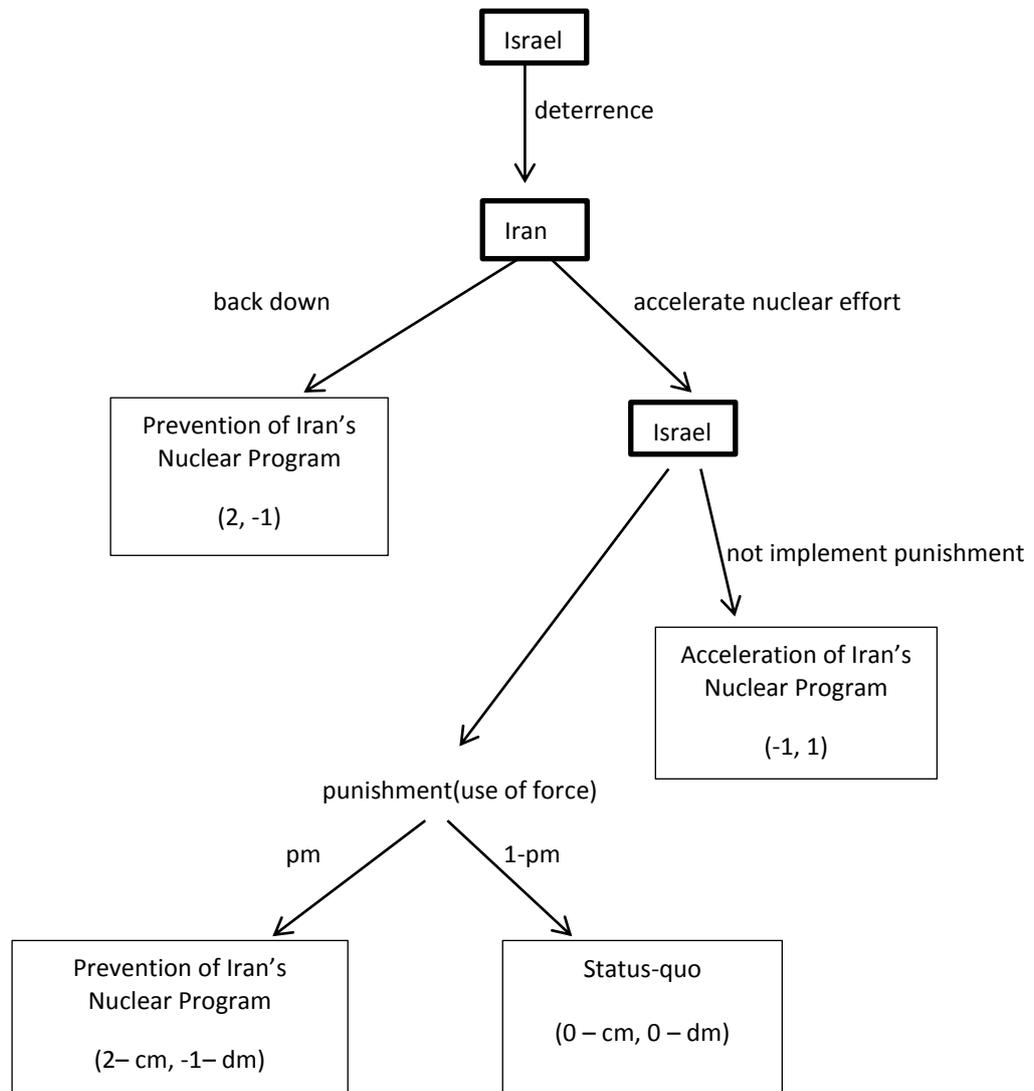
Note: Payoffs listed as Israel first and Iran second

In this new game tree, Israel backs down in the sub-game at the bottom. If Iran knows that Israel will back down, Iran accelerates its nuclear efforts in response to controlling strategy. Then, the equilibrium becomes: [CONTROLLING-BACK DOWN; ACCELERATE NUCLEAR EFFORTS]; and Israel gets the payoff “-1” and Iran gets “1”.

Consequently, this model stresses the role of the costs of the controlling strategy for both players. Particularly, the model makes it clear that since Iran’s preference ordering that prioritize the nuclear program increases its resistance against the costs and its resistance mechanism decreases the cost in general, it is quite difficult, if not impossible, to achieve the outcome desired by Israel. In addition, even though the provocative aspect of the controlling strategy is not presented in the game tree, defining Iran’s action as “acceleration of nuclear efforts” rather than “maintain status-quo” signifies that the controlling option would exacerbate the situation irreversibly.

4.4. Solution of the Model II (Extensive Form Game Model for the Deterrence Strategy of Israel)

Figure 7. Extensive Form Game Model for the Deterrence Strategy of Israel



Note: Payoffs listed as Israel first and Iran second

In the model of deterrence option, we start to solve the game from the bottom of the game tree again. In the sub-game at the bottom of the game tree, Israel would implement the punishment, which is the core of the deterrent threat. Yet, this action has two possible outcomes according to the probability of success. Moreover,

implementation of the punishment has significant costs for both players and these costs are also included to the utilities of outcomes.

Under these circumstances, Israel's utility from implementing punishment is $[(pm).(2-cm)] + [(1-pm).(0-cm)]$ and it is equal to:

$$[(pm).(2-cm)] + [(1-pm).(0-cm)] = [2pm - (pm.cm)] + [-cm + (pm.cm)]$$

$$[2pm - (pm.cm)] + [-cm + (pm.cm)] = 2pm - (pm.cm) -cm + (pm.cm)$$

$$2pm - (pm.cm) -cm + (pm.cm) = \mathbf{2pm - cm}$$

Iran's utility from the same outcome is $U[(pm).(-1-dm)] + [(1-pm).(0-dm)]$ and it is equal to:

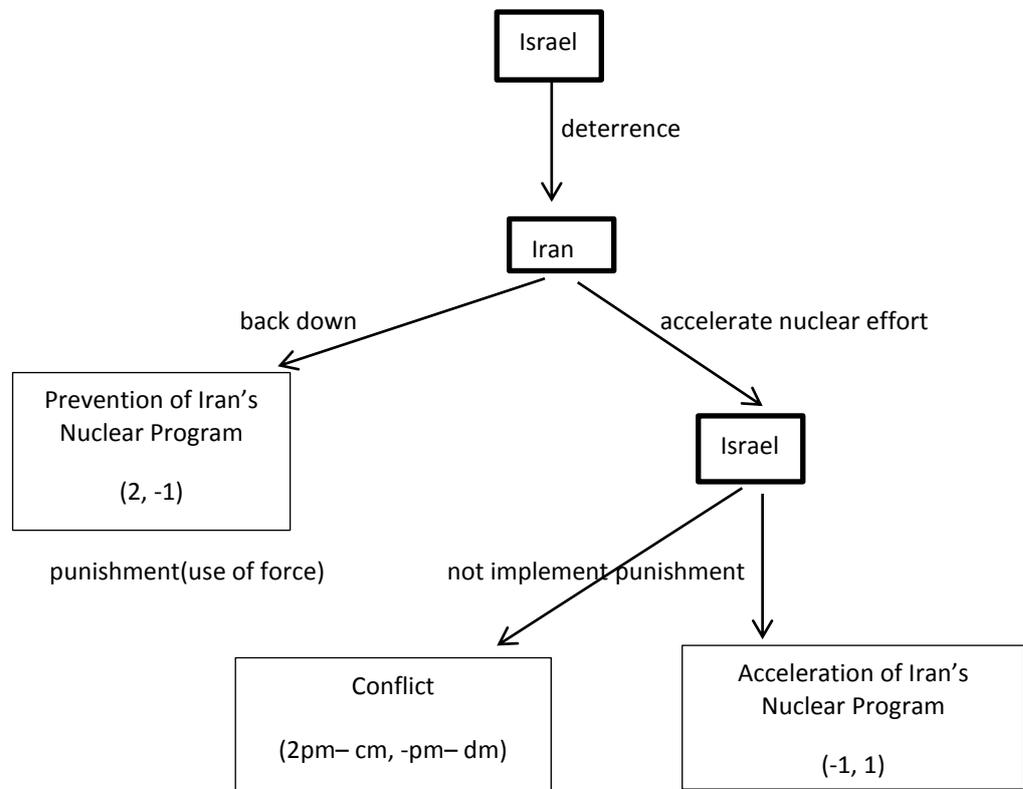
$$[(pm).(-1-dm)] + [(1-pm).(0-dm)] = [-pm - (pm.dm)] + [-dm + (pm.dm)]$$

$$[-pm - (pm.dm)] + [-dm + (pm.dm)] = -pm - (pm.dm) - dm + (pm.dm)$$

$$-pm - (pm.dm) - dm + (pm.dm) = \mathbf{-pm - dm}$$

With these calculated payoffs, the game tree becomes as follows:

Figure 8. Extensive Form Game Model for the Deterrence Strategy of Israel with calculated payoffs



Note: Payoffs listed as Israel first and Iran second

With the knowledge of these payoffs, in the upper sub-game, Israel makes a choice between implementing punishment or not. If the utility of implementing punishment, $2pm - cm$, exceeds the utility of the not implementing punishment, -1 , then, Israel implements punishment. In this situation, Iran, who knows that Israel would implement punishment if it needs, makes a choice between accelerating nuclear efforts and backing down. If the utility of backing down, -1 , exceeds the utility of accelerating nuclear efforts, $-pm - dm$, then, Iran would back down at the top of decision tree. Thus, the equilibrium becomes: [DETERRENCE; BACK DOWN] and Israel gets the payoff “2” and Iran gets “-1”.

Another possible equilibrium exists when Iran chooses to accelerate its nuclear efforts even if it already knows that Israel is more likely to implement punishment. So, when $2pm - cm > -1$, Israel would implement punishment and Iran knows this. However, Iran compares two utilities, and if the utility of accelerating nuclear efforts, $-pm - dm$, exceeds the utility of backing down, -1 , Iran chooses to accelerate its nuclear efforts. Therefore, the equilibrium becomes as follows: [DETERRENCE-IMPLEMENT PUNISHMENT; ACCELERATE NUCLEAR EFFORTS] and Israel gets the payoff " $2pm - cm$ ", and Iran gets " $-pm - dm$ ".

In the last possible equilibrium, if the utility of not implementing punishment, -1 , exceed the utility of implementing punishment, $2pm - cm$, for Israel in the sub-game at the bottom of the game tree, Israel chooses not to implement punishment. Iran, who knows that Israel would not implement punishment, compares the utility of backing down, -1 , and the utility of accelerating nuclear efforts, 1 , and chooses to accelerate its nuclear efforts. Therefore, the equilibrium becomes: [DETERRENCE-NOT IMPLEMENT PUNISHMENT; ACCELERATE NUCLEAR EFFORTS] and Israel gets the payoff -1 , and Iran gets 1 .

4.5. Interpretation of the Model II

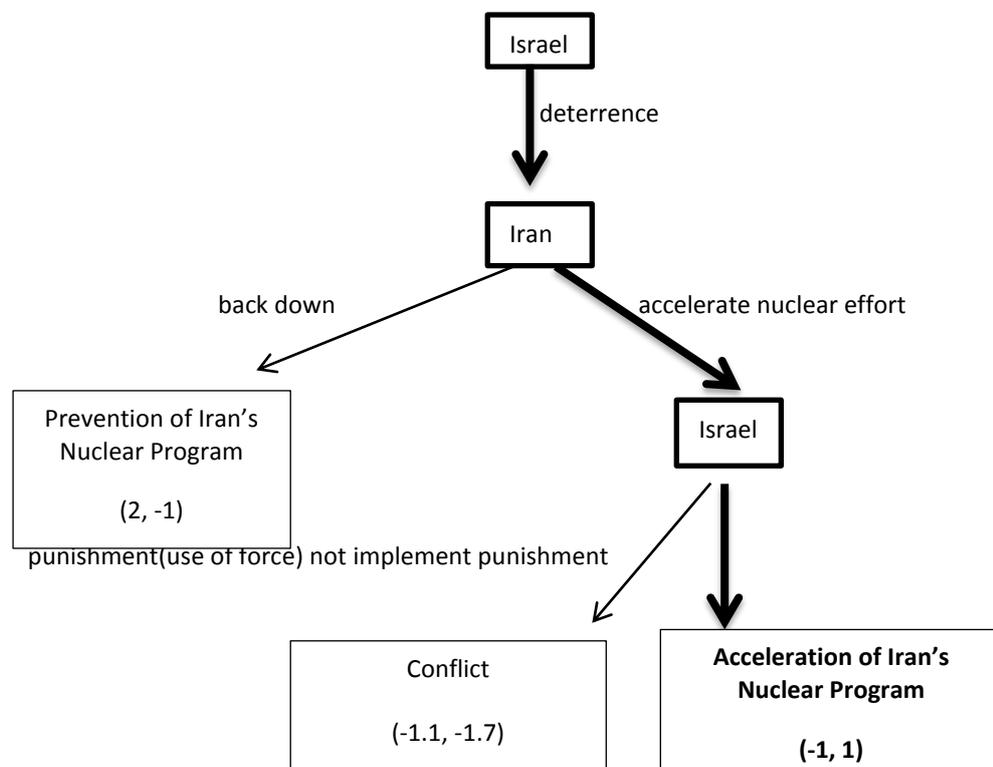
There are three sub-game perfect Nash equilibria again. Similar to previous model, cost of the strategy to both players play a significant role. However, the probability of success also comes into play in this model and becomes a decisive variable. In the first equilibrium, which is the most preferable one for Israel, Iran backs down in response to deterrence strategy of Israel. What leads Iran to this choice is its knowledge regarding Israel's possible action in the sub-game at the

bottom of the game tree where Israel considers that its utility from implementing punishment exceeds the utility of not implementing punishment ($2pm - cm > 1$). Thus, Israel can reach its objective by increasing the probability of success and/or decreasing the cost of use of force to itself. The need for decreasing the cost to deter itself supports the perfect deterrence theory which argues that only rational threats are credible. For instance, if Israel threatens Iran with a nuclear attack, it would not be a credible threat since the possible cost of a nuclear attack to Israel (cm) would be quite high and decrease the expected utility of the “punishment” option, $2pm - cm$. Therefore, this increase in the “ cm ” changes the inequality ($2pm - cm > 1$) in favor of Iran. Additionally, even though this equilibrium includes a credible threat that makes deterrence successful, the second equilibrium below shows that a credible threat is neither sufficient nor necessary for a successful deterrence strategy.

In the second equilibrium, Iran accelerates its nuclear efforts despite the credible threat of Israel. The motivation for Iran is the better outcome of accelerating nuclear efforts compared to outcome of backing down ($-pm - dm > -1$). In other words, if the probability of success and the cost of punishment to Iran are not high enough, Iran would not comply with the deterrence strategy even though the deterrent threat seems credible. So, Israel’s threat might be “credible” in the sense of being rational to be implemented, but it might not be “capable” in the sense of being able to convince the target that the utility it can get from the status-quo is better compared to the outcome of the implementation of punishment. In this sense, it can be asserted that the second equilibrium of this model points out the argument of the perfect deterrence theory that the sufficient condition for a successful deterrence strategy is the capability of threat, not the credibility.

The third equilibrium points out the situation that utility of implementing the punishment is worse than the utility of not implementing the punishment for Israel ($2pm - cm < 1$) due to the changes in the cost and/or probability. The cost of action to Israel might be increased and/or the probability of success might be decreased here. As stated previously, lack of intelligence and problematic exit strategy are likely to decrease the probability of success (pm); while high probability of retaliation and diplomatic and economic costs are likely to increase the cost of implementation of punishment to Israel (cm). In order to represent this likely situation, if we suppose that the probability of success of implementation of punishment (pm) is equal to “0.2”, cost of implementation of punishment to Israel (cm) is equal to “1,5”, and cost of implementation of punishment to Iran (dm) is equal to “1.5”; the game tree becomes as follows:

Figure 9. Solution of the Game for the Deterrence Strategy of Israel



Note: Payoffs listed as Israel first and Iran second

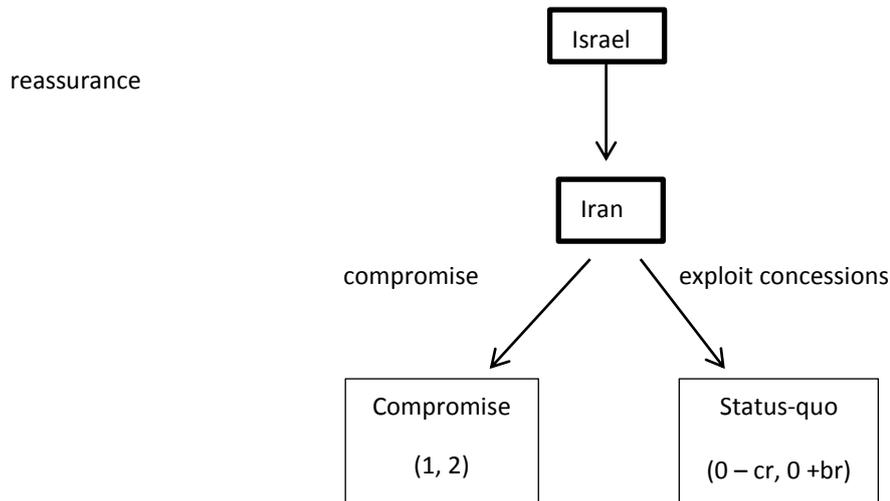
In this new game tree, Israel chooses not to implement punishment in the sub-game at the bottom. Iran, who knows that Israel would not implement punishment, chooses to accelerate its nuclear efforts. Therefore, the equilibrium becomes: [DETERRENCE-NOT IMPLEMENT PUNISHMENT; ACCELERATE NUCLEAR EFFORTS] and Israel gets the payoff -1, and Iran gets 1. In other words, Iran, who knows Israel's threat is not credible, chooses to accelerate its nuclear efforts, and the deterrence strategy of Israel fails at the endpoint.

However, as the second equilibrium in the solution part suggests, even if Israel decrease the cost of use of force to itself in order to make its threat credible, the threats might not address Iran's own motivations and could not burden an intolerable cost to Iran. In other words, a deterrent threat, which is supposed to increase the cost to Iran (**dm**), must address what is valuable and/or vulnerable to Iran. Otherwise, deterrence strategy is likely to fail since the deterrent threat will lack the capability to convince Iran to back down.

In addition, when deterrence strategy is applied, there is no outcome that includes a compromise in which both sides can reach a reasonable agreement. Moreover, it would provoke Iran who could be convinced to limit its nuclear activities in accord with the international norms. Thus, deterrence strategy lacks flexibility and excludes some possible beneficial outcomes, as controlling strategy does.

4.6. Solution of the Model III (Extensive Form Game Model for the Reassurance Strategy of Israel)

Figure 10. Extensive Form Game Model for the Reassurance Strategy of Israel



Note: Payoffs listed as Israel first and Iran second

The model of reassurance strategy is the simplest model among others. Iran has two options in response to reassurance strategy of Israel: compromising or exploiting the concession made by Israel. If the utility of exploiting concessions “ $0+br$ ” exceeds the utility of compromise “ 2 ”, then, it is expected from Iran to respond Israel’s strategy negatively and exploit the concession made by Israel as part of the reassurance strategy. In this case, the equilibrium is [REASSURANCE;EXPLOIT CONCESSIONS] and Israel gets the payoff “ $0-cr$ ”, and Iran gets “ $0+br$ ”.

In the other equilibrium, if Iran gets a better outcome by compromising compared to exploiting concessions, $2 > 0+br$, it would respond Israel’s efforts to reach a peaceful solution and compromise. Therefore, the equilibrium becomes

[REASSURANCE; COMPROMISE] and Israel gets the payoff “1”, and Iran gets the payoff, “2”.

4.7. Interpretation of the Model III

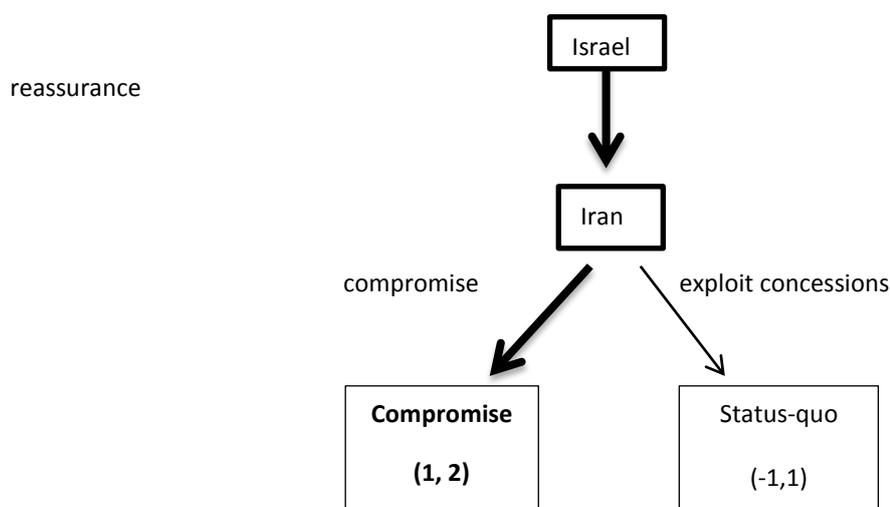
Reassurance strategy is a way to prevent unintended conflicts resulted from misperception and mistrust. Moreover, even if it cannot provide the desired outcome (prevention of conflict), it allows eliminating the uncertainty regarding the other side's intentions, although it is a risky way to learn other's intentions. However, in order to get a compromise or to eliminate the uncertainty, it is needed to make some concessions and see whether the other player reacts negatively or positively. In this sense, if the other player reacts positively, a compromise, which provide the same utility to both players, can be reached. On the other hand, if the concessions made by the first players are exploited, then, we reach a different endpoint.

As we see in the model III, there are two equilibria. In the first equilibrium, the utility of exploiting concessions, $0+br$, exceeds the utility of compromise, 2, and Iran chooses exploiting concessions made by Israel. Thus, the inequality, $0+br > 2$, indicates that the benefit Iran can get from exploiting concessions is greater than it can get from a compromise. However, the benefit Iran can get from exploiting concessions is valuable only in the short-term, since Israel would be certain about Iran's malign intentions and has the chance to adjust its strategy with this knowledge in further stages. Moreover, refusing Israel's call to compromise would undermine Iran's diplomatic efforts and invalidate its recent charm-offense towards international

community. Therefore, the benefit Iran can get from exploiting concessions is not likely to be high enough to exceed the utility of compromise.

In this sense, if we suppose that the utility of benefits Iran can get from exploiting concessions (br) and cost of reassurance to Israel “ cr ” are both equal to “1”, then the game tree becomes as follows:

Figure 11. Solution of the Game Model for the Reassurance Strategy of Israel



Note: Payoffs listed as Israel first and Iran second

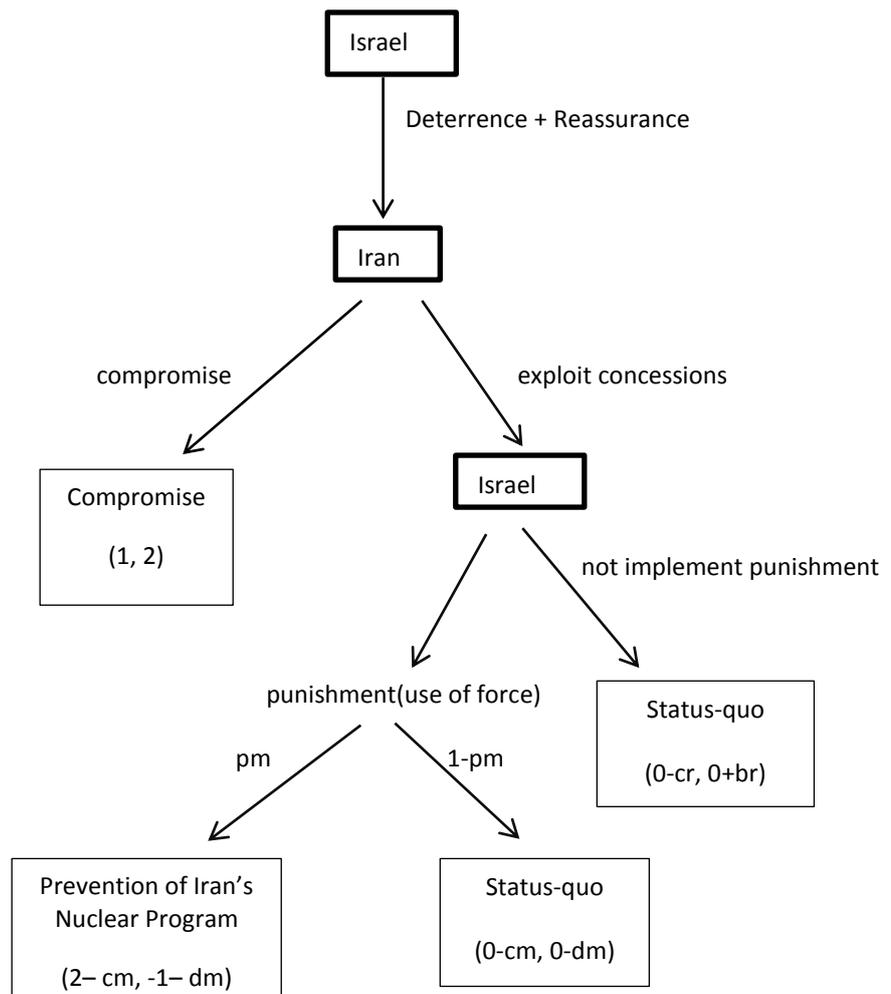
As can be seen in this new game tree, Iran gets a better outcome by compromising compared to exploiting concessions, and so it responds Israel’s efforts to reach a peaceful solution and compromise. Therefore, the equilibrium becomes [REASSURANCE; COMPROMISE] and Israel gets the payoff “1”, and Iran gets the payoff, “2”.

Although such a compromise would require both sides to make some concessions regarding their red-lines, reassurance strategy promises the most desirable outcome for Iran while it has significant advantages for Israel too. Most

importantly, it does not provoke Iran and not change the status-quo irreversibly even if it fails. Additionally, differently from the previous models, it includes the compromise as an option which makes the game a kind of non-zero sum game. Yet, Israel, as a rational actor, would desire more flexibility in its strategy which lacks in reassurance strategy in the sense of not having a chance to response Iran if it exploits concessions. Therefore, the combination of deterrence and reassurance would promise a better outcome.

4.8. Solution of the Model IV (Extensive Form Game Model for the Combination of Deterrence and Reassurance Strategies of Israel)

Figure 12. Extensive Form Game Model for the Combination of Deterrence and Reassurance Strategies of Israel



Note: Payoffs listed as Israel first and Iran second

In the model of the combination of deterrence and reassurance strategies, a deterrence option, if necessary in response to exploitation of concession by Iran, is added to the model of reassurance strategy. In the sub-game at the bottom of the game tree, similar to deterrence model, Israel would implement the punishment and it has two different outcomes according to the probability of success. If the utility of implementing punishment exceeds the utility of not implementing punishment for Israel, $2pm - cm > 0 - cr$, Israel prefers implementing punishment. Iran, who knows that Israel would implement punishment if it exploits the concessions made by Israel, compares the utilities of compromising, 2 , and exploiting concessions, $-pm - dm$. If $2 > -pm - dm$, Iran compromises at the top of the game tree by considering the undesired result of exploitation of concessions. Therefore, the equilibrium becomes [DETERRENCE + REASSURANCE; COMPROMISE] and Israel gets the payoff “1”, and Iran gets the payoff, “2”.

If $-pm - dm > 2$, then, Iran would exploit concessions made by Israel, even though it has the knowledge that Israel’s threat is credible in the sub-game at the bottom of the game tree. This is because Israel’s strategy lacks the capability that can influence Iran’s decision in the sense not being able to make the compromise more favorable to Iran by increasing the probability of success and/or the cost of punishment to Iran. In this context, the equilibrium becomes [DETERRENCE+REASSURANCE - PUNISHMENT; EXPLOIT CONCESSIONS] and Israel gets the payoff “ $2pm - cm$ ”, and Iran gets “ $-pm - dm$ ”.

In the third equilibrium, when $0 - cr > 2pm - cm$, and so Israel does not implement the punishment in the sub-game at the bottom of the game tree again, Iran can still compromise if $1 > 0 + br$, even though it already knows that Israel would not implement punishment in response the exploitation of the concessions. The

equilibrium here is same with the first equilibrium ([DETERRENCE + REASSURANCE; COMPROMISE]), but it is resulted from a different counterfactual reasoning which actually reflects the equilibrium of the reassurance model.

Finally, if the utility of not implementing punishment exceeds the utility of implementing punishment for Israel, $0 - cr > 2pm - cm$, Israel does not implement the punishment in the sub-game at the bottom of the game tree. In the upper game, Iran, who knows that Israel would not punish Iran for exploiting the concessions, compares the utility of compromising, 2 , and the utility of exploiting concessions, $0 + br$. If $0 + br > 2$, Iran exploits concessions in order to maximize its utility. Therefore, the equilibrium becomes [DETERRENCE+REASSURANCE – NOT IMPLEMENT PUNISHMENT; EXPLOIT CONCESSIONS] and Israel gets the payoff “ $0 - cr$ ”, and Iran gets “ $0 + br$ ”.

4.9. Interpretation of the Model IV

The important aspect of this combination is that Israel starts with the application of reassurance strategy without putting aside the deterrent threat. The first move Israel which is labeled as “deterrence+reassurance” in the game tree reflects the announcement that Israel is committed to implement reassurance strategy unless Iran reacts negatively in response. In this sense, the main objectives of the reassurance part of the strategy are conveying the message that Israel acts only with defensive motives, and learning Iran’s intentions through its reaction to Israel’s *bona fide* efforts. The deterrence part of the strategy, on the other hand, aims avoiding the

possible cost of reassurance strategy in the case of Iran reacts negatively and exploit concessions.

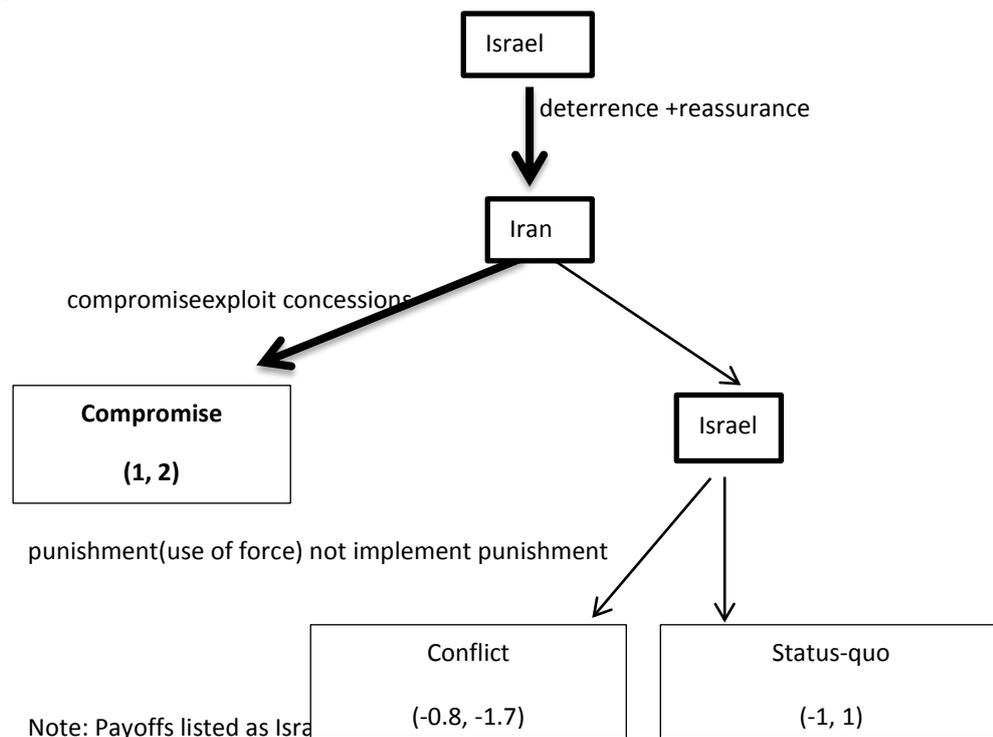
In the first equilibrium, which ends up with the compromise, it can be observed that the probability of success and the cost of punishment play significant roles. Firstly, if the probability of success is high enough and/or the cost of punishment is low enough, " $2pm - cm > 0 - cr$ ", they can make the punishment credible in the sub-game at the bottom of the game tree. Secondly, in the upper sub-game, if the probability of success and the cost of punishment to Iran is high enough " $2 > pm - dm$ ", they can make the deterrence strategy capable in the sense of preventing Iran from exploiting the concessions made initially as a part of the reassurance strategy. This equilibrium corresponds with the main objective of this combination, and it can be achieved by balancing the probability of success and the costs of punishment.

One may be skeptical about the need for such a combination while the objective is still achieved through a deterrent threat, but there are significant differences. Firstly, Israel starts with the application of reassurance strategy which avoids provoking Iran and breaking the status-quo irreversibly. Hence, we see that even if Iran exploits the concessions and Israel needs to use deterrence, status-quo still can be maintained- although it would include some costs. Differently from the deterrence and controlling models, it is assumed that Iran would not need to accelerate its nuclear efforts in this model, since reassurance strategy indicates Israel's defensive motives and does not provoke Iran with offensive demands. Secondly, even if Israel needs to implement punishment in response Iran's negative reaction, this punishment action would be considered as a legitimate act by the international community because of Israel's initial commitment to peaceful solution

and Iran's violation of this attempt. Therefore, the cost of implementation of punishment to Israel would be decreased significantly. As a result, the objective can be achieved without needing a deterrent threat, and even if it is needed, it can be implemented with a lower cost.

Thus, the model of this combination has a decreased cost of implementation of punishment for Israel (cm) in the sub-game at the bottom, and a compromise outcome which promise the maximum utility for Iran at the top. In this sense, if we suppose that the cost of implementation of punishment for Israel (cm) is decreased from "1.5" to "1.2", the cost of implementation of punishment for Iran (dm) is again equal to "1.5", the probability of success of implementation of punishment (pm) is equal to "0.2", the utility of benefits Iran can get from exploiting concessions (br) and cost of reassurance to Israel " cr " are both equal to "1", then the game tree becomes as follows:

Figure 13. Solution of the Game Model for the Combination of Deterrence and Reassurance Strategies of Israel



Therefore, the first equilibrium occurs and Iran compromises at the top of the game tree by considering the undesired result of exploitation of concessions. The equilibrium becomes [DETERRENCE + REASSURANCE; COMPROMISE] and Israel gets the payoff “1”, and Iran gets the payoff, “2”.

In another possible equilibrium, the utility of exploiting concessions is greater than the utility of compromising for Iran, even though it is aware of a credible deterrent threat in the sub-game at the bottom of the game tree. However, the inequality that brings us this outcome, $-pm - dm > 2$, is not probable. Since $0 < pm < 1$, “dm” must be a negative number in order to satisfy this inequality which is technically impossible. Therefore, it can be concluded that if a credible and capable threat exists in the sub-game at the bottom, Iran would not exploit concessions. This finding also supports the logic of the combination of deterrence and reassurance strategy.

The third equilibrium is similar to the best scenario in reassurance model in which deterrent threat never exists. Namely, if Iran knows that the utility of compromise is greater than the utility of exploiting concessions, it prefers compromising even in the absence of a credible threat in the sub-game at the bottom. At this point, one may argue that the combination of deterrence and reassurance is no longer relevant, since Iran chooses compromise in any case. However, as stated earlier, reassurance strategy lacks flexibility in the case that the benefits Iran can get from exploiting concessions increase, and so Iran attempts to exploit concessions. This bad scenario is reflected in the last equilibrium where Iran, who knows that Israel would not punish Iran for exploiting the concessions, compares the utility of compromising, 2, and the utility of exploiting concessions, $0 + br$. If “br” is greater

than “2”, then, Iran would exploit concessions. The objective of combining deterrence and reassurance strategies is avoiding this possible bad scenario for Israel.

4.10. Conclusion for Chapter IV

What has been done in this chapter is presentation of the dynamics of each strategic option and their influence on the players’ choices. In the solution parts of the games, no specific numbers are assigned to the cost or probabilities of the actions in order to show that if they increase or decrease, they can change the equilibria, and so the optimum strategy for Israel. However, in the interpretation parts, some specific numbers are assigned to probability of success and costs to find specific solutions which reflect the most likely scenarios for each strategic option. To sum up, all the possible equilibria for each option are presented in the solution parts, and the most likely equilibria are pointed out in the interpretation parts.

The models contribute to literature in the sense of including the combination of deterrence and reassurance as an alternative option, of which assertions are not discussed or applied contemporary cases to see whether it can compensate the problematic sides of deterrence and reassurance strategies. The solution of the model of this combination does not only explore its pros and cons, but also generates some insights regarding the dynamics of the strategy.

In the models of deterrence and controlling strategies, a well-discussed issue in the literature that the deterrence and controlling strategies break the status-quo by provoking the target is presented as an initial assumption. In the both deterrence and controlling models, when Israel applies these strategies, Iran backs down or accelerates its nuclear efforts, rather than maintaining status-quo. This assumption

significantly affected the rest of the model, since the outcomes and payoffs are changed. Most importantly, it increased the risk and cost for Israel if it applies the strategy and it fails. Thus, it decreased the flexibility of Israel's strategy which is not a preferable situation for a rational player.

Secondly, it is observed in the extensive form game models of the deterrence and controlling strategies that Israel needs to increase the cost of punishment to Iran and the probability of success of the punishment action, while it needs to decrease the cost of punishment to Israel. In other words, these are the variables what would make these strategies more likely to succeed. However, as discussed previously, it is a challenging task for Israel. For example, Iran has been coping with the costs of the economic sanctions through its economy of resistance. Also, it seems difficult for Israel to decrease the cost and to increase the probability of success regarding use of force in present-day conditions due to the reasons mentioned in the related part of this chapter. Therefore, it can be argued that Israel does not have the ability to establish a credible and capable threat, which would convince Iran to back down and accept stopping its entire nuclear program.

In the model of reassurance strategy, it is pointed out that implementation of reassurance strategy promises better outcomes, but it lacks flexibility similar to deterrence and controlling strategies. It leaves Israel vulnerable against Iran if Iran tends to exploit the concessions made by Israel. In order to overcome this problem, a combination with deterrence is proposed in the literature.

In the model of the combination of deterrence and reassurance strategies Israel starts with the reassurance strategy without putting aside the deterrent threat that can come into play if Iran exploits the concessions. The objective is making use

of reassurance strategy, but avoiding the possible losses which might result from the inflexibility. In addition to flexibility obtained by this combination, it has some clear advantages to Israel. Firstly, since it starts with reassurance strategy, which indicates Israel's benign intentions, it allows maintaining the status-quo even if the strategy fails. Additionally, the reassurance action at the top of the game tree decreases the cost of a possible punishment in further games, and so increases the credibility of deterrent threat. Accordingly, existence of a credible deterrent threat at the sub-game, increase the capability of reassurance strategy in the sense of encouraging Iran to choose compromise at the top of the game tree.

However, this strategy also has some limitations. Most importantly, even though it is preceded by the reassurance strategy, keeping a deterrent threat available would still provoke Iran. Thus, it is crucial to manage the process in a sophisticated way in the sense of avoiding misperceptions. It would be easier to maintain a positive discourse that avoids escalation of mistrust and hostility, when we consider that Israel does not have to reiterate a provocative discourse of threat since it already has enough credibility due to its actions in recent history (Iraq and Syria cases). Moreover, if the reassurance part of the strategy is implemented consistently, Iran would be convinced that Israel's deterrent threat is a defensive precaution.

Consequently, deterrence and controlling strategies are too risky and inflexible in the sense of provoking Iran and damaging the status-quo irreversibly. Moreover, it seems difficult to satisfy the requirements of these strategies, such as increasing probabilities of success and cost of punishment to Iran, in order to achieve desired outcome. Reassurance strategy, on the other hand, promises relatively better outcomes, but it also lacks flexibility in the sense of leaving Israel vulnerable if Iran reacts negatively. Finally, the combination of deterrence and reassurance strategies

appears as an alternative which is capable to encourage Iran to compromise, and flexible enough to react Iran if the reassurance efforts fail.

CHAPTER V

CONCLUSION

This research aims to address one of the most important issues in international affairs which has been drawing attention of not only the great powers, but also the regional powers, such as Israel, Turkey or the Gulf countries. In this thesis, it is assumed that Israel has a more essential role among others, and so, a comprehensive analysis of Israel's possible strategies is needed. Although some studies about Israel's policy towards Iran already exist in the literature, they lack either a wide-ranging theoretical approach or a well-organized research method. In this sense, this research aimed to answer the questions that what are the strategic options available for Israel in response to Iran's nuclear program and what are these strategies' advantages and limitations for Israel?

In the first chapter, importance of the subject is introduced firstly. Later, the purpose of the research and the method used for this purpose are stated. Additionally, the main findings and contribution to the literature are summarized in this chapter.

In the second chapter, the history and future of the Iran's nuclear program, and the international actors' reactions are explained briefly. Also, Israel's threat perceptions, which determine its strategic moves, are discussed. Due to these threat

perceptions, four strategic options are defined as available strategies for Israel: controlling, coercion (deterrence), reassurance, combination of deterrence and reassurance. Primarily, these strategies are discussed theoretically free from the Iran-Israel case in order to comprehend their theoretical evolution in time. Even though these strategies have been used interchangeably by some scholars, this thesis it is assumed that each of them has different dynamics, natures and distinct frameworks (Freedman, 2004). After this abstract discussion, the literature regarding the implementation of these strategies by Israel is presented in the second chapter. The pros and cons of these strategies for Israel in response to Iran's nuclear program are discussed. The interpretations of the models in further chapters are mostly based upon this discussion.

In the third chapter, the advantages and limitations of the game theory are stated firstly. It is underlined that game-theoretic modelling provides a disciplined, well-organized and transparent research design, even though it requires exclusion of the some elements of the case in order to preserve simplicity. Moreover, since the research aims to stress the interactive nature of the Israel's and Iran's decisions, the models are designed as extensive form game trees. The elements of the models and the game trees of the each strategic option are also presented in this chapter.

In the fourth chapter, the models are solved through the backward induction technique, which starts to solve the game from the bottom of the game tree. It allowed us to observe that how the possible actions of the actors in the sub-games influence the real-time decision of the actors. The models here, primarily, highlighted the key role of the costs and probabilities of success of the actions. Next, they points out that how the equilibria change according to Israel's capability to increase the probability of success and costs to Iran, and decrease the costs to Israel.

Given the discussion in the second chapter, the conditions are not in favor of Israel in the sense of high costs of controlling strategy and deterrent threat, and the low probability of success of the punitive action in deterrence games. Thus, lack of the capability that can balance these costs and probabilities impedes the deterrence and controlling strategies for Israel. In addition, the provocative nature of these strategies decreases the flexibility in the sense of forcing Iran to break the status-quo and to follow more aggressive policies.

The findings also showed that the reassurance strategy, which is presented as the alternative of deterrence in the literature, is not a smooth option, even though it can promise better outcomes (Stein, 1991). As Israel might become vulnerable if Iran reacts in a hostile manner to the reassurance efforts of Israel, this strategy also lacks flexibility, and so it is not a favorable one for Israel.

Lastly, the model of combination of deterrence and reassurance strategies points out that if Israel has a capable deterrent threat in the sub-game, it is more likely for Iran to compromise in the upper game. Thus, existence of a deterrent threat prevents Iran from exploiting the concession made by Israel. This result supports the argument in the literature that it would be more efficient to combine deterrence and reassurance strategies since it can avoid the risks and costs of a single deterrence or reassurance strategy (Stein, 1991; Lebow and Stein, 1983). Furthermore, the important point with this strategy is that Israel starts with the reassurance strategy which avoids provoking Iran, and so the status-quo can be still maintained even if the strategy fails. This shows how this combination avoids the cost of a single deterrence strategy. Consequently, this combination avoids the cost of deterrence strategy by not provoking Iran, and avoids the risk of reassurance strategy by preventing Iran from exploiting Israel's concessions.

The results obtained from this research contribute the literature in two ways. Firstly, it enhances the literature concerning Israel's stance towards Iran's nuclear program, by evaluating a wide-range of strategic approaches in the same research. More importantly, it uses a game-theoretical modelling which is quite helpful in the sense of simplifying such a complicated and problematic case. Secondly, the model of the combination of deterrence and reassurance can be accepted as an application of this underdeveloped alternative strategy to a current case. It is concluded such a combination is theoretically consistent with the perfect deterrence theory's arguments, particularly its emphasis on rationality of threats and the reciprocity norm (Zagare and Kilgour, 2000; Quackenbush, 2010). Therefore, combination of these strategies can be based upon the perfect deterrence theory's theoretical framework.

The results of this thesis also have some policy implications for the actors. First of all, Israel's current stance is based upon the assumption that Iran is buying time through the negotiations while it is continuing nuclear activities with the aim of reaching nuclear weapons capability. However, although there is no way to be sure that whether Iran aims having nuclear weapons or not, it is reasonable to argue that using its nuclear technology for weapons or peaceful goals is a decision will be made by Iran in the future (Özcan and Özdamar, 2009: 131). In this sense, the Iranian policy makers can change their minds according to developments in the international system and region, or the other actors' policies towards Iran. Thus, if Israel prefers controlling strategy (by pressuring international community to increase sanctions, continuing covert operations and cyber-attacks, or by a possible limited military operation) or deterrence strategy (by an overt threat of use of force), it may only provoke Iran and lead it to contemplate developing nuclear weapons. Moreover, the high costs and low probabilities of success make these strategies inefficient.

Furthermore, the benefits Iran can get from a compromise (continuation of its nuclear program in accord with the international norms, easing of economic sanctions and isolation by the Western states) is higher than the benefits it can get by exploiting the *bona fide* efforts of international actors, including Israel. Therefore, if Israel's leaders attempt to reassure Iran, it is more likely to be welcomed by Iran's leaders. Nevertheless, differently from the other actors in the P5+1, Israel's leaders might have plausible concerns about the possibility that Iran would exploit the concession made by Israel due to hostile relations in late history. At this point, combination of deterrence and reassurance, the strategy recommended in this thesis, can be the most favorable option in the sense of minimizing the risk and cost as far as possible. In order to apply this strategy, Israel should support the diplomatic efforts made by the P5+1 firstly. Then, direct communication is needed to be established between Iran and Israel to avoid possible misperceptions. Meanwhile, it is essential for Israel's leaders to soften their discourse towards Iran. Although it is unlikely to expect construction of a collective security understanding in short term, Israeli policy makers can reassure Iran that Israel is not a threat for Iran. Irrevocable commitments and some courageous actions by Israel, such as ending the nuclear ambiguity policy (declaring whether Israel has nuclear weapons or not) and signing the Treaty on the Non-Proliferation of Nuclear Weapons, would be more effective than verbal reassurance.

By applying such a reassurance strategy, Israel can convince Iran to compromise and not to develop nuclear weapons- if Iran really aims this. If reassurance strategy fails, Israel can contemplate deterrence option against Iran. The important point is that even if reassurance fails, Israel can still get two important benefits: i) it becomes certain about Iran's malign intentions, if any, and evades

being considered as trouble-maker by the international community ii) it can apply deterrence strategy, and other strategic options as well, with lower cost and more support by its allies. In addition, in the case that Israel succeeds in reassuring Iran in the nuclear confrontation, it can pave the way for further cooperation over other issues in the region.

Such a policy by Israel would also facilitate the task of P5+1, particularly the United States. First of all, the P5+1 countries have been making effort to both find a diplomatic solution to the nuclear confrontation with Iran; and conserve their positive relations with Israel who strongly opposes this diplomatic process and makes pressures on these countries. In this sense, if Israel welcomes the diplomatic efforts, it would make things easier for the P5+1 countries. Secondly, observing Iran's reactions to Israel's reassurance strategy would be another chance for the P5+1 to test Iran's intentions. Consequently, a constructive stance by Israel would contribute to positive atmosphere in the negotiations between Iran and the P5+1.

Beyond the contributions to literature and the policy implications mentioned above, this thesis might inspire some future researches about the Iran-Israel case and strategies discussed here. Different forms of game-theoretic models with different assumptions can shed light on the different aspects of the case. For instance, an imperfect information game model would underline the uncertainties and mistrust between the actors. Furthermore, the basic application of the combination of deterrence and reassurance strategies in this thesis might be improved, and more specific insights can be obtained about this strategy.

SELECT BIBLIOGRAPHY

- Abrams, E. 2012. Attacking Iran's Nuclear Project-The Grounds for an Israeli Attack. *World Affairs*, 175 (1), pp. 25-30.
- Adamsky, D. 2012. Why Israel Should Learn to Stop Worrying and Love the Bomb. *Foreign Affairs*, Available at: <http://www.foreignaffairs.com/articles/137374/dmitry-adamsky/why-israel-should-learn-to-stop-worrying-and-love-the-bomb> [Accessed: 12 Dec 2013].
- Al Jazeera, (2014). Israel renews concern over Iran nuclear talks. [online] Available at: <http://www.aljazeera.com/news/europe/2014/02/israel-renews-concern-over-iran-nuclear-talks-2014223134652962762.html> [Accessed 6 Jul. 2014].
- Albright, D. 2005. Timeline of Iran's Path to Nuclear Weapons. *McNair Papers (Institute for National Strategic Studies-National Defense University)*, No: 69 Available at: <http://www.questia.com/library/journal/1G1-147059804/timeline-of-iran-s-path-to-nuclear-weapons> [Accessed: 12 Dec 2013].
- Albright, D., Shire, J. and Brannan, P. (2009). *Is Iran running out of yellowcake?*. Institute for Science and International Security.[online] Available at: http://isis-online.org/uploads/isis-reports/documents/Iran_Yellowcake_11Feb2009.pdf[Accessed 5 Jul. 2014].
- Amuzegar, J. 1997. Adjusting to Sanctions. *Foreign Affairs*, 76 (3), pp. 31-41. [Accessed: 12 Dec 2013].
- Armbruster, B. (2014). Top Israeli Official Takes Hard Line On Iran Ahead Of Nuclear Talks. *Think Progress*. [online] Available at: <http://thinkprogress.org/world/2014/05/13/3437246/steinitz-israel-iran-enrichment/> [Accessed 21 Jun. 2014].

- Bahgat, G. 2006. Nuclear Proliferation: The Islamic Republic of Iran. *Iranian Studies*, 39 (3), pp. 307--327.
- Barzegar, K. 2012. Sanctions Won't End Iran's Nuclear Program. *Foreign Affairs*, Available at: <http://www.foreignaffairs.com/features/letters-from/sanctions-wont-end-irans-nuclear-program> [Accessed: 12 Dec 2013].
- BBC News. 2013. *Iran declares key nuclear advance*. [online] Available at: http://news.bbc.co.uk/2/hi/middle_east/4900260.stm [Accessed: 12 Dec 2013].
- Ben-Meir, A. 2010. Israel's Response to a Nuclear Iran. *International Journal on World Peace*, 27 (1), pp. 61-78.
- Bergman, R. 2009. Letter From Tel Aviv: Netanyahu's Iranian Dilemma. *Foreign Affairs*, Available at: <http://www.foreignaffairs.com/features/letters-from/letter-from-tel-aviv-netanyahu%C3%A2%E2%82%AC%E2%84%A2s-iranian-dilemma> [Accessed: 12 Dec 2013].
- Booth, W. (2013). Israel says Iran is accelerating nuclear quest. *The Washington Post*. [online] Available at: http://www.washingtonpost.com/world/middle_east/israel-says-iran-is-accelerating-nuclear-quest/2013/08/07/c3f67b5e-ff96-11e2-8294-0ee5075b840d_story.html [Accessed 5 Jul. 2014].
- Bueno de Mesquita, B. (2002). Accomplishments and Limitations of a Game-Theoretic Approach to International Relations. In: F. Harvey and M. Brecher, ed., *Evaluating Methodology In International Studies*, 1st ed. Ann Arbor: The University of Michigan Press, pp.59-81.
- Bueno de Mesquita, B. (2010). *Principles of international politics*. 1st ed. Washington, D.C.: CQ Press.
- Chubin, S. 2001. Iran's Strategic Environment and Nuclear Weapons. In: Kemp, G. eds. 2001. *Iran's Nuclear Weapons Options: Issues and Analysis*. Washington: The Nixon Center, pp. 17-35.
- Chubin, S. and Litwak, R. 2003. Debating Iran's nuclear aspirations. *Washington Quarterly*, 26 (4), pp. 99--114.

- Eiran, E. 2011. What Happens After Israel Attacks Iran. *Foreign Affairs*, Available at: <http://www.foreignaffairs.com/articles/137300/ehud-eiran/what-happens-after-israel-attacks-iran> [Accessed: 12 Dec 2013].
- Freedman, L., 1998. *Strategic coercion*. 1st ed. Oxford: Oxford University Press.
- Freedman, L., 2004. *Deterrence*. Cambridge, UK: Polity Press.
- Freedman, L., Raghavan, S., 2013. *Coercion*, in Williams, P.D. (ed.), *Security Studies: An Introduction*. Oxon: Routledge, pp. 206-221.
- Gearan, A. (2014). Iran takes tough opening stand at nuclear talks, vows not to dismantle equipment. *The Washington Post*. [online] Available at: http://www.washingtonpost.com/world/national-security/iran-takes-tough-opening-stand-at-nuclear-talks-vows-not-to-dismantle-equipment/2014/02/18/8219fee8-98c7-11e3-80ac-63a8ba7f7942_story.html [Accessed 4 Jul. 2014].
- George, A., 1991. *Forceful persuasion*. 1st ed. Washington, D.C.: United States Institute of Peace Press.
- Goodby, J.E., Mazarr, M., 2011. Redefining the Role of Deterrence, in Shultz, G., Drell, S., Goodby, J.E.(eds), *Deterrence-Its Past and Future*. California: Hoover Institution Press, pp. 47-97.
- Greenblum, B. 2006. Iranian Nuclear Threat: Israel's Options under International Law, *The. Hous. J. Int'l L.*, 29 p. 55.
- Haass, R. 2005. Regime Change and Its Limits. *Foreign Affairs*, 84 (4), pp. 66-78. [Accessed: 12 Dec 2013].
- Ho, S. (2014). Netanyahu: Iran's nuclear program must be 'dismantled'. *The Times of Israel*. [online] Available at: <http://www.timesofisrael.com/netanyahu-irans-nuclear-program-must-be-dismantled/> [Accessed 6 Jul. 2014].
- Ho, S. (2014). Ya'alon: Iran 'number one threat' to Israel. *The Times of Israel*. [online] Available at: <http://www.timesofisrael.com/yaalon-iran-number-one-threat-to-israel/> [Accessed 3 Jul. 2014].

- Huth, P. and Russett, B., 1984. What Makes Deterrence Work? Cases from 1900 to 1980. *World Politics*, 36 (4), pp.495-526.
- Huth, P. and Russett, B., 1990. Testing deterrence theory: Rigor makes a difference. *World Politics*, 42(04), pp.466-501.
- Huth, P., 1988. *Extended deterrence and the prevention of war*. 1st ed. New Haven: Yale University Press.
- Hymans, J. 2012. Botching the Bomb. *Foreign Affairs*, Available at: <http://www.foreignaffairs.com/articles/137403/jacques-e-c-hymans/botching-the-bomb> [Accessed: 12 Dec 2013].
- Inbar, E. 2006. The Need to Block a Nuclear Iran. *Middle East Review of International Affairs*, 10 (1), pp. 85--104.
- Jervis, R., 1979. Deterrence theory revisited. *World Politics*, 31(02), pp.289-324.
- Joint Plan of Action. 2013. *European Union External Action Service*. [online] Available at: http://eeas.europa.eu/statements/docs/2013/131124_03_en.pdf [Accessed: 12 Dec 2013].
- Jones, P. 2012. Learning to Live with a Nuclear Iran. *The Nonproliferation Review*, 19 (2), pp. 197--217.
- Kahl, C. 2012. Not Time to Attack Iran. *Foreign Affairs*, Available at: <http://www.foreignaffairs.com/articles/137031/colin-h-kahl/not-time-to-attack-iran> [Accessed: 12 Dec 2013].
- Keinon, H. 2013. Netanyahu says Iran nuclear deal is 'historic mistake'. *The Jerusalem Post*, [online] October 24. Available at: <http://www.jpost.com/Iranian-Threat/News/Israel-denounces-Iranian-nuclear-deal-says-it-will-review-options-332800> [Accessed: 27 Oct 2013].

- Khalaf, R., Barber, L. and Bozorgmeh, N. (2013). FT interview: Hassan Rouhani. *Financial Times*. [online] Available at: <http://www.ft.com/intl/cms/s/0/22bbf304-58e2-11e3-a7cb-00144feabdc0.html#axzz374Xo7aO7> [Accessed 5 Jul. 2014].
- Knopf, J., 2010. The fourth wave in deterrence research. *Contemporary Security Policy*, 31(1), pp.1-33.
- Koch, A. and Wolf, J. 1997. Iran's nuclear procurement program: How close to the bomb?. *The Nonproliferation Review*, 5 (1), pp. 123--135.
- Kroenig, M. 2012. Time to Attack Iran. *Foreign Affairs*, Available at: <http://www.foreignaffairs.com/articles/136917/matthew-kroenig/time-to-attack-iran> [Accessed: 12 Dec 2013].
- Kydd, A., 2000. Trust, Reassurance, and Cooperation. *International Organization*, 54 (2), pp.325-357.
- Lappin, Y. (2012). 'Iran may accelerate nuke program if Israel attacks'. *The Jerusalem Post*. [online] Available at: <http://www.jpost.com/Iranian-Threat/News/Iran-may-accelerate-nuke-program-if-Israel-attacks> [Accessed 6 Jul. 2014].
- Lebow, R. and Stein, J., 1990. Deterrence: The elusive dependent variable. *World Politics*, 42(03), pp.336-369.
- Lebow, R.N., 1983. The Deterrence Deadlock: Is there a Way out?. *Political Psychology*, 4(2), pp. 333-354.
- Lebow, R.N., Stein, J.G., 2011. Rational Deterrence Theory: I Think, Therefore I Deter. *World Politics*, 41(2), pp. 208-224.
- Ledeen, M. 2012. Tehran Takedown. *Foreign Affairs*, Available at: <http://www.foreignaffairs.com/articles/137803/michael-ledeen/tehran-takedown> [Accessed: 12 Dec 2013].

- Levy, J. (1992). Prospect theory and international relations: Theoretical applications and analytical problems. *Political Psychology*, pp.283--310.
- Lindsay, J. and Takeyh, R. 2010. After Iran Gets the Bomb. *Foreign Affairs*, Available at: <http://www.foreignaffairs.com/articles/66032/james-m-lindsay-and-ray-takeyh/after-iran-gets-the-bomb> [Accessed: 12 Dec 2013].
- Lupovici, A., 2010. The Emerging Fourth Wave of Deterrence Theory—Toward a New Research Agenda. *International Studies Quarterly*, 54(3), pp.705-732.
- Maloney, S. (2013). Israeli Foreign Minister on Iran: If You Want To Shoot, Shoot; Don't Talk. *Saban Center for Middle East Policy*. [online] Available at: <http://www.brookings.edu/blogs/iran-at-saban/posts/2013/12/07-avigdor-lieberman-israel-saban-forum-iran> [Accessed 4 Jul. 2014].
- Maloney, S. 2010. Sanctioning Iran: If only it were so simple. *The Washington Quarterly*, 33 (1), pp. 131--147.
- Maloney, S. 2012. Obama's Counterproductive New Iran Sanctions. *Foreign Affairs*, Available at: <http://www.foreignaffairs.com/articles/137011/suzanne-maloney/obamas-counterproductive-new-iran-sanctions> [Accessed: 12 Dec 2013].
- McGwire, M., 1985-1986. Deterrence: The Problem- Not the Solution. *International Affairs*, 62(1), pp. 55-70.
- Mearsheimer, J. (2013). Structural Realism. In: T. Dunne, M. Kurki and S. Smith, ed., *International Relations Theories: Discipline and Diversity*, 3rd ed. Oxford: Oxford University Press, pp.71-88.
- Montgomery, E., 2006. Breaking Out of the Security Dilemma: Realism, Reassurance, and the Problem of Uncertainty. *International Security*, 31 (2), pp.151-185.
- Morgan, P., 1977. *Deterrence*. Beverly Hills, Calif.: Sage Publications.

- Morrow, J. (1994). *Game theory for political scientists*. 1st ed. Princeton, N.J.: Princeton University Press.
- Mousavian, H. 2012. How to Engage Iran. *Foreign Affairs*, Available at: <http://www.foreignaffairs.com/articles/137095/hosseini-mousavian/how-to-engage-iran> [Accessed: 12 Dec 2013].
- Mousavian, S. 2006. Iran and the West: The Path to Nuclear Deadlock. *Global Dialogue (Online)*, 8 (1-2), Available at: <http://www.worlddialogue.org/content.php?id=367> [Accessed: 12 Dec 2013].
- NTI: Nuclear Threat Initiative, (2014). *Profile for Iran / NTI*. [online] Available at: <http://www.nti.org/country-profiles/iran/nuclear/> [Accessed 3 Jul. 2014].
- Özcan, N. and Özdamar, . (2009). Iran's Nuclear Program and the Future of US-Iranian Relations. *Middle East Policy*, 16(1), pp.121--133.
- Parsi, T. 2005. Israel-Iranian relations assessed: Strategic competition from the power cycle perspective. *Iranian Studies*, 38 (2), pp. 247--269.
- Parsi, T. 2007. Iran and Israel: The avoidable war. *Middle East Policy*, 14 (3), pp. 79--85.
- Pedatzur, R. 2007. The Iranian nuclear threat and the Israeli options. *Contemporary Security Policy*, 28 (3), pp. 513--541.
- Quackenbush, S. and Zagare, F. (2006). Game Theory: Modeling Interstate Conflict. In: J. Sterling-Folker, ed., *Making sense of international relations theory*, 1st ed. Boulder, Colo: Lynne Rienner Pub.
- Quackenbush, S., 2010. General deterrence and international conflict: Testing perfect deterrence theory. *International Interactions*, 36(1), pp.60-85.
- Quackenbush, S., 2011. Deterrence theory: where do we stand?. *Review of International Studies*, 37(02), pp.741-762.

- Raas, W. and Long, A. 2007. Osirak redux? Assessing Israeli capabilities to destroy Iranian nuclear facilities. *International Security*, 31 (4), pp. 7--33.
- Reuters, (2014). Iran would resume enrichment if nuclear talks fail: minister. [online] Available at: <http://www.reuters.com/article/2014/06/12/us-iran-nuclear-idUSKBN0EN2EJ20140612> [Accessed 5 Jul. 2014].
- Roth, A. 2009. The Root of All Fears. *Foreign Affairs*, Available at: <http://www.foreignaffairs.com/articles/65692/ariel-ilan-roth/the-root-of-all-fears> [Accessed: 12 Dec 2013].
- Rouhani, H. 2013a. *Statement at the Sixty-eight Session of the United Nations General Assembly*. [online] Available at: http://gadebate.un.org/sites/default/files/gastatements/68/IR_en.pdf [Accessed: 12 Dec 2013].
- Rouhani, H. 2013b. Why Iran seeks constructive engagement. *The Washington Post*, [online] September 20. Available at: http://www.washingtonpost.com/opinions/president-of-iran-hassan-rouhani-time-to-engage/2013/09/19/4d2da564-213e-11e3-966c-9c4293c47ebe_story_1.html [Accessed: 12 Dec 2013].
- Sadr, E. 2005. The Impact of Iran's Nuclearization on Israel. *Middle East Policy*, 12 (2), pp. 58--72.
- Sagan, S. 2006. How to keep the bomb from Iran. *Foreign Affairs.*, 85 (5), pp. 45-59.
- Sagan, S., Waltz, K. and Betts, R. 2013. A Nuclear Iran: Promoting Stability or Courting Disaster. *Journal of International Relations*, 60 (2), pp. 135-150. Available at: http://iis-db.stanford.edu/pubs/21918/Sagan_Nuclear_Iran.pdf [Accessed: 12 Dec 2013].
- Sagan, S., Waltz, K. and Betts, R., 2007. A Nuclear Iran: Promoting Stability or Courting Disaster?. *Journal Of International Affairs-Columbia University*, 60(2), p.135.

- Sanders, R. 2009. Israel and the Realities of Mutual Deterrence. *Israel Affairs*, 15 (1), pp. 81-97.
- Schaub, G., 2004. Deterrence, Compellence and Prospect Theory. *Political Psychology*, 25(3), pp. 389-411.
- Schelling, T., 1960. *The strategy of conflict*. Cambridge: Harvard University Press.
- Schelling, T., 1966. *Arms and influence*. 1st ed. New Haven: Yale University Press.
- Snidal, D. (2004). Formal Models of International Politics. In: D. Sprinz and Y. Wolinsky-Nahmias, ed., *Models, Numbers, And Cases*, 1st ed. Ann Arbor: University of Michigan Press.
- Stein, J.G., 1991. Reassurance in International Conflict Management. *Political Science Quarterly*, 106(3), pp. 431-451.
- Takeyh, R. 2007. Time for Détente With Iran. *Foreign Affairs*, 86 (2), pp. 17-32.
- Takeyh, R. and Maloney, S. 2011. The self-limiting success of Iran sanctions. *International Affairs*, 87 (6), pp. 1297--1312.
- Tang, S. and Montgomery, E., 2007. Uncertainty and Reassurance in International Politics. *International Security*, 32 (1), pp.193-200.
- The Guardian, (2014). Rouhani says Iran will not acquire nuclear weapons 'on principle'. [online] Available at: <http://www.theguardian.com/world/2014/mar/01/rouhani-iran-nuclear-weapons-principle> [Accessed 6 Jul. 2014].
- The Times of Israel, (2014). Israeli ministers lambaste 'delusional' Iran nuclear deal. [online] Available at: <http://www.timesofisrael.com/top-israeli-officials-lambaste-self-delusional-iran-nuclear-deal/> [Accessed 4 Jul. 2014].

- Viotti, P. and Kauppi, M. (1999). *International relations theory*. 1st ed. Boston: Allyn and Bacon.
- Waltz, K. 1981. The Spread of Nuclear Weapons: More May Be Better. *Adelphi Papers*, 21 (171), Available at: http://polsci.colorado.edu/sites/default/files/10B_Waltz.pdf [Accessed: 12 Dec 2013].
- Weiss, L. 2009. Israel's Future and Iran's Nuclear Program. *Middle East Policy*, 16 (3), pp. 79--88.
- Wexler, R. 2012. Attacking Iran's Nuclear Project-An Attack Might Be Necessary, but Not Yet. *World Affairs*, 175 (1), pp. 30-38.
- Zagare, F. and Kilgour, D. (2000). *Perfect deterrence*. 1st ed. Cambridge, UK: Cambridge University Press.
- Zagare, F., 2004. Reconciling rationality with deterrence a re-examination of the logical foundations of deterrence theory. *Journal of Theoretical Politics*, 16(2), pp.107-141.
- Zarif, M. (2014). What Iran Really Wants: Iranian Foreign Policy in the Rouhani Era. *Foreign Affairs*, 93(3), p.49.