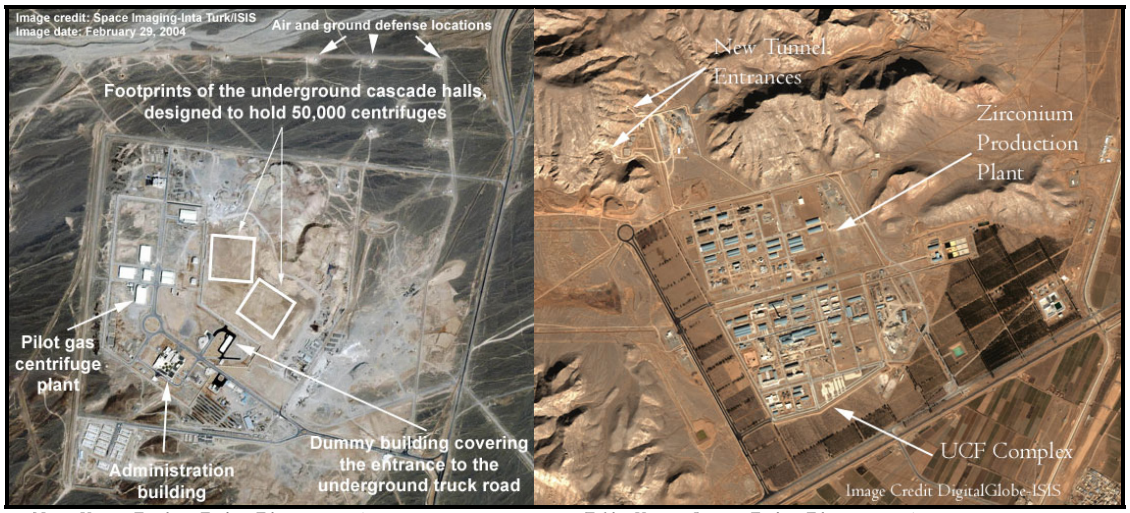
PLAN B FOR PERSIA:
RESPONDING TO IRAN'S NUCLEAR WEAPONS PROGRAM ABSENT DIPLOMATIC AGREEMENT



(Natanz Uranium Enrichment Facilities, February 29, 2004) *(Esfahan Uranium Conversion Facilities, February 12, 2005)*

2006 Kennedy School of Government
Policy Analysis Exercise
April 4, 2006

HARVARD UNIVERSITY
JOHN F. KENNEDY SCHOOL OF GOVERNMENT

Prepared by:
Sean Patrick Hazlett
Submitted in Partial Fulfillment
of the Requirements for the
Degree of Master in Public Policy

Prepared for:
Ambassador R. Nicholas Burns
Under Secretary for Political Affairs
United States Department of State

Faculty Advisor:
Dr. Ashton B. Carter

Seminar Leaders:
Dr. Steve Miller and **Dr. Monica Toft**

Turkey
Iraq
Iran
Turkmenistan
Uzbekistan
Afghanistan
Pakistan
Saudi Arabia
Kuwait
Bahrain
Qatar
United Arab Emirates
Oman
Caspian Sea
Persian Gulf
Gulf of Oman
Arabian Sea
Shatt al Arab
Euphrates
Tigris
Dasht-e Kavir (salt desert)
Kavir-e Namak
BAKU
YEREVAN
TEHRAN
ASHGABAT
BAGHDAD
KUWAIT
RIYADH
DOHA
MANAMA
ABU DHABI
MUSCAT
TABRIZ
MASHHAD
ISFAHAN
SHIRAZ
KERMAN
ZAHEDAN
BANDAR-E BUSHEHR
BANDAR-E ABBAS
SCALE 1:11,250,000
0 100 200 300 Kilometers
0 100 200 300 Miles
Lambert Conformal Conic Projection, standard parallels 12°N and 38°N
International boundary
National capital
Province capital
Railroad
Expressway
Road

Contents

LIST OF ABBREVIATIONS ..... **V**

ACKNOWLEDGMENTS ..... **VII**

EXECUTIVE SUMMARY ..... **VIII**

INTRODUCTION **1**

THE PROBLEM 1
STATEMENT OF PURPOSE 1
ROADMAP 2

BACKGROUND **3**

METHODOLOGY **5**

CASE STUDY FINDINGS **6**

CASE 1: IRANIAN FOREIGN POLICY 6
Key Lessons *6*
CASE 2: COERCIVE OPTIONS – OSIRAK, NORTH KOREA, KOSOVO AND OTHERS 6
Key Lessons *6*
CASE 3: US STRATEGIC ADJUSTMENT TO CHINA'S NASCENT NUCLEAR WEAPONS PROGRAM 7
Key Lessons *7*

POLICY OPTION 1: COERCION **8**

STRATEGIC OUTLOOK 8
TIMING AND TRIGGERS: A STRATEGY FOR TRANSITION FROM PLAN A TO PLAN B 8
PLAN A AND PLAN B MUST PROCEED IN PARALLEL, BE MUTUALLY REINFORCING, FOCUS SOLELY ON IRAN'S NUCLEAR PROGRAM, AND HAVE FIRM COMMITMENTS FROM US-EU PARTNERS FOR COERCIVE ACTION 8
ALLIES 9
EU-3/EU/Japan Cooperation is Necessary Condition for Successful Coercion *9*
Turkey's Tacit Cooperation via Military Action is Necessary Condition for Coercion *10*
Russia Must Not Impede US Effort *10*
China Must Not Impede US Effort *11*
Israel Must Exercise Restraint *11*
Egypt Must Help Agitate Arab World against Iran *12*
Iraq Must Continue to Support Coalition Presence in Iraq *12*
Gulf Cooperation Council (GCC) States Are Critical Players in US Effort *13*
POLITICAL, ECONOMIC, AND MILITARY OPTIONS/TOOLS 14
Political Tools *14*
Economic Tools *15*
Military Options *15*
POLICY INGREDIENTS: US COERCIVE POLICY MUST FOCUS ON IRAN'S NUCLEAR PROGRAM 22
Political Pressure *22*
Economic Pressure *23*
Military Pressure *28*
IRANIAN REACTIONS 28
Political *28*
Economic *29*
Military *30*
KEY FINDINGS 31
Finding #1: Transition from Plan A to Plan B Must Be Abrupt and Unambiguous *31*
Finding #2: Multilateral Economic Sanctions and Military Action are Most Effective Coercive Tools *31*
Finding #3: Military Action against Iran Will Have Severe Impact on Global Economy *31*

POLICY OPTION 2: STRATEGIC ADJUSTMENT **32**

STRATEGIC OUTLOOK 32
ALLIES 32
US Must Convince EU-3/EU/Japan to Share Greater Burden in Energy Security *32*
US Must Integrate Turkey into Western Alliance by Advocating for its EU Membership *32*
US Must Induce Russia to Sever Nuclear Relationship with Iran *32*
US Must Manage Chinese, Japanese and US Regional Competition for Energy *32*
Israel Will Be On a Hair Trigger *32*
US Must Induce and Bully Egypt Not to Develop Nuclear Weapons *33*
Iraq Could Become the Neo Germany of the Neo Cold War *33*
US Must Convince Gulf Cooperation Council (GCC) States to Help Contain Iran *33*
POLICY INGREDIENTS 33
Protection – Denial, Detection, Deterrence and Defense *33*
Reduction of Negative Impact to Regional Alliances *36*
Response to Increased Iranian Adventurism: Containing Iran *36*
Prevention of Regional Proliferation *37*
Damage Limitation to Counter proliferation Worldwide *37*
KEY FINDINGS 38
Key Finding #4: A Nuclear Iran Will Engage in More Aggressive Regional Behavior *38*
Key Finding #5: A Nuclear Iran Will Result in Pressure for Other Regional Actors to Proliferate *38*
Key Finding #6: Some Will Perceive Iran's Acquisition of Nuclear Weapons as a US Strategic Failure *38*

DECISION ANALYSIS / GAME THEORY **39**

KEY FINDING: A COERCIVE US POLICY WILL COST THE US AND IRAN LESS THAN STRATEGIC ADJUSTMENT WILL 39
US COST METHODOLOGY 39
IRANIAN COST METHODOLOGY 40
POLICY 1: COERCION 40
DECISION ANALYSIS: COERCION 41
GAME THEORETIC ANALYSIS: COERCION 42
POLICY 2: STRATEGIC ADJUSTMENT 43
DECISION ANALYSIS: STRATEGIC ADJUSTMENT 44
GAME THEORETIC ANALYSIS: STRATEGIC ADJUSTMENT 45

RECOMMENDATIONS **47**

POLICY 1: COERCION 47
Recommendation #1: Prepare the Battlefield for the Transition from Plan A to Plan B *47*
Recommendation #2: Coercive Strategy Must Focus Solely on Iranian Nuclear Weapons *47*
Recommendation #3: Secure Energy Resources *48*
POLICY 2: STRATEGIC ADJUSTMENT 48
Recommendation #4: Contain the Increased Iranian Conventional Military Threat *48*
Recommendation #5: Reassure Regional Friends and Allies against Proliferation *49*
Recommendation #6: Continue to Push for a Denuclearized Iran *49*

INTERVIEWS AND CONSULTATIONS **50**

BIBLIOGRAPHY **51**

ABOUT THE AUTHOR **59**

APPENDIX A: CASE STUDIES **60**

CASE 1: IRANIAN FOREIGN POLICY 60
Iranian Hostage Crisis *60*
Iran-Iraq War *61*
Iranian Terrorism *65*
Iranian Nuclear Program *67*

Key Lessons *70*
CASE 2: COERCIVE OPTIONS – OSIRAK, NORTH KOREA, KOSOVO AND OTHERS 71
Osirak *71*
US Strike Plan on North Korean Reactor *74*
Kosovo *75*
Cuban Missile Crisis *79*
Key Lessons *81*
CASE 3: US STRATEGIC ADJUSTMENT TO CHINA'S NASCENT NUCLEAR WEAPONS PROGRAM 82
China's Nascent Nuclear Weapons Program *82*
Key Lessons *84*

APPENDIX B: LOCATION OF MAJOR IRANIAN WEAPONS PROGRAMS 85

APPENDIX C: LOCATION OF MAJOR IRANIAN OILFIELDS AND PIPELINES 86

APPENDIX D: IRANIAN IMPORTS AND EXPORTS 87

APPENDIX E: US ECONOMIC IMPACT OF IRANIAN OIL EMBARGO 89

APPENDIX F: US ECONOMIC IMPACT OF STRAIT OF HORMUZ OIL DISRUPTIONS 91

APPENDIX G: DECISION ANALYSIS/GAME THEORETIC CALCULATIONS 93

List of Abbreviations

AEOI	Atomic Energy Organization of Iran
APC	Armored Personnel Carrier
CTBT	Comprehensive Test Ban Treaty
DPRK	Democratic People's Republic of Korea
EU	European Union
FDI	Foreign Direct Investment
FEP	Fuel Enrichment Plant
FMP	Fuel Manufacturing Plant
FRY	Federal Republic of Yugoslavia
GBU	Guided Bomb Unit
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
HEU	Highly Enriched Uranium
IAEA	International Atomic Energy Agency
ILSA	Iran and Libya Sanctions Act
IMF	International Monetary Fund
IRP	Islamic Republic Party
IRBM	Intermediate Range Ballistic Missile
IRGC	Islamic Revolutionary Guards Corps
JDAM	Joint Direct Attack Munitions
KDOM	Kosovo Diplomatic Observer Mission
KFOR	Kosovo Force
KLA	Kosovo Liberation Army
KVM	Kosovo Verification Mission
mbpd	Million Barrels per Day
MEK	Mujahedin-e-Khalq
MLF	Multilateral Force
MOIS	Ministry of Intelligence and Security
NAC	North Atlantic Council
NATO	North Atlantic Treaty Organization
NBC	Nuclear, Biological, and Chemical
NPT	Nuclear Non-Proliferation Treaty
OECD	Organization for Economic Cooperation and Development
OEF	Operation Enduring Freedom
OIC	Organization of the Islamic Conference
OIF	Operation Iraqi Freedom
OPEC	Organization of the Petroleum Exporting Countries
OPLAN	Operation Plan
PAE	Policy Analysis Exercise
PFEP	Pilot Fuel Enrichment Plant
PSI	Proliferation Security Initiative
RTD	Return to Duty
SACEUR	Supreme Allied Commander Europe
SCC	Special Coordinating Committee
SPR	Strategic Petroleum Reserve
SRBM	Short-Range Ballistic Missile
THAAD	Theater High Altitude Air Defense

TNRC	Tehran Nuclear Research Center
UAE	United Arab Emirates
UCF	Uranium Conversion Facility
ULCC	Ultra Large Crude Carrier
UN	United Nations
UNHCR	United Nations High Commissioner for Refugees
UNSC	United Nations Security Council
VLCC	Very Large Crude Carrier
VOA	Voice of America
WIA	Wounded in Action
WMD	Weapons of Mass Destruction
WTO	World Trade Organization

Acknowledgments

This Policy Analysis Exercise (PAE) would not have been possible without the unflagging support of my wife, Claire. I also want to thank my advisor, Dr. Ashton B. Carter for helping me to frame and to focus this complex problem in a manner more amenable for comprehensive analysis. Dr. Carter also arranged for my trip to Washington, D.C. through the Preventive Defense Project, so that I would have the opportunity to speak to policy experts and practitioners working on the Iranian problem. I also want to thank my client, Ambassador Nick Burns, for taking time out of his busy schedule to view my perspective on this problem. I also would be remiss if I did not thank Gretchen Bartlett at the Preventive Defense Project for her good cheer and support during the course of this project. Dr. Steven Miller also greatly assisted me in analyzing this issue and I thoroughly enjoyed our frequent discussions in his office about Iran, its nuclear program, and its people.

A number of other individuals' advice was also critical during the process of writing this report. General Kevin Ryan graciously volunteered his time to help me think through the military options and consequences. Xenia Dormandy gave me a great perspective on the political and economic dimensions of this issue and helped me organize these issues into a more logical framework. Dr. George Perkovich at the Carnegie Endowment educated me on the political nuances and dimensions of Iranian nuclear proliferation. Dr. Geoffrey Kemp at the Nixon Center was instrumental in broadening my understanding about alternative military and economic options designed to pressure the Iranian leadership. Henry Wooster, the Iran Desk Officer at the United States Department of State, helped me to understand the current diplomatic situation regarding Iran and how other major parties on the UN Security Council might react to different US economic, political, and military actions. Dr. Richard Zeckhauser urged me to examine more deeply the interests and motivations of other nations who would directly and indirectly be involved in any future US conflict with Iran.

Finally, I would like to thank the numerous other contributors who assisted with this project not specifically mentioned above. I appreciate all of the help I received in the course of producing this PAE.

Executive Summary

Iran's efforts to develop nuclear capability over the last five years present a clear and present danger to US security. Experts believe that Iran is between one and two years from producing a functional nuclear device if it acquires fissionable material from an outside state like North Korea, and between two and ten years if it produces its own nuclear fuel.[1] Other more recent estimates range from one to four years.[2] Once Iran completes a nuclear fuel cycle, its Natanz facility alone will have the capacity to produce enough highly enrich uranium (HEU) to produce between several to 20 nuclear devices per year.[3] Iran's efforts to deliver such a system are also proceeding rapidly with the Iranians increasing their Shahab-3 Intermediate Range Ballistic Missile (IRBM) arsenal from an estimated 24 missiles on 6 launchers at an annual rate of about 10 missiles per year. Experts also estimate that Iran has increased the range of its Shahab-3 to 1,700 km, which is capable of hitting some targets in continental Europe.[4] Intelligence indicates that Iran is currently working on the Shahab-4 and 5 missiles with estimated ranges of 2,000 km and 5,000 km respectively.[5] Iran's long history of support for terrorism, its president's recent statements calling for Israel's annihilation, and its consistent evasion of a diplomatic solution with the EU-3 and Russia, highlight the dangers associated with Iranian nuclear weapons possession. Failing to address this problem will result in Iranian possession of a nuclear weapon, which will lead to further regional proliferation and emboldened Iranian regional adventurism – both factors that would gravely harm US security interests. Case studies, consultations with leading military, political, and economic experts, and the application of game theory and decision analysis to the Iranian nuclear dilemma reveal the following findings:

Finding #1: Transition from Plan A to Plan B must be abrupt and unambiguous. The US and its allies must clearly outline the timing and triggers of this transition so that it is clear to Iran that military action is imminent if Iran fails to comply with the demands of the international community.

Finding #2: Multilateral economic sanctions and military action are most effective coercive tools. The US has already employed the maximum level of unilateral economic and political sanctions over the past thirty years and thus has little leverage left to exploit. However, the EU still consists of a significant portion of Iran's imports and can be used as leverage to pressure Iran. Iran's nuclear program is also still vulnerable to military strikes and if the US can convince its allies to share the burden of a precision strike, EU and US leaders should neutralize Iran's program after exhausting political and economic pressures.

Finding #3: Military action against Iran will have severe impact on the global economy. The Strait of Hormuz poses a strategic dilemma for the US and its allies that Iran can exploit. The Saudi oil infrastructure is also highly vulnerable to Iranian disruption. Should Iran decide to employ mines or sink oil tankers in the Strait of Hormuz or to launch ballistic missiles at one or two key Saudi oil refineries, oil prices would rise to a point that could significantly dampen US GDP growth.

---

[1] Michael Eisenstadt, "Delay, Deter and Contain, Roll-Back: Toward a Strategy for Dealing with Iran's Nuclear Ambitions," *Iran's Bomb: American and Iranian Perspectives*, ed. Geoffrey Kemp, (Washington, D.C.: The Nixon Center, 2004), 14.
[2] Henry D. Sokolski, "Getting Ready for a Nuclear-Ready Iran: Report of the NPEC Working Group," *Getting Ready for a Nuclear-Ready Iran*, ed. Henry D. Sokolski and Patrick Clawson, (Carlisle, PA: The Strategic Studies Institute Publications Office, 2005), 1.
[3] Anthony H. Cordesman, *Iran's Developing Military Capabilities*, (Washington, D.C.: Center for Strategic and International Studies Press, 2005), 105.
[4] The International Institute for Strategic Studies, *The Military Balance: 2005-2006*, ed. Colonel Christopher Langton, (London: Routledge, 2005), 175, 189.
[5] Richard L. Russell, "Iran in Iraq's Shadow: Dealing with Tehran's Nuclear Weapons Bid," *Parameters* 34.3 (Autumn 2004):34.

Finding #4: A nuclear Iran will engage in more aggressive regional behavior. A nuclear emboldened Iran will be less deterred by US conventional superiority and be increasingly likely to engage in activities which advance its national interests at the expense of US interests. The US must prepare to fight a second cold war against Iran, which will require more blood and treasure than it is currently spending in Iraq.

Finding #5: A nuclear Iran will result in pressure for other regional actors to proliferate. Other regional actors that feel threatened by Iranian nuclear weapons will face increasing pressure to develop nuclear weapons. The US will need to stifle this impulse to halt regional and global nuclear proliferation.

Finding #6: Some will perceive Iran's acquisition of nuclear weapons as a US strategic failure. US credibility will suffer if Iran goes nuclear because many will consider this event a US strategic defeat. The US must not admit defeat and must convince others that Iran's nuclear weapons possession is temporary.

This author recommends that the US take the following coercive actions if diplomacy fails:

Recommendation #1: Prepare the Battlefield for Transition from Plan A to Plan B. The US must work with EU allies to prepare the battlefield for a transition from Plan A to B. A clear timeline and set of triggers are necessary for US efforts to succeed. To prepare for this transition, the US must be mindful of two key considerations. First, the transition from Plan A to Plan B requires a binding UNSC resolution within one year and the triggers for military action are Iranian withdrawal from the NPT, expulsion of IAEA inspectors, large scale uranium enrichment, and/or imminent completion of an atomic weapon

Recommendation #2: Coercive Strategy Must Focus Solely on Iranian Nuclear Weapons. The US must make a clear linkage of its coercive policy to Iran's pursuit of nuclear enrichment. Coercion also requires that the US limit its ends and means to curbing these nuclear activities.

Recommendation #3: Secure Energy Resources. Prepare US and allied economies that are heavily dependent on oil by stocking up strategic petroleum reserves, encouraging investment in alternative fuels, and reducing vulnerability to the Saudi oil production and distribution system to sustain at least three years of high petroleum prices.

If the Iranians acquire a full nuclear fuel cycle the US must do the following for strategic adjustment:

Recommendation #4: Contain the Increased Iranian Conventional Military Threat. The US must contain an Iran emboldened by its nuclear weapons capability. The US must provide the organizational structure, troops, and arms and training necessary to provide regional allies with the means to resist Iranian external military and internal terrorist and insurgent threats.

Recommendation #5: Reassure Regional Friends and Allies against Proliferation. To reassure regional allies, the US must guarantee a regional nuclear umbrella, increase allied access to US arms and training, and develop nuclear forensics to deter Iran from covertly using or diverting nuclear materials.

Recommendation #6: Continue to Push for a Denuclearized Iran. The US must continue to push for a denuclearized Iran by pursuing diplomatic, political, economic, and military means to persuade and coerce the Iranian regime to relinquish its nuclear weapons.

There are many other critical issues that the US must address in the intermediate and long-term. How will the US end a conflict with Iran? How will the US manage its international reputation after a strike on Iran? What are the long-term consequences of another Middle Eastern war on the viability of the US military? While these and many other questions are critical, a failure to prepare the battlefield today for a strike on Iran tomorrow will lead to ill-conceived and haphazard efforts if diplomacy fails.

Introduction

The Problem

Since August 2002, when Iranian dissidents revealed the existence of a covert uranium enrichment facility at Natanz and a heavy-water plant at Arak, Iranian nuclear proliferation has become one of the most intractable security policy problems today. Iran's efforts to develop nuclear capability over the last five years present a clear and present danger to US security. As a state sponsor of terrorism with access to an international network of seasoned terrorists, it is unacceptable for Iran to possess nuclear weapons. Unfortunately, tainted US credibility over its failure to discover any Iraqi weapons of mass destruction (WMD) has made it increasingly difficult for the US to mobilize international support against Iran. This intelligence failure, coupled with current US commitments in Iraq, Afghanistan, the Horn of Africa and Northeast Asia make it increasingly unlikely that the US will be able to tackle the Iranian problem alone. Meanwhile, the clock favors the Iranians as they continue to use diplomacy as a stalling tactic while they get ever closer to producing an indigenous bomb. Some experts have estimated that Iran could have a functional nuclear weapon in less than a year.[6] The Iranians have also been working hard on producing missiles capable of delivering these nuclear weapons. Experts estimate that the range of Iran's 1,700 km range missile, the Shahab-3, is capable of hitting some targets in continental Europe.[7] Intelligence indicates that Iran is currently working on the Shahab-4 and 5 missiles with estimated ranges of 2,000 km and 5,000 km respectively.[8]

Iran's long history of support for terrorism, its president's recent statements calling for the annihilation of Israel, and its consistent evasion of a diplomatic solution with the EU-3 and Russia, highlight the dangers associated with Iranian possession of nuclear weapons. Failing to address this problem will result in Iran's possession of a nuclear weapon, which in turn, will lead to further regional proliferation and emboldened Iranian regional adventurism – factors that would gravely harm US security interests.

This Policy Analysis Exercise (PAE) aims to address this problem by carefully examining Plan B – the political, economic, and military actions that the United States can take either to exert pressure on Iran or to adjust to the eventuality of Iran's future possession of a nuclear weapon.

Statement of Purpose

This PAE was conducted for Ambassador R. Nicholas Burns, Under Secretary of Political Affairs at the US Department of State, to generate a series of actionable recommendations that US policymakers can take absent a diplomatic agreement with Iran. It will examine two broad policy options that might exist in the absence of a diplomatic agreement including exerting political, economic, and military pressure on the Iranians and adjusting to the future Iranian possession of nuclear weapons.

This PAE will analyze each option separately. It will first provide a description of the strategic outlook or environment under which each option would be considered. Second, it will discuss the time and triggers involved in each option by addressing questions like: when should the US implement Plan B? Why? What are the key triggers? Are these triggers event-driven, time-driven, or both? Why is this time the best time to execute this option? Third, it will include a discussion of the relationship of Plan A – a diplomatic agreement – to Plan B. Key questions will include: does Plan B preclude doing Plan A in parallel? Are components of Plan B incompatible with Plan A? Fourth, this PAE will discuss the role and probable reactions of allies in Plan B. Key questions will include: who does the US have to bring along with it in the process? What roles must different allies plan in the process for Plan B to be effective? Fifth, this

[6] Sokolski, op. cit., 1.
[7] The International Institute for Strategic Studies, op. cit., 175, 189.
[8] Russell, op. cit., 34.

analysis will examine what US objectives should be in each scenario. Sixth, it will include a detailed discussion and analysis of the key ingredients of these policies. Seventh, the coercive option will contain an overview of potential Iranian reactions to each policy. Finally, it will use game theoretic concepts and decision analysis to perform a cost benefit analysis of each policy in an attempt to quantify choice in this very complex issue.

Roadmap

This policy analysis will outline the background of the current nuclear crisis that began in August 2002 up until the current date. It will then briefly outline the methodology of this study. This paper will then analyze several case studies involving Iranian policy, previous instances of coercive political, economic, and military action, and one instance of strategic adjustment to the emergence of a nascent nuclear power. The case study on Iranian policy will examine historical events including the 1979 Iranian hostage crisis, the Iran-Iraq War, the Iranian nuclear program, and Iranian terrorism. The case study on coercive actions includes an examination of the Israeli precision strike on the Osirak reactor, OPLAN 5026 – the precision strike plan on the North Korean Yongbyon reactor, the Kosovo bombing campaign, and the Cuban Missile Crisis. The third case study involves an examination of how US policy-makers reacted to the emergence of a nuclear China and why they decided not to attack while this program was still an "infant in the cradle." This paper will then examine two scenarios in detail. The first scenario will include an analysis of US coercive options against Iran before it acquires nuclear weapons. The second scenario will include an analysis of what strategy the US should employ should the Iranians announce that they have atomic weapons. This paper will then attempt to analyze both of these scenarios using decision analysis and game theoretic concepts to get some sense of how one might quantify this problem. The final sections will include this author's formal recommendations.

Background

Over the past two years, no real progress has been made on convincing the Iranians to halt their nuclear program. The current crisis began in August 2002, when Iranian dissidents reported the existence of a covert Iranian nuclear program.[9] In September 2002, the Vice President of the Islamic Republic of Iran stated that Iran was "embarking on a long-term plan to construct nuclear power plants with a total capacity of 6000 MW within two decades."[10] That same month, Russian technicians began construction on the Bushehr reactor despite strong US objections.[11] In December 2002, US officials declared that satellite imagery of the Natanz and Arak facilities was consistent with Iran's "across-the-board pursuit of weapons of mass destruction." That same month Iran agreed to IAEA inspections of these two facilities.[12]

In February 2003, Iran informed IAEA representatives of its uranium enrichment program that consisted of two new facilities at Natanz including a pilot fuel enrichment plant (PFEP) and a large commercial-scale fuel enrichment plant (FEP). Iran also confirmed that a heavy water production plant was under construction in Arak. The Iranians also admitted to receiving an illicit shipment of 1.8 metric tons of natural uranium from China in 1991.[13] The IAEA continued to discover Iranian nuclear violations over the course of 2003 including finding traces of Highly Enriched Uranium (HEU).[14] On October 21, 2003, the EU-3 negotiated a deal with Iran to cease uranium enrichment.[15]

Throughout 2004, Iran continued to cooperate with the IAEA, which continued to discover more evidence of an illicit nuclear weapons program.[16] The situation came to a head in September 2004, when Iran resumed a "large-scale" enrichment program. In response, the IAEA ordered Iran to halt its enrichment activity and to reveal all of its nuclear programs by 25 November 2004.[17] On November 29th, the IAEA Board of Governors passed a resolution that required Iran to implement the NPT Safeguards Agreement and forced Iran to suspend all nuclear activities until the IAEA could conduct a formal investigation of Iran's nuclear program. Iran agreed to follow the resolution, "but repeatedly declared that" it had "no intention of completely abandoning its nuclear program as the agreement is temporary."[18]

In April 2005, the Iranians announced that they would resume uranium conversion at Esfahan. In May 2005, the European Union announced that Iran's resumption of its uranium enrichment program would cancel the trade and energy package that the EU-3 was poised to offer Iran in exchange for nuclear cooperation. On August 5, 2005, the EU-3 offered Iran economic incentives and security guarantees in exchange for Iran's abandoning a full nuclear fuel cycle. Three days later, the Iranians rejected the offer describing it as "absurd, demeaning, and self-congratulatory." Tehran also announced that it would resume an "irreversible" enrichment program as was its right under Article IV of the NPT. On August 10,

---

[9] Geoffrey Kemp, *Iran and Iraq: The Shia Connection, Soft Power, and the Nuclear Factor*, (Washington, D.C.: United States Institute of Peace, 2005), 4.
[10] International Atomic Energy Agency, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran GOV/2003/40*, 6 June 2003, 1.
[11] BBC News, "Timeline: Iran," [online: web], updated 4 February 2006, cited 4 February 2006, para 43, URL: http://news.bbc.co.uk/1/hi/world/middle_east/country_profiles/806268.stm
[12] Kemp, op. cit., 4.
[13] International Atomic Energy Agency, op. cit., 1-6.
[14] Kemp, op. cit., 4.
[15] Ibid.
[16] Nuclear Threat Initiative, "Iran Profile: Nuclear Overview," [online: web], updated December 2005, cited 5 February 2006, para 20, URL: http://www.nti.org/e_research/profiles/Iran/1819.html.
[17] Kemp, op. cit., 5.
[18] Nuclear Threat Initiative, op. cit., para 24-26.

2005, the Iranians broke IAEA seals on equipment at its Esfahan facility under IAEA supervision. The next day, the IAEA adopted a resolution calling for Iran to cease reprocessing activities at Esfahan.[19]

In mid November, the Russians attempted to resolve the crisis by offering to enrich Iranian uranium in Russia to prevent Iran from completing a full nuclear cycle. The Iranians expressed immediate skepticism over the offer.[20] Iran notified the IAEA in a letter dated 3 January 2006, that it had decided to resume, as of 9 January 2006, "those R&D on the peaceful nuclear energy programme which ha[d] been suspended as part of its expanded voluntary and non-legally binding suspension." The IAEA received a second letter on January 7, 2006 that requested that the IAEA remove seals at Iran's Natanz uranium enrichment facility. Iran removed the seals on January 10th and 11th.[21]

On February 4, 2005, the IAEA voted to report Iran to the UNSC for its nuclear activities. The resolution postponed all action until IAEA Director General ElBaradei delivered his report on March 6, 2006. In response, the Iranians threatened to downgrade their cooperation with the IAEA and "end any chance of a compromise on enrichment."[22] On February 6th, Tehran ordered the IAEA to remove its surveillance cameras and other equipment from Iran's nuclear sites by mid-February 2006.[23]

[19] Kemp, op. cit., 5-6.
[20] International Atomic Energy Agency, "Developments in the Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran and Agency Verification of Iran's Suspension of Enrichment-related and Reprocessing Activities," *Update Brief by the Deputy Director General for Safeguards*, 31 January 2006, 2-3.
[21] Ibid, 3-4.
[22] BBC News, "Iran Reported to Security Council," [online: web], updated 4 February 2005, cited 5 February 2005, para 1-20, URL: http://news.bbc.co.uk/1/hi/world/middle_east/4680294.stm.
[23] CNN, "Iran Tells IAEA to Remove Cameras," [online: web], updated 6 February 2006, cited 6 February 2006, para 1, URL: http://www.cnn.com/2006/WORLD/meast/02/06/iran.inspections/index.html.

Methodology

This Policy Analysis Exercise will address the alternative to diplomatic agreement through two broad alternative policies: 1) **Coercion:** Implementing a coercive policy of pressure and protection against Iran; and 2) **Strategic Adjustment:** Adapting US policy to live with an Iran that possesses nuclear weapons. For each alternative, this PAE will use the following methods to generate insights on each of the above subordinate questions as delineated in the introduction:

Analytical Framework
The primary driver of this analysis will be the analytical framework that the Preventive Defense Project developed at the North Korea Plan A/Plan B Design Workshop in July 2005 to address North Korean nuclear proliferation. This framework will be particularly useful in conducting an analysis of Plan B's objectives and ingredients.

Case Studies
This PAE will analyze the central question through the lens of three case studies including an historical analysis of Iranian foreign policy and its nuclear program, several brief examples of previous coercive policies including the US's plan to attack North Korea's nuclear reactor, Israel's Osirak operation, and the US's Kosovo campaign among others, and a case on the US's decision not to interfere in the development of China's nascent nuclear program. This PAE will use these case studies to address issues such as what the strategic outlook of each particular situation was and how it impacted decision-making, timing and triggers, the relationship of Plan A to Plan B, allied relationships, Plan B's objectives and ingredients, how decision makers used cost/benefit analyses to make decisions, what the operational challenges of the options under consideration were, and what the likely or actual adversary/Iranian reactions were.

Decision Analysis/Game Theory
This PAE will use decision analysis to make a crude attempt to quantify the two broad alternatives using decision trees to assess the probability of success or failure at each decision node. Additionally, this PAE will use game theory to predict the Iranian strategic response to US coercion and strategic adjustment. This PAE will use this analytical tool to provide additional layers of analysis for possible policy timing and triggers, allied relationships, a quantitative cost/benefit analysis for these two policies, the operational challenges of US and allied military options, and potential Iranian strategic responses.

Interviews of Subject Matter Experts
This PAE will use interviews of subject matter experts to enrich and augment the analytic framework, case studies and decision analysis listed above. The author traveled to Washington, D.C. in January to interview US diplomats and Iran experts to supplement information for understanding the strategic outlook of each alternative policy, these policies' timing and triggers, the relationship of Plan A to Plan B, how allied relationships might be impacted by these policies, Plan B objectives and ingredients, a qualitative cost/benefit analysis of these options, operational challenges of US and allied military options, and potential Iranian strategic reactions.

Case Study Findings

The following section summarizes the findings of three case study categories including Iranian foreign policy, historical coercive strategies to disarm or compel opponents to change their strategic behavior, and the US strategic adjustment to China's development of nuclear weapons in the 1960s. Appendix A includes more extensive background and analysis of these cases.

Case 1: Iranian Foreign Policy
Because Iran's situation is unique, it is important to derive several key lessons from Iran's foreign policy since 1979 with a particular emphasis on Iranian terrorism, the Iran-Iraq War, and Iran's nuclear program.

Key Lessons
One can draw three conclusions from Iranian foreign policy over the past three decades. First, the Iranians are determined to develop nuclear capability independent of whatever regime is in power. While a future regime might not pursue nuclear weapons, it will continue to pursue a full nuclear fuel cycle to reduce its dependency on foreign energy. Second, Iran has access to a sophisticated and international terror apparatus that consists of strong ties to Hezbollah and HAMAS and loose ties to other terrorist groups like al-Qaeda. Any US coercive action must contend with the eventuality that it will provoke the Iranians to unleash these unconventional forces against the US and allied homelands. Third, a US coercive policy against Iran requires that the US and its allies consider all options – even a full scale military invasion once the US decides to commit itself to this policy. Once threatened, Iran can be a shrewd and determined foe that will continue to fight even under conditions in which its enemy has complete air superiority as Iraq did during the Iran-Iraq War. Furthermore, the last time the US sent ground troops into Iran, the US was unprepared for any option other than a rescue attempt and thus failed to respond effectively against Iranian aggression. Such failure to act would be unacceptable in a future coercive Iranian policy.

Case 2: Coercive Options – Osirak, North Korea, Kosovo and Others
Because this PAE is examining a coercive policy to roll back Iran's nuclear program, it is instructive to examine past cases of points in history in which decision-makers had to decide under what conditions to apply coercion. This case study focused on the operational challenges inherent in striking a nation's nuclear program by examining the Israeli military operation against Iraq's nuclear program and the US's plan to eliminate North Korea's nuclear program. It also examined similar military operations like the Kosovo bombing campaign and the US quarantine of Cuba in the Cuban Missile Crisis.

Key Lessons
Several key lessons underscore these four coercive cases that inform future coercive policy in Iran. The first lesson is that in precision operations in which one is targeting an opponent's nascent nuclear capability, intelligence must be near perfect. In the Osirak raid the Israelis acquired near perfect intelligence on the Iraqi reactor through clandestine operations and satellite observation. As such, they proceeded with a strike on the reactor. In the Cuban Missile Crisis, the key decision-makers sensed that their intelligence had gaps and chose not to strike. The Iranian situation has this inherent risk as it is highly probable that US intelligence will not locate every Iranian nuclear site. A second key lesson is that crises like these four cases involve the risk of an escalation spiral. In Kosovo, NATO counted on a pure air and missile campaign and ended up preparing for a 175,000 troop invasion of Kosovo. Likewise, the Kennedy Administration chose not to do a precision strike on Cuba because it sensed that this initial small operation would expand as the Air Force and Navy sought to eliminate Cuba and Soviet air defenses in an ever increasing target list. Similarly, the US ultimately did not execute a precision strike against North Korea because of the high probability of military escalation against Seoul. US planners in any Iranian scenario should heed these historical precedents. A third key lesson is that in three out of four of these operations, the strategic or extrinsic consequences of these operations outweighed the operation's inherent

or intrinsic risk. For instance, the US could execute a precision strike against the Yongbyon reactor with cruise missiles at minimal losses to US forces. However the consequence of the North Koreans initiating an invasion of South Korea was too much of a risk for US forces to assume. The fourth lesson is that fighting with allies brings a great deal of legitimacy along with enhanced military inefficiency. The Kosovo campaign is a clear model of this fact as General Clark struggled throughout the crisis to get target lists approved by NATO governments. If the US intends to pursue a policy of coercion against Iran with a strong NATO coalition, it must sacrifice military expediency for political legitimacy.

Case 3: US Strategic Adjustment to China's Nascent Nuclear Weapons Program

Because this PAE is also examining the alternative policy of strategic adjustment, it is useful to examine a historical situation in which the US decided to adjust to Chinese possession of a nuclear weapons program. When China developed its nuclear program in the early 1960s, the US considered eliminating it, but decided against it. This case study focused on this strategic adjustment.

Key Lessons

There are two key lessons from this case that one can apply to the Iranian case. First, extending a nuclear umbrella to one nation is expensive, especially if one's enemies can target the country extending the nuclear umbrella with nuclear weapons. The more nations to which a country extends a nuclear umbrella, the less credible the guarantee is. Fortunately, in the Iranian case, if Iran acquires nuclear weapons before the US can preempt them, it will still be a decade or so away from possessing a ballistic missile that can reach the continental US. Hence, a nuclear umbrella would be credible in the Iranian case so long as Iranian missile systems are incapable of reaching American cities. Second, adjusting to a nuclear proliferator has a cost – the emergence of more proliferators. While in the intervening years, the US was successful at slowing down this process, it was unable to stem the increase in the number of nuclear nations surrounding China like India, Pakistan, and North Korea.

Policy Option 1: Coercion

This policy option represents the point at which the US government is no longer considering a diplomatic agreement with Iran and decides to rollback Iran's nuclear program. Clifford Kupchan, a private consultant at the Eurasia Group has concluded that "containment is not an option" and that in less than 18 months "there is going to be a war" in Iran.[24] Coercion's objective is rolling back Iran's nuclear program.

Strategic Outlook

After the February 4, 2006 IAEA vote to refer the Iranians to the UNSC, the US and its allies appear to be moving closer to coercive path. In a coercive scenario, the US and its allies will have concluded that diplomacy with Iran is failing and Iran's production of a nuclear device is less than two years away.

Timing and Triggers: A Strategy for Transition from Plan A to Plan B

The transition from Plan A to Plan B would begin with a UNSC resolution requiring Iran to submit to compulsory inspections and to suspend uranium enrichment activity under Chapter 7 of the UN charter. This development is probably three to four months away and is the first trigger for a coercive option. Before the US reaches this point, it faces two preliminary hurdles. First, it must convince the UNSC to issue a president's statement rebuking Iran for failure to comply with the IAEA. Second, it must convince key UNSC members like Russia and China to support this binding UNSC resolution. If after these four months, the US is unable to secure this resolution, it should ask the UNSC to issue a nonbinding resolution that condemns Iran to keep the process going and to prepare the UNSC for a later binding resolution. If the US fails to get a binding UNSC resolution within one year, UN diplomacy has failed and the US should encourage NATO to execute political and economic sanctions. If the US gains a binding resolution, it should encourage the UN to execute political and economic sanctions immediately to signal to Iran that the only way out of the crisis is to accept the legitimate Russia's enrichment proposal. This communication provides Iran with a way out of the crisis and thereby increases the legitimacy of the US proposal. The US should also push the UNSC to include triggers in the resolution that grant the UN authority for military action if Iran begins large-scale uranium enrichment, expels IAEA inspectors, and/or unilaterally withdraws from the NPT. While Russia and China are unlikely to accept this contingent clause, the US should still push for as much clarity as possible in the resolution so that the international community knows what the triggers are and when Iran violates them. The final red line is the one that separates political and economic sanctions from military action. If Iran begins large-scale uranium enrichment, expels IAEA inspectors, unilaterally withdraws from the NPT, and/or is within one month of producing an atomic weapon, NATO or the UN should execute a precision strike for reasons outlined in the remainder of this section. The US will fail if it does not convince the UN or NATO to begin a sanctions regime within one year. Unfortunately, the loss of US credibility over Iraq will make the cost of unilateral action against Iran outweigh the benefits. Unilateral action is not an option.

Plan A and Plan B Must Proceed in Parallel, Be Mutually Reinforcing, Focus Solely on Iran's Nuclear Program, and Have Firm Commitments from US-EU Partners for Coercive Action

Plan B is the shadow of Plan A. A good coercive policy must have a ratcheting component for psychological reasons. What one can potentially do to one's enemy is always worse than what one has already been done. It is also critical that diplomacy proceed in parallel to allow both sides to deescalate an impending crisis, but it should also be clear to Iran which phase of the process it is in as the section above on triggers described. This dialogue, of course, has implicit costs. As the Kosovo case demonstrated, a shrewd negotiator can use diplomacy to schedule bombing halts so that he can regroup his forces. Any policy against Iran would require careful coordination between the two plans. Furthermore, the further one goes down the Plan B path, the less flexibility one has to pursue Plan Policymakers could reach a

[24] Clifford Kupchan, telephone interview, 5 January 2006.

point of no return if they venture too far along Plan B. For instance, embarking on regime change would end all possibility of dialogue between the US and Iran. To prevent both sides from reaching this point, the US and its European allies must frame the issue as a problem with Iran's nuclear program. The ends and means of any coercive policy must be limited to Iran's nuclear program for the US to maintain international and domestic political support. It must not send a muddled message with references to concern over the Iranian regime's support for terrorism. The signal must be clear and unambiguous to Iran: the US and EU will stop applying pressure to Iran once its nuclear enrichment program no longer exists either by Iran's cooperation or through force. For Plans A and B to be effective, both the US and the EU must be ready at the outset to use coercion against Iran if diplomacy fails. The Iranians do not believe that the Europeans have the will to push this crisis far enough to impose economic sanctions let alone support a preemptive strike against Iran's nuclear infrastructure. Before the US pursues this course of action, it is vital that it secure firm political, economic, and military commitments from the Europeans to support and to participate fully in all phases of Plan B as a requirement for the US's full and exhaustive support of Plan A. Furthermore, this commitment should include an explicit time component that determines the "tipping point" of when Plan A will irrevocably shift to Plan B.

Allies

A key consideration in determining a coercive policy against Iran is how the US's allies will view different options and how these allies can support US efforts. This section will include a discussion of how US allies and other nations are likely to view a coercive US policy against Iran, what actions the US would require from each of its regional allies, and what the US can offer them for their cooperation.

EU-3/EU/Japan Cooperation is Necessary Condition for Successful Coercion

EU and Japan Must Balance Energy Concerns with Desire to Halt Iranian Proliferation

Most EU members and the Japanese would prefer that the diplomatic path run its course before they consider more coercive options. However, the Europeans are beginning to view a more coercive response as a possibility after Iran removed IAEA seals from its Natanz facility on January 10, 2006. However, there are three key concerns that the EU might have with a coercive response. First, EU countries and Japan will be concerned about the economic impact of a coercive policy – more specifically how it will affect the price of oil. Second, EU countries must contend with the response of their domestic populations to a coercive policy's economic impact and the concerns of their huge Muslim populations. For instance, France has a population of between 5 to 6 million Muslims or nearly 10% of its population. As France discovered in the Paris riots of 2005, some of these Muslims have been radicalized by events like the September 11th attacks, the Iraqi War, the ban on headscarves in French state schools, and high unemployment among the Muslim population.[25] Angela Merkel's ascension in Germany and France's convergence toward the US's position on Iran's behavior with France's recent threats to use nuclear weapons against rogue regimes that use WMD and terrorism against France make it increasingly likely that the EU will support some level of political and economic sanctions. However, due to the intelligence fiasco in Iraq, the high uncertainty of a military campaign, and the impact on oil prices, it is unlikely that the US will convince the Europeans to support any military action in the next twelve months.

US Requires EU/Japanese Diplomatic and Financial Support

The EU and Japan would be most helpful to the US by allowing Plan A to run its course, supporting Plan B when Plan A fails, and imposing economic sanctions on Iran once the US puts Plan B into action. As mentioned above, the US must get both the EU and Japanese to sign up for the full gamut of coercive actions *a priori* to the US supporting their efforts to fully pursue Plan A. While contributing NATO military assets to any US military operation would be ideal, it is unlikely that EU politicians can convince

[25] "France's Failure: Of Riots and Failure," *The Economist* 377 (12 November 2005): via Factiva [online: web], cited 22 January 2006, URL: http://global.factiva.com/ha/default.aspx.

their populations to support a jingoistic policy. However, the Europeans and the Japanese may be open to help finance military action against Iran should the US and EU jointly deem such action necessary.

Inducements the US Can Offer for Cooperation
The US can offer several inducements. First, the US can continue to support the EU's leadership role in current diplomacy with Iran. This tactic has always been a smart move for the US because it allows US EU partners to see for themselves that Iran is not negotiating in good faith. Second, the US can work with its EU and Japanese allies to build up their petroleum reserves to protect them from an oil shock that any future crisis might cause. Third, the US can cooperate on a number of unrelated issues that the EU and Japan value highly. Cooperation may include reducing barriers to free trade with Europe like reducing or eliminating US steel tariffs. It might also include support for global initiatives like certain components of the Kyoto Accords and more US cooperation with the International Criminal Court. Either way, the US must give up something to accomplish the greater goal of countering Iranian proliferation.

Turkey's Tacit Cooperation via Military Action is Necessary Condition for Coercion
Turkish Government Supports Iranian Coercion, Turkish Population Does Not
On the one hand, the Turkish military, which holds the real power in Ankara, supports military action against Iran because of its adversarial relationship with the Turks and the threat of its nuclear program. On the other hand, the Turkish people and, by extension, Turkish politicians would be reluctant to support an attack on another Muslim nation, especially in light of the Iraq War.

US Must Secure Turkish Intelligence Cooperation and Military Basing Rights for NATO
Turkey's cooperation will be necessary in any US-led NATO military action against Iran. Turkish intelligence and basing rights would be key for NATO allies to conduct air strikes or ground attacks into Iran. Without Turkey, the US loses a key window to Iran and political credibility in its case against Iran.

EU Membership, Military Cooperation and Capital Necessary for Turkish Cooperation
The most attractive "carrot" that the US can offer belongs to the EU. The promise of EU membership for Turkey's support against Iran is an attractive inducement for the Turkish government and its people. This promise would almost assuredly bring Turkey on board. The problem is convincing the EU that they should offer this "carrot" to Turkey. It would also be impossible politically for the EU to overtly declare a *quid pro quo* for Turkish support against Iran. The US would need to structure this deal in a manner that both the Turks and EU agreed upon. This deal, however, is beyond the scope of this paper. Sufficed it to say, such a deal would go a long way in bringing the Turks on board. The US might also offer the Turks increased access to its arms market and US capital to further cement Turkey to the US and NATO.

Russia Must Not Impede US Effort
Russian Nuclear Ambitions Conflict with US Effort against Iran
Iran's January 10th removal of IAEA seals on its pilot uranium enrichment plant in Natanz may have inclined Russia to listen more carefully to US calls for UNSC action, but Russia continues to demure on this issue for three reasons. First, the Russians are very sensitive about preserving their nuclear industry. The Russians consider their nuclear industry to be strategic and will help the Iranians pursue nuclear technology if it helps keep this vital industry afloat. Second, the Russians do not believe that Iran is a real threat. Finally, political prestige is at stake for Russia. The Security Council is the last place in the world where Russia can challenge and even defeat the US. As ridiculous as this notion might appear, Russia takes immense pride in how it wields its veto power against the US and is willing to use it if it deems the US is pursuing an aggressive policy toward Iran.[26] As such, the Russians are currently leery of any coercive option. To neutralize the Russians into abstaining in a future Security Council resolution that

[26] Henry Wooster, personal interview, Washington, D.C., 10 January 2006.

demands some form of sanctions, the US must continue bilateral talks with the Russians over the next several months and share intelligence about Iran's program with the Russians to keep them informed.

US Must Secure Russian Diplomatic Cooperation for Coercive Iranian Policy
While Russia could bolster a US-led effort to put pressure on Iran, it is unlikely that it will cooperate in this manner. The most that the US can expect from Russia and the minimum the US needs from Russia is diplomatic cooperation. Russia could be useful if it either supported or abstained from any UNSC resolutions against Iran. Russia's withdrawal of its technicians from Bushehr would also be necessary should the US ultimately attack that facility. The US would also call on Russia to restrict its nuclear cooperation with Iran if the situation escalates. As one of Iran's two major weapons suppliers, it would also be incumbent upon Moscow to restrict arms sales to Iran, though this is unlikely at this point in time.

US Must Support Russian Nuclear Industry Survival to Guarantee Russian Cooperation
Russian cooperation would require the US to make guarantees to help shore up Russia's nuclear industry by encouraging further cooperation between the US and Russian nuclear industry. The US should also use US-Russian cooperative initiatives in conventional, counterterrorism and missile defense as carrots to ensure alignment against Iranian proliferation. The US and other G-8 members might also condition Russia's continued participation in the G-8 on its cooperation in rolling back Iranian nuclear proliferation.

China Must Not Impede US Effort
China's Economic Interests Conflict with US Objectives
On December 17, 2005, the Chinese sent a delegation to Iran to negotiate a major oil and gas export deal worth $100 billion for the sale of 250 million tons of liquefied natural gas (LNG) over a period of 25 years at a time when it was clear that Iran faced a good chance of being referred to the UN Security Council.[27] China sees the tremendous geopolitical significance of the Middle East and cares first and foremost about securing access to oil and gas in the region, especially in Iran. The Chinese also have a highly profitable arms trade with the Iranians ranging from cruise missiles to illicit nuclear technology.[28] As such, an aggressive US stance against Iran's nuclear program is not in China's strategic interest.

US Must Convince China to Abstain from Political Interference in US Iran Policy
Like the Russians, the Chinese are unlikely to assist in coercive efforts. However, the US would need them to support or abstain from any diplomatic and economic actions against the Iranian regime. With China's recent economic ties to Iran, it will be difficult to guarantee Chinese cooperation or neutrality. Most likely, the US and its NATO allies might be required to act despite Chinese reservations.

US Must Trade Some Strategic Interests in the Pacific for Chinese Cooperation
Any coercive actions on the US's part that venture into the military sphere would require significant coordination with and cajoling of the Chinese. The US might make some concessions regarding military arms sales to Taiwan or recognition of some Chinese claims in the Spratley Islands among other options.

Israel Must Exercise Restraint
Israelis Strongly Support Coercive Iranian Policy
The Israelis favor a much more aggressive response than the US currently seems to be contemplating. The key for US policy is to prevent the Israelis from acting before the US prepares the political, economic and military battlefields for future military operations against Iran. If Israel were to act unilaterally before the

[27] "China Bids to Revive Mega Iran Energy Deal," *Agence France Presse*, 17 December 2005, via Factiva [online: web], cited 30 January 2006, URL: http://global.factiva.com/ha/default.aspx.
[28] Richard L. Russell, *Weapons Proliferation and War in the Greater Middle East: Strategic Contest*, (New York: Routledge, 2005), 122, 128.

US embarks on a multilateral solution, the US will be left to deal with the regional consequences before it can fully leverage the resources necessary to counter these threats.

US Requires Israeli to Exercise Military Restraint
It is unlikely that the US would want Israel to act as its proxy in a military air strike. Until the military option becomes necessary, it would be useful for the Israelis to remain off the radar screen during the political and economic showdown. A conspicuously combative Israel would thwart US regional efforts to get tacit support from its Arab allies. By drawing attention to itself, Israel would only complicate the situation for the US by encouraging Iran to criticize Israel's own nuclear proliferation. However, the Israeli Mossad has one of the best and most capable human intelligence networks in the world. Extensive intelligence sharing between the US and Israel would be critical in maximizing intelligence accuracy.

US Must Offer Israelis Security Guarantees against Iranian Retaliation
The Israelis would require guarantees from the US that the US protect Israeli civilians from Iranian ballistic missile retaliation. Much like the first Gulf War in which the Israelis threatened to enter the war if the US did not allocate resources to destroy mobile SCUD launchers in Iraq, the US will similarly have to provide assurances to the Israelis that it would mitigate the likelihood for such strikes. Otherwise, the US is doing the Israelis a favor and it should not take any other Israeli demands seriously.

Egypt Must Help Agitate Arab World against Iran
Egypt Skeptical of Coercive Iranian Policy
While Egypt's leaders view a strike on Iran's nuclear complex favorably, it would not play well among the Egyptian population. They also view the US focus on Iran as a double standard given Israel's possession of nuclear weapons.

US Needs Egyptian Informal Political Support
Egyptian support for a US-led coercive response against Iran would have to be political. While an "Arab coalition of the willing" led by Egypt would be a diplomatic coup for the US, it would be impossible for the Egyptian leadership to convince its people that attacking another Muslim state is in Egypt's interests. Politically, the US would ask Egypt to support independent organizations like the Arab League and the Organization for the Islamic Conference (OIC) in denouncing Iran's nuclear ambitions. These efforts would help mobilize the Muslim community against Iran and add increased legitimacy to US efforts.

US Access to Foreign Aid, Arms, and Training Is Critical for Egyptian Cooperation
Positive inducements would include US security guarantees and increased access to US military training and arms. For a negative inducement to influence Egypt, the US could reduce foreign aid. Since 1975, US economic assistance to Egypt through the US Agency for International Development (USAID) has totaled nearly $26 billion[29] and the US had budgeted $495 million for Egypt in 2006 for infrastructure, environmental and natural resources management, improved basic education, job creation, health care, and democracy and governance.[30] Disruption of these funds would compel Egypt to support US efforts.

Iraq Must Continue to Support Coalition Presence in Iraq
Iraq Exposes Itself to Significant Risk by Supporting US Coercive Iranian Policy
Because Iraq's government is predominantly Shia, any military coercive action against Iran would disrupt the ongoing political process in Iraq. As of December 29, 2005, Iraqi security forces numbered more than

[29] U.S. Agency for International Development, "Asia and the Near East: Egypt," [online: website], updated 30 June 2005, cited 16 January 2006, para 1, URL: http://www.usaid.gov/locations/asia_near_east/countries/egypt/.
[30] U.S. Agency for International Development, "Budget: Egypt," [online: website], updated 14 June 2005, cited 16 January 2006, para 1, URL: http://www.usaid.gov/policy/budget/cbj2006/ane/eg.html

223,000.[31] If the US conducted military operations from Iraq and Iran retaliated, this number would be insufficient for Iraq to defend itself independently. Many of these units are also still incapable of independently conducting military operations. Furthermore, the Iraqi military's loyalty is not necessarily to US forces and some elements in the Iraqi military might cooperate with Iran by providing intelligence on US military plans and locations in Iraq to Iran. Another complication is that the Iraqi Government has the authority to ask Coalition forces to leave Iraq. If Iraq were to do so, the US would have to cede control of Iraq to Iranian influence, which would be a decisive political victory for the Iranians. Another consideration is Iraqis' lingering memory for the devastating Iran-Iraq War. On the one hand, this may increase Iraqi support against the Iranians because of the Iraqis' hatred for Iran. On the other hand, the memories of this long war and its devastating effects on Iraq might give Iraqis pause to support any future military action against the Iranian regime conducted from Iraqi territory. Finally, the Iraqis are in the midst of fighting an insurgency and rebuilding their country. The last thing they want is another war.

US Requires Iraq to Support Continued Coalition Presence in Iraq
First, the US would require Iraq's support for a continued US presence in Iraq during any Iranian conflict. Second, US forces would need Iraq to increase its own share of its security burden to free US resources. Third, the US would need Iraq to help mobilize Arab governments and populations against Iran.

US Can Leverage Military Presence, Investment Capital and Technology to Ensure Iraqi Cooperation
The US can use both positive and negative inducements to ensure Iraqi cooperation. On the positive side, the US can continue to offer Iraq access to foreign capital for reconstruction. The US can also leverage its budding military relationship with Iraq to guarantee access to US military training and weapons. Third, the insurgency continues to align the Iraqi government's interests with US regional interests. While Iran might help defeat an Iraqi insurgency if Iraq asks coalition forces to withdrawal, Iran does not have the same scale of military resources and expertise that the US military already has in the region. The infant Iraqi government owes a great deal to the US and requires the US's continued support for its survival. Fourth, US industry can leverage its advanced oil sector technology to encourage Iraqi cooperation. Negative inducements include restricting capital to Iraq and access to Western technology. The US can also exploit divisions amongst the Kurds, the Shia, and the Sunni to encourage Iraqi cooperation.

Gulf Cooperation Council (GCC) States Are Critical Players in US Effort
The six GCC states of Saudi Arabia, the United Arab Emirates, Bahrain, Oman, Qatar, and Kuwait[32] must support US coercive pressures for this option to work.

GCC States Support US Action against Iran Privately and Denounce It Publicly
Privately, GCC leaders view a coercive response to Iranian nuclear proliferation as a positive step. For them, Iran's meddling in their affairs in the past and their fear of an aggressive Iranian neighbor have been key drivers in their massive arms expenditures over the past two decades. However, many of these countries have significant Shia minorities who are disenfranchised and maltreated by their Sunni majorities. Many GCC leaders rightly fear that the Iranians might exploit these tensions through terrorism, unrest, and/or revolution, should these states support US and allied action against Iran.

GCC Must Guarantee Energy Stability and Continued Basing Rights for Allied Forces
In any coercive scenario, the GCC states will be instrumental in guaranteeing worldwide energy stability. The Saudis will need to use their influence in the Organization of Petroleum Exporting Countries (OPEC)

[31] Brigadier General C.D. Alston, "Ongoing Security Operations in Iraq," Special Defense Department Briefing, [online: web], updated 29 December 2005, cited 8 February 2005, para 4, URL: http://www.mnf-iraq.com/Transcripts/051229.htm.
[32] Cooperation Council for the Arab States of the Gulf Secretariat General, "Introduction: The Concepts and Foundations," [online: website], cited 14 January 2006, para 1, URL: http://www.gcc-sg.org/Foundations.html.

to ensure that oil prices remain stable during a crisis and block any Iranian moves to inspire other OPEC member states to defect and raise oil prices. The US will also need these countries to provide military basing rights to its armed forces and may even require their participation in military action against Iran.

US Must Guarantee Security and Freedom of Commerce to Secure GCC Cooperation
The fate of the GCC States is tied to the success or failure of US efforts in the region. There are a number of key guarantees that the US must make to these states that are nonnegotiable and necessary conditions for GCC cooperation. First, the US must make security guarantees to these states – namely, to defend them against Iranian internal and external aggression. Second, the US must guarantee the GCC freedom of commerce through the Strait of Hormuz by either actively patrolling the Strait, re-flagging GCC vessels as US vessels to protect them from Iranian interdiction, or both.

Political, Economic, and Military Options/Tools
Before outlining a concrete coercive strategy, it is critical that one examines the political and economics tools and military options that the US and its allies have available to pressure Iran. This section will outline the generic policy tools available to the US.

Political Tools
To pressure Iran, there are a number of political tools that the US can employ. These tools include legal, diplomatic and domestic political actions that the US can employ both unilaterally and multilaterally.[33]

Legal
The US can pursue a number of legal actions against Iranian leaders to include imposing travel restrictions, freezing their assets and/or those of pro-regime groups, and putting them on watch lists. Multilaterally, the US can encourage other countries to pursue legal actions against Iranian leaders by indicting them for terrorism, among other charges. The US might also encourage the international community to pursue certain Iranian leaders through the apparatus of the International Criminal Court.

Diplomatic
The US can pursue a number of unilateral diplomatic actions to isolate a country like closing its embassy and putting a country on its state sponsor of terrorism list. Unfortunately, the US has used just about every diplomatic tool in its arsenal to isolate Iran over the past three decades. However, the US can also work multilaterally to impose diplomatic restrictions on Iran by denying it access to organizations that Iran wants to join and by working to expel Iran from organizations of which it is currently a member. These organizations include the Arab Bank for Economic Development in Africa (ABEDA), CP, ECO, FAO, G-15, G-24, G-77, IAEA, the International Bank for Reconstruction and Development (IBRD), the International Civil Aviation Organization (ICAO), ICC, ICCt (signatory), ICRM, IDA, IDB, IFAD, IFC, IFRCS, IHO, ILO, IMF, IMO, Interpol, IOC, IOM, ISO, ITU, MIGA, NAM, OIC, OPCW, OPEC, PCA, SCO (observer), UN, UNCTAD, the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations High Commissioner for Refugees (UNHCR), United National Industrial Development Organization (UNIDO), the United Nations Mission in Ethiopia and Eritrea (UNMEE), UPU, WCL, WCO, WFTU, the World Health Organization (WHO), WIPO, WMO, WToO, and observer status in the WTO.[34]

Domestic Political
The US can pursue a number of unilateral options to influence domestic politics in Iran. First, it can pursue public diplomacy through Voice of America (VOA) and other affiliated organizations to influence

[33] Adapted from Xenia Dormandy, personal interview, Cambridge, MA, 3 January 2006.
[34] Central Intelligence Agency, "Iran," *The World Factbook*, [online: web], updated 10 January 2006, cited 28 January 2006, URL: http://www.odci.gov/cia/publications/factbook/print/iz.html.

Iranian public opinion and to isolate the Iranian regime from its people. It can also support dissident groups throughout Iran ranging from active pro-reform student groups like the Organization for Strengthening Unity to opposition groups like the Freedom Movement of Iran, the National Front, Marz-e Por Gohar, and various Monarchist and ethnic organizations.[35]

Multilaterally, the US can encourage third-party and independent organizations to isolate the Iranian leadership from its population. For instance, the US might encourage Muslim leaders to issue *fatwas* against the Iranian regime and al Jazeera to question Iranian motives. Both would serve to influence Iranian public opinion in a manner unfavorable to the Iranian regime.

Economic Tools

In addition to various unilateral and multilateral political tools, the US can also influence and isolate the Iranian regime through an array of unilateral and multilateral economic tools. These tools include trade, financing and remittances that can be employed both unilaterally and multilaterally.[36]

The US has also already employed most of its unilateral economic tools against Iran. One effective economic tool is restricting US trade to a particular country. The Iran and Libya Sanctions Act (ILSA) has effectively cut off most trade with Iran and also prevents companies that do business with Iran from conducting business with the United States. The only areas that the US has not barred trade with Iran are for humanitarian goods like food. However, the US can also convince its allies to pursue trade sanctions against Iran by either refusing to buy Iranian exports, denying the Iranians imports, or both.

A second means of pursuing economic sanctions involves blocking financing. The US can block financing directly by barring bank transactions in the US unilaterally and seizing bank accounts, or it can convince other countries multilaterally to stop providing foreign direct investment in a target country and work through international institutions like the World Bank and the International Monetary Fund (IMF) to deny or to recall loans that a target country might need to support internal capital investment.

A third economic tool is to target remittances or payments from target country nationals in one country back to their home of origin. The US could pursue a policy of preventing remittances unilaterally or encouraging its allies to do the same in a multilateral approach. Since stopping remittances directly targets the population of a given country, this author recommends that this tool not be exploited in the Iranian case because the target is the Iranian regime and not the Iranian people.

Military Options

Any political and economic coercive measures to roll back Iran's nuclear program are inadequate without the threat of military force. US and allied military options against Iran range from a precision strike of Iran's nuclear facilities to a full-scale ground invasion. This analysis will study the three most realistic military options including a US or Israeli precision strike, a modified "Kosovo" comprehensive bombing campaign, and a limited land incursion to seize the oil rich province of Khuzestan.

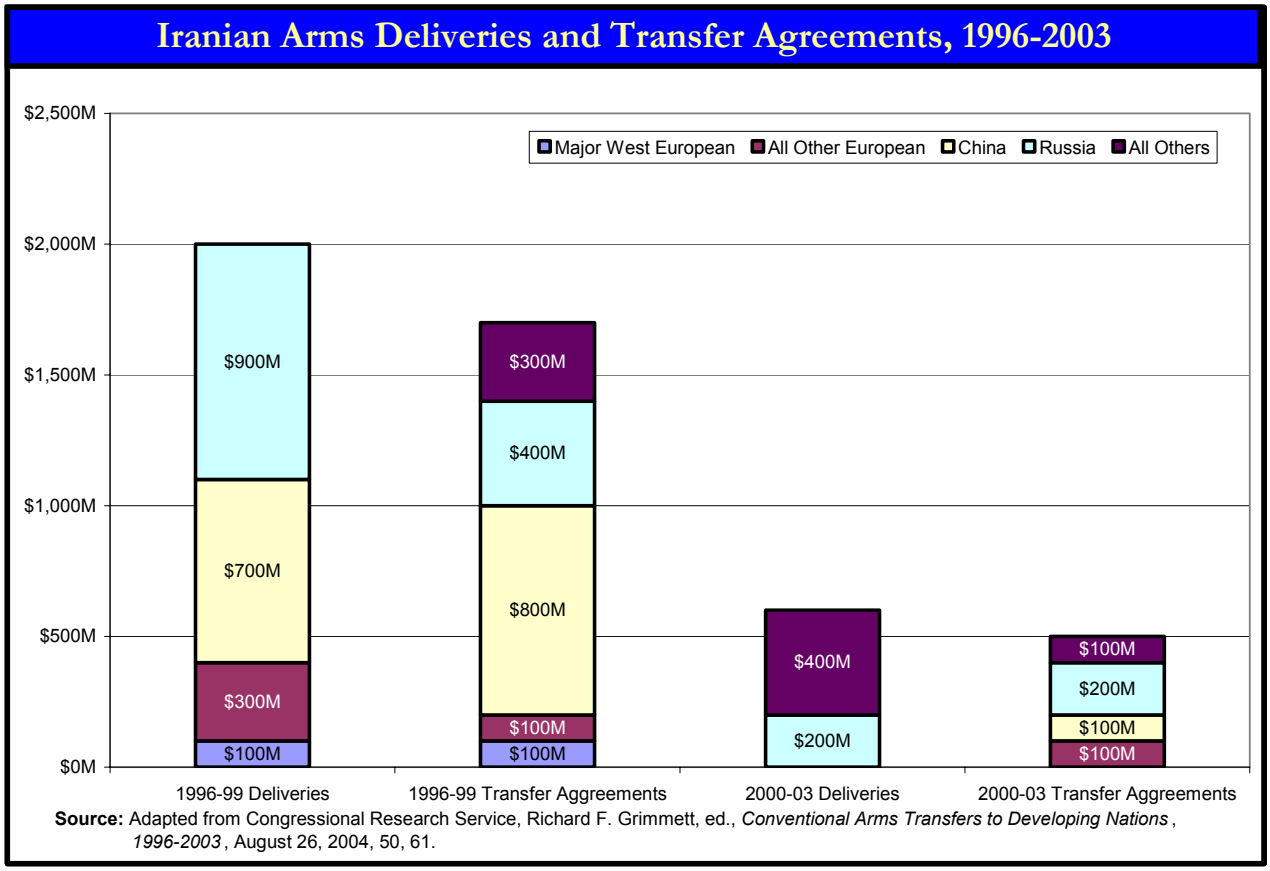
Ground Invasion

A full-scale military effort to liberate Iran would be a colossal effort requiring hundreds of thousands of troops and a full mobilization of the US military. With an estimated population of 69.7 million and a land area of 1.636 million square kilometers, Iran has 2.4 times the population of Iraq and 3.8 times as much land area.[37] The terrain is also rugged throughout Iran, making it difficult for US forces to move quickly

[35] Ibid.
[36] Adapted from Dormandy, op. cit.
[37] The Economist Intelligence Unit, *Country Report December 2005: Iran*, (London: The Economist Intelligence Unit, 2005), 5; The Economist Intelligence Unit, *Country Report December 2005: Iraq*, (London: The Economist

through Iran's interior. Iran has a "rugged, mountainous rim," a "central basin" with deserts and mountains, and "small, discontinuous plains along both coasts."[38]

US invasion forces would face an Iranian Army of 350,000 soldiers consisting of four armored and six infantry divisions, over 100,000 IRGC ground forces organized into up to 20 infantry divisions, an Army reserve of 350,000 ex-service volunteers, and 40,000 paramilitary border and security troops. The Iranians also have a Basij Resistance force of up to 1 million on mobilization and a total membership of 10 million that includes women and children. Iran's military also has over 1,613 Russian and US main battle tanks, 610 armored infantry fighting vehicles, 640 APCs, and over 8,196 artillery pieces. Iran's air force consists of about 281 US and Russian combat aircraft. Iran's navy has a relatively small fleet with three submarines, three frigates, and three corvettes and over 254 small craft. Much of this equipment is in poor condition due to US export restrictions on US military spare parts.[39] Iranian arms deliveries, transfer agreements and defense budget as a percentage of Iranian GDP indicate that Iran has been unable to acquire the military equipment necessary to match US conventional superiority (See graph below).

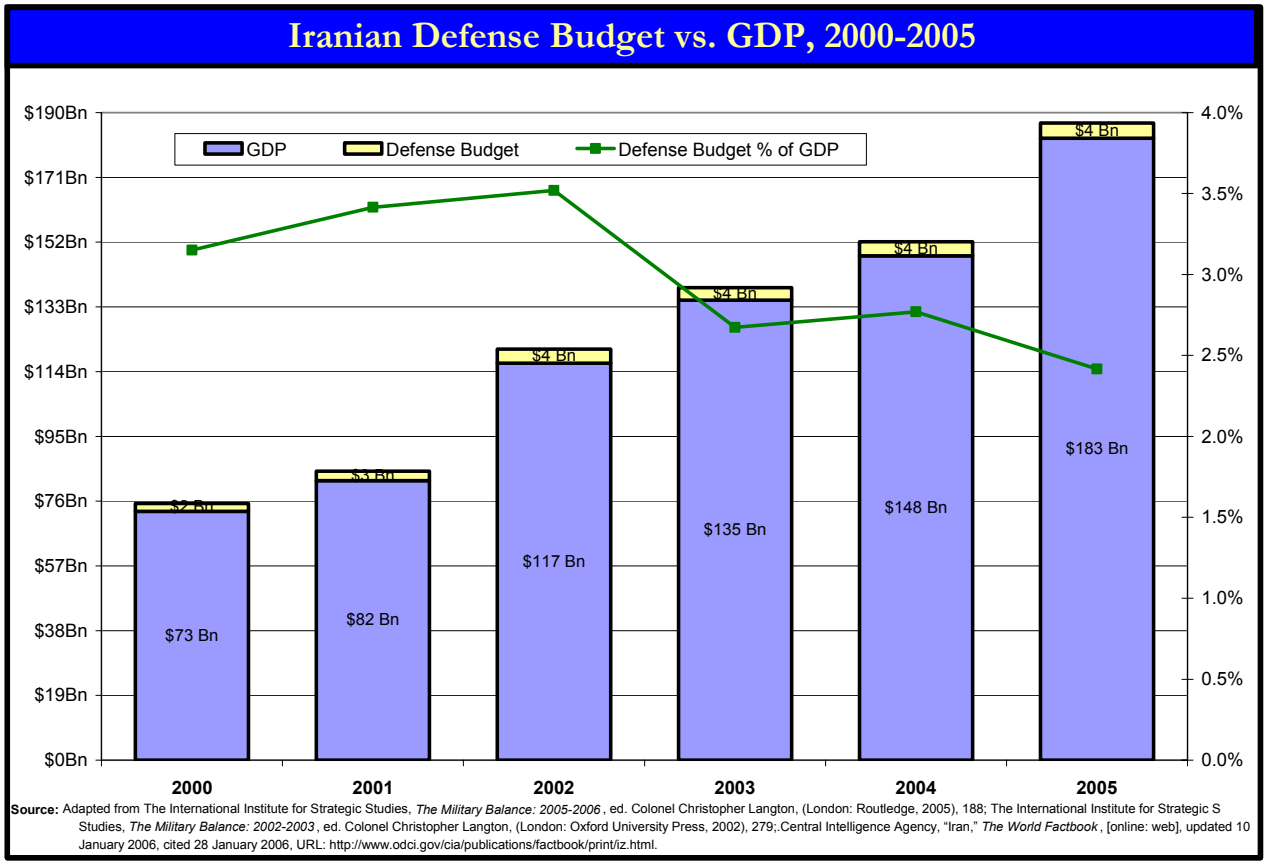


Additionally, Iran has been budgeting less on defense as a percentage of GDP over the last five years (See graph below).

Intelligence Unit, 2005), 5; Central Intelligence Agency, "Iran," op. cit.; Central Intelligence Agency, "Iraq," *The World Factbook*, [online: web], updated 10 January 2006, cited 28 January 2006, URL: http://www.odci.gov/cia/publications/factbook/print/iz.html.

[38] Central Intelligence Agency, "Iran," op. cit.

[39] The International Institute for Strategic Studies, op. cit., 188-191.



Given the state of US forces, the most pragmatic military invasion option would be a gambit to seize the oil rich province of Khuzestan, an area of approximately 9,800 square kilometers. This invasion would require participation of key US NATO allies like Britain, France and Germany. Without this additional manpower, it is hard to imagine the US going it alone militarily, economically, or politically. A limited ground campaign would include an invasion to seize key oil fields and political objectives in Khuzestan. The end state would be the liberation of the province's Arab majority and seizure of Iranian oil fields to cripple the Iranian leadership's ability to govern effectively.

Ground Invasion Advantages

A US ground invasion would damage Iran's economy and sow seeds of doubt about the current regime's capacity to sustain a war against the US and its allies. The US could also use the oil rich Khuzestan region as a bargaining chip to force Iran to cease its nuclear weapons program in exchange for a US withdrawal.

Ground Invasion Disadvantages

With only 492,728 active duty soldiers and 180,029 active duty Marines available as of September 30, 2005, any invasion of Iran would be one of vast scale and scope.[40] Not only would US forces have to seize and secure Khuzestan – which would be a relatively quick one to two week campaign – they would have to hold this territory indefinitely against hordes of Iranian volunteers, fanatics, and suicide bombers.

[40] Defense Manpower Data Center, Statistical Information Analysis Division, *Active Duty Military Personnel Strengths by Regional Area and By Country (309A)*, [online: web], updated 30 September 2005, cited 8 February 2006, URL: http://web1.whs.osd.mil/mmid/military/history/hst0905.pdf.

Another implication of pursuing this course of action is that the US would be unable to respond to another major theater war in Taiwan or the Korean Peninsula. This vulnerability would be apparent to the US's enemies and they might seek to exploit it while the US is embroiled in a conflict with Iran.

A ground invasion is likely to cost at least as much as the Iraqi War given Iran's size and population. Some estimates put the total cost of the Iraqi War at between $1 and $2 trillion.[41] The US must be willing to incur a cost at least as high as this amount before it crosses the Shatt al-Arab and into Iran.

Another detractor of a limited ground invasion would be the strain on US military personnel at a time when the force is stretched thin. "As of April 2005, Guard and Reserve personnel comprised 33%" of forces in Iraq, "21% in Afghanistan, and 45% in Djibouti."[42] The requirements of Operations Iraqi Freedom (OIF) and Enduring Freedom (OEF) have also taken their toll on the military. 32 of the Army's 33 combat brigades and 9 out of 10 of the Army's newly constituted modular Brigade Combat Teams have already been to Iraq or Afghanistan for at least a twelve month tour. Some units are on their second or third tours and some high demand specialty units on about to embark on a fourth. The Army National Guard has mobilized more than 95% of its combat battalions and all but one of its ten special forces units since 9/11. The Army Reserve has mobilized 60% of its personnel since 9/11 and only 16% remain eligible for mobilization in support of OIF/OEF under current authority. In the current rotation in Iraq, 20% of high demand specialties consist of soldiers from other military occupational specialties who the Army retrained to fill high demand billets. The Marine Corps is also under strain with its Marine Expeditionary Units (MEUs) serving two operational deployments per cycle instead of the usual one. All Marine Reserve combat units have also been deployed.[43]

The US military has also shown other symptoms of strain in addition to the 2,241 deaths and 7,659 wounded in action (WIA) who could not return to duty (RTD) in OIF and 255 deaths and 400 WIA who were non-RTD in OEF. [44] During 2005, the Army had difficulties with both recruitment and retention. At the end of fiscal year 2005, the Army was short 6,627 recruits from its annual goal of 80,000, while the Army Reserve and the National Guard were short by 16% and 20%, respectively. While the Army, Army National Guard, and Marine Corps are meeting their overall retention goals, there are other signs that this trend might reverse. For example, between 2001 and 2004, divorce rates for Army officers tripled and rates among the Army enlisted grew by 50%. The rate of domestic violence also increased during this period.[45] Another military adventure in Iran is sure to push the military to its breaking point unless the US does something now to increase the size of the US military prior to such an operation.

This operation would also increase the already high wear and tear on US military equipment. "High operational and training tempo is putting up to 5 years worth of wear on equipment per year, placing a huge demand on maintenance, supply, depot repair and production." Units have also faced high levels of combat-related damage and damage caused by the harsh desert environment of Iraq and Afghanistan.[46]

---

[41] Linda Bilmes and Joseph E. Stiglitz, "The Economic Costs of the Iraqi War: An Appraisal Three Years After the Beginning of the Conflict," *Kennedy School of Government Faculty Research Working Paper Series. RWP06-002*, January 2006, 30.

[42] General Richard B. Myers (Chairman, Joint Chiefs of Staff), "Testimony on FY06, Appropriations: Defense before the Senate Appropriations Committee, Subcommittee on Defense," (Date: 7 April 2005), Text from: Federal Document Clearing House Congressional Testimony, Available from: LexisNexis® Congressional; Accessed 16 January 2006.

[43] National Security Advisory Group II, *The US Military Under Strain and at Risk*, (Washington, D.C.: National Security Advisory Group II, 2006), 2-3.

[44] U.S. Department of Defense, *Casualty Reports*, [online: web], updated 27 January 2006, cited 28 January 2006, URL: http://www.defenselink.mil/news/casualty.pdf.

[45] National Security Advisory Group II, op. cit., 3-5.

[46] Myers, op. cit.

An invasion would also come at a time when the military is suffering ammunition shortages. "Combatant Commanders and Services continue to identify preferred munitions shortfalls as one of their areas of concern, including Laser Guided Bombs and Joint Direct Attack Munitions production." The Department of Defense (DOD) reduced gaps between requirements and available inventory in 2005 through supplemental funding to bolster JDAMs and Laser-Guided Bomb kits by 193% and 138%, respectively.[47]

US allies would also be unlikely to support a ground invasion in Iran, especially because of their energy needs. Getting international cooperation, let alone participation in a ground invasion, would be a bridge too far for US diplomacy unless Iran commits an egregious act in the next six months. Even if the US convinced its allies to support an invasion, the US could not sustain an international commitment over the long-term without the coalition sundering over disparate national interests.

A ground invasion also risks inciting the Iranians to increase their support of international terrorism against the US homeland and to foment a Shia insurgency in Iraq. Both actions would have significant impact on an American citizenry that is increasingly unwilling to fight for anything worth fighting.

Any invasion would also have to include plans for post conflict reconstruction and require a long-term US commitment to Iran. As the US learned in Iraq, a failure to plan for a conflict's aftermath can have a critical impact on the long-term duration of a conflict.

Another long-term military adventure in the Middle East would also garner little domestic political support. Even at a time when most Americans, with the exception of those in uniform and their families, are making little to no sacrifices for the war effort, most Americans oppose the war. In a January 22, 2006 CNN/USA Today/Gallup Poll, 51% of Americans surveyed believe that the United States made a mistake in sending troops to Iraq. It is unlikely that they will support a similar Iranian invasion any time soon.

US Precision Strike

A second military option is to launch or encourage an ally like Israel to launch a precision strike against key components of Iran's nuclear complex. This section will discuss both the American and Israeli options in detail. A US precision strike against the Iranian nuclear program would have the overriding objective of setting back Iran's nuclear program a number of years.

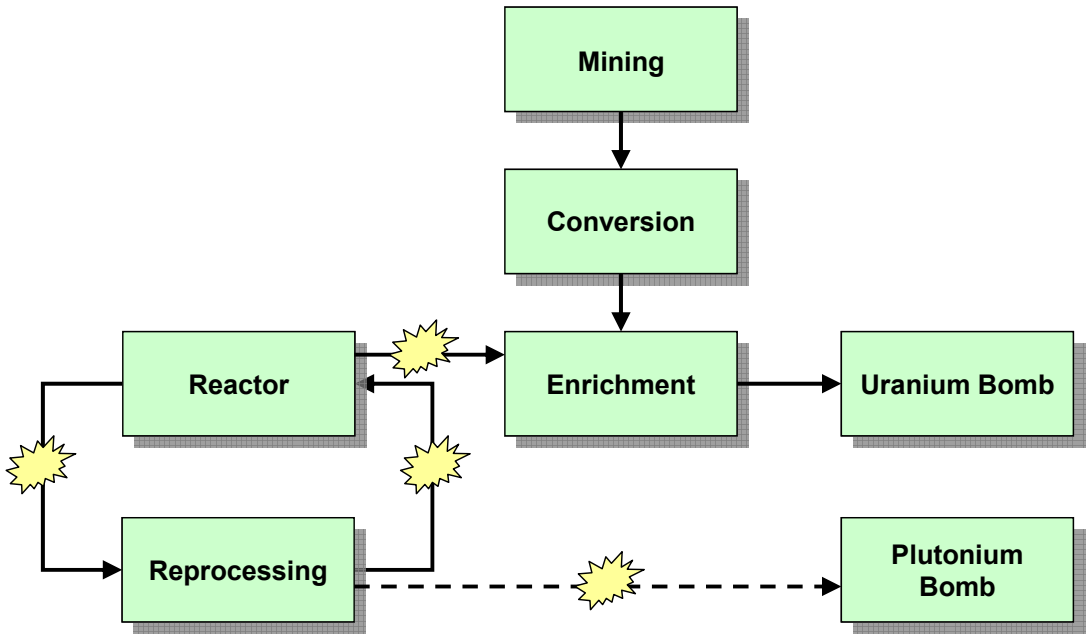
US Precision Strike Targets

A US precision bombing campaign would include three levels of targets. Level 1 targets would include uranium enrichment and reprocessing facilities. As demonstrated in the figure below, uranium enrichment facilities are a critical pathway in the nuclear fuel cycle for construction of a uranium bomb. Likewise, the reprocessing facilities are critical for production of a plutonium bomb. Destroying these facilities would set the Iranian program back several years. This target list would include the uranium enrichment facilities at Natanz, the heavy water plant at Arak which could be used to support a reactor producing weapons grade plutonium, and the enrichment plant that is being constructed in Esfahan, along with any other targets that include reprocessing facilities or uranium enrichment plants. US and allied forces could destroy these targets using cruise missiles with minimal risk to both US and Iranian lives and at accuracies approaching 100%.[48] If the US expanded its target list, level 2 targets would include nuclear and other WMD delivery systems like Shahab-3 and SCUD missile launch sites, as well as Iranian aviation units. These targets would be much more difficult to locate and would require some use of special operations forces to locate and track mobile SCUD launchers in the midst of the targeting process. Because manned aircraft would be involved to optimize time-critical targeting, initial targets would have

[47] Ibid.
[48] General Kevin Ryan, personal interview, Cambridge, MA, January 4, 2006.

to include the destruction of Iranian air defense systems.[49] Level 3 targets would include individuals, organizations, research centers, and nuclear scientists and employees. Attacking these targets would involve extensive use of special operations forces and manned aircraft and involve high risk to US forces.

Severing Links in the Nuclear Fuel Cycle



Source: Adapted from BBC News, "The Nuclear Fuel Cycle," [online: web], cited 4 February 2006, URL: http://news.bbc.co.uk/2/shared/spl/hi/sci_nat/05/nuclear_fuel/html/mining.stm

US Precision Strike Advantages

A precision strike would limit military objectives to level 1 targets. This option has several advantages. First, it is a low cost and low risk military operation. The US need only expend several hundred cruise missiles and five to ten 5,000 pound bunker buster bombs per hardened target dropped by high-flying B-2s to hit targets with near 100% accuracy, it could conduct operations at night when few Iranians would be present, and no US forces involved in the operation would be at risk during the operation.[50] A precision strike also allows the US to escalate or deescalate the crisis based on Iran's reaction.[51]

US Precision Strike Disadvantages.

A precision strike has several disadvantages. First, an attack on Iranian nuclear facilities risks producing nuclear fallout. However, as evidenced by US experience in OPLAN 5026, this is a risk that US and allied forces can mitigate by attacking targets in a manner that entombs the uranium. Second, there is a possibility that the strike might kill third party nationals. For instance, some "600 to 1,000 Russians are now working" on the Bushehr reactor[52] and reports on the Chalus facility indicate that it is staffed by

[49] Ibid.
[50] Captain Douglas Scott, personal interview, Cambridge, MA, February 10, 2006; General Kevin Ryan, personal interview, Cambridge, MA, January 4, 2006.
[51] Ryan, op. cit.
[52] Cordesman, *Iran's Developing Military Capabilities*, op. cit., 98.

experts from Russia, China and North Korea.[53] The US can mitigate this risk by attacking facilities at night and notifying foreign leaders before a strike. Third, Coalition forces might not successfully destroy all essential nuclear targets because they do not have precise intelligence about where they all are. If this event happens, the operation would fail as the Iranians would still have the capability to develop nuclear weapons in a short period of time. Fourth, Iran will still retain the capability to retaliate with other WMD if coalition forces only strike level 1 targets. This action would inevitably expose the US and its allied militaries and civilians to undue harm from Iranian SCUDs tipped with WMD. Fifth, a 100% successful precision strike would still fail if Iran acquired plutonium or HEU on the open market after the attack.

Israeli Precision Strike

Israel's 2005 $30 million purchase of 100 Guided Bomb Unit-28B (GBU-28B) laser-guided "bunker buster" bombs for use with its long-range fighter-bomber, the F-15I, signals that the Israelis are contemplating an attack on Iran's subterranean nuclear complex. 2004 orders of 5,000 Joint Direct Attack Munitions (JDAM) bombs also point to this possibility.[54] The Israelis see an attack on Iran's nuclear facilities as more difficult than their 1981 attack on Osirak. The nuclear facilities are farther from Israel than was the Osirak reactor, they are spread throughout Iran, many facilities are underground, and these facilities are better protected. The Israelis believe that this attack would require a strike on three or four separate "facilities associated with the uranium enrichment and plutonium production." Any such attack would also require the tacit coordination of British and US military forces in Iraq to "avoid a clash with American forces." Israel would also notify the US to prepare coalition forces for Iranian retaliation.[55]

While a precision strike might achieve delay Iranian development of nuclear weapons, it is unlikely to deter the Iranians from continuing their. Due to the more advanced nature of the Iranian nuclear infrastructure, Iran relies less on foreign agencies, has a large and technically skilled work force, and "already possesses most of the know-how necessary to produce fissile material." Thus, Iran could quickly reconstruct new facilities in as soon as three years after an attack. An attack might also miss covert Iranian facilities, rendering Iran with sufficient capability to continue its program. It is also likely that an Israeli attack might further rally the Iranian people to support the current regime. The Iranians might also use the attack as an excuse to claim victim status and use this victim status as a reason to formally withdraw from the NPT regime and reject any demands for IAEA supervision. Furthermore, an Israeli attack would unite the Islamic world against both Israel and the US, even if most of Iran's Arab neighbors are leery of Iran's nuclear program. An Israeli attack would also provoke an Iranian response that might involve terrorist attacks on Israeli or Jewish targets, Shahab-3 missile launches against Israeli territory, Hezbollah rocket attacks against northern Israel and further Iranian support of Palestinian terrorism.[56]

Allied Comprehensive Bombing Campaign

A third military option would include a comprehensive allied bombing campaign similar to the air and missile campaign in Kosovo. Like the Kosovo campaign, this operation would be a NATO effort that combined Plan A diplomacy with Plan B military pressure to roll back Iran's nuclear program. The campaign would increase gradually in tempo to break the psychological will of the Iranian regime. NATO would destroy initial targets that include Iran's air defense system and WMD delivery systems with cruise missiles. After NATO air forces spent four or five days reducing Iran's air defense system, they would target Iran's nuclear facilities and continuing targeting them until these facilities were completely destroyed. Furthermore, NATO would attack key command and control centers associated with the Iranian regime if and only if the Iranians retaliated against NATO countries using terrorism. The

[53] Ibid, 99.
[54] The International Institute for Strategic Studies, op. cit., 221.
[55] Ephraim Kam, "Curbing the Iranian Nuclear Threat: The Military Option," *Strategic Assessment* 7.3 (December 2004): [online: web], cited 21 January 2006, para 20-21, URL: http://www.tau.ac.il/jcss/sa/v7n3p2Kam.html.
[56] Ibid, para 22-30.

operation would also require a heavy NATO naval presence to prevent the Iranians from mining the Strait of Hormuz or attacking GCC economic resources like oil terminals and refineries. NATO could also use air and special operations assets to support anti-regime elements within Iran.

Comprehensive Bombing Campaign Advantages
There are several advantages to a NATO-led bombing campaign. First, in contrast to a precision campaign, NATO aircraft can strike targets multiple times to ensure their destruction. Second, NATO can slowly ratchet up the pressure through bombing or slow the tempo of the operation when the Iranian regime begins to comply. This operation has an inherent escalation/de-escalation component that makes it attractive versus a precision strike. Third, NATO can use a bombing campaign in concert with a diplomacy that it can turn on and off at will. Fourth, because the operation is a NATO-led operation it will have more international legitimacy and NATO members can share the campaign's costs.

Comprehensive Bombing Campaign Disadvantages
A disadvantage of a bombing campaign is that if an air and missile campaign fails to accomplish political objectives, NATO must commit to a ground campaign. It is unlikely that the Europeans would have the will to pursue this option and the Iranians know it. Furthermore, in a bombing campaign, time would be on Iran's side. The longer the bombing campaign persisted, the more Iran could portray itself as yet another victim Muslim country targeted by Westerners. There will also inevitably be more friction generated among NATO participants because of constraints inherent in a multilateral military operation.

Policy Ingredients: US Coercive Policy Must Focus on Iran's Nuclear Program
A coercive policy must focus unambiguously on Iran's nuclear program. All pressure must stop once Iran ceases pursuit of a full nuclear fuel cycle. The US must also convince Iran that the US would respond in kind to a disproportionate Iranian response. For instance, the US would meet Iranian use of WMD against US targets with "massive retaliation." Furthermore, the US must clearly communicate its intentions, ends, and sometimes means to Iran periodically to ensure that the conflict does not spiral out of control.

Political Pressure
The US has already used most of the unilateral actions in its political kit bag outside of declaring open war. Since April 7, 1980, the US broke off diplomatic relations with Iran and uses the Swiss Government as an intermediary to represent its interests in Tehran. Iran similarly uses Pakistan as its intermediary.[57] However, there are multilateral steps that the US can take to convince its allies to put political pressure on Iran. As of February 3, 2006, the IAEA's convening of its extraordinary session to refer Iran to the UNSC is the first step for the international community to collectively exert political pressure on Iran.

Political Pressure Components
Political pressure should include 1) expelling or denying Iran's membership in international organizations; 2) exerting political pressure on individual Iranian leaders; and 3) encouraging independent organizations to condemn Iran. Each political sanction should explicitly and exclusively link Iran's political behavior with its pursuit of nuclear weapons. These steps must also isolate the Iranian regime from the international community, the Muslim world, and its people. The mechanisms through which these steps should operate include legal, diplomatic, and domestic political actions.

Expel/Deny Iranian Membership in International Organizations
The US can exert pressure on Iran by making it difficult for Iran to join and remain in international organizations. For instance, the Iranians are keen on joining the WTO. The US can continue to block

[57] US Department of State, "Background Note: Iran," [online: web], update August 2005, cited 14 January 2006, para 42, URL: http://www.state.gov/r/pa/ei/bgn/5314.htm#political.

Iran's membership in this organization. The US and its EU allies can also isolate the Iran's leadership from its people by banning Iran from international sporting events like the Olympics and the World Cup.

Exert Political Pressure on Iranian Leaders
The US could also isolate the current regime by sanctioning individual leaders legally, diplomatically, and domestically. When a German court implicated Iran's leaders in political assassinations in Berlin in April 1997, the ruling impacted Iranian public opinion and ultimately contributed to Khatami's election victory. The US and its allies could use legal proceedings to build a case against Khamenei by gathering evidence on crimes that might include "financing and facilitating terrorists, corruption, the torture and murder of Khamenei's opponents at home and abroad and development of weapons of mass destruction in violation of the Non-proliferation Treaty and other accords."[58]

Two ways to target Iranian leaders diplomatically are through asset freezes and travel bans. Unfortunately, the US has done as much as it can on both fronts unilaterally and any hope that US allies effectively freeze Iranian assets dissipates each day the crisis continues as the Iranians are increasingly withdrawing their monetary assets from European banks to preempt a future asset freeze. The US might have more success in convincing the Europeans and the Japanese to impose travel bans on Iran's leaders. These actions should be contingent on Iran's continued refusal to cease pursuit of a full nuclear fuel cycle.

The US can isolate Iranian leaders domestically through its public diplomacy campaign by influencing Iranian public opinion through television, radio and the internet. The US currently broadcasts the Farsi language Radio Farda and several hours of Voice of America (VOA) television each week, but could increase the scale and intensity of this campaign.[59] The US and its allies can also issue visas to students and reformers for travel to the US, so they can eventually return to Iran to demand reform. The downside of this policy is that it might be an avenue for Iranian intelligence to infiltrate the US and its allies so that it can coordinate and stage terrorist attacks in the US should the current situation escalate into war.

Encourage Independent Organizations to Condemn Iran
The US should encourage independent organizations to speak out against the current Iranian regime. While the US's attempts to reach the Iranian people through VOA and Radio Farda, these broadcasts are limited and may be tainted by their association with the US. The US should provide incentives to private US-based Iranian satellite television stations through tax breaks totaling at least $10 million per year. By exposing the Iranian people to an independent information source, the US increases the probability that it will successfully isolate an Iranian regime bent on developing nuclear weapons.[60]

Economic Pressure
The US has taken most of the unilateral steps it can to exert economic pressure. It has already restricted commercial relations between Iran and the US with economic sanctions. Trade now only consists mainly of "Iranian purchases of food and medical products and U.S. purchases of carpets and food." Otherwise, the "U.S. Government prohibits most trade with Iran." During the Bam earthquake of December 2003, the US temporarily lifted some sanctions so that US officials and relief workers could "assist in relief and reconstruction efforts."[61] More specifically, the United States issued a number of economic sanctions since 1979 including sanctions on arms and dual use material; banning of US financial aid to Iran that was not exclusively directed for humanitarian relief; prohibiting international organizations from providing

[58] Mark Palmer, "Testimony on Policy Toward Iran before the House International Relations Committee," (Date: 16 February 2004), Text from: Federal Document Clearing House Congressional Testimony, Available from: LexisNexis® Congressional; Accessed 21 January 2006.
[59] Ibid.
[60] Ibid.
[61] US Department of State, "Background Note: Iran," op. cit., para 44.

US-derived funds to Iran; and barring Iran from "direct loans, credits, insurance and export-import bank guarantees, and indirect assistance from US contributions to multilateral development banks." Furthermore, Executive Order 12613 prohibited Iranian imports from trading in the US including Iranian crude oil in 1987 and the 1995 Executive Order 12959 banned US investment in any sector of Iran's economy and "prohibited most trade with Iran." To discourage other countries from investing in Iran, Congress passed the Iran-Libya Sanctions Act (ILSA) in 1996, which sanctions foreign firms that invest more than $20 million in Iran's energy sector.[62] To deny Iran access to nuclear materials, Congress passed the Iran Nonproliferation Act of 2000. To thwart Iranian efforts to develop ballistic missiles, Congress enacted the Iran Missile Proliferation Sanctions Act of 1997.

Economic Pressure Components

An effective US coercive policy would leverage a multilateral economic sanctions regime along the dimensions of financing and trade that are linked to Iran's pursuit of a full nuclear fuel cycle. Dr. George Perkovich indicated that sanctioning capital is the easiest way for US allies to exert pressure on Iran because it is fungible and easy to sell politically. However, if the United States is unable to convince China to engage in Foreign Direct Investment (FDI) sanctions, then the net result of this component might drive Iran eastward toward China. In the long-run, this is an unacceptable outcome.[63]

Foreign Direct Investment Sanctions

Years of US economic sanctions have taken their toll on Iranian society. Despite its abundant oil resources, Iran creates only half as many new jobs as its 1 million entrants into the labor force each year. As of 2004, the unemployment rate for Iranians aged 15 to 29 was 28.4% even though 41.4% of the overall unemployed have high school and college educations. In a recent poll, 74.6% of Iranians identified economic problems as the most important problem facing their society. The US and its allies can exploit this dissatisfaction with the current regime by denying critical FDI in Iran's dilapidated oil industry. 2004 estimates indicate that Iran needs about $17 billion in foreign direct investment to modernize its oil infrastructure.[64] By encouraging an increasing number of countries to limit their foreign aid to Iran, the US can squeeze the Iranian regime and increasingly separate it from the Iranian people.

Trade: Import Sanctions

In the year ending March 20, 2003, 67.7% of Iranian imports came from the country's top 10 suppliers, and 78.6% of all imports were concentrated in 10 industries. These concentrations increased year over year by 50.8% and 30.6%, respectively. Not only is Iran highly vulnerable to imports from specific countries and in specific industries, but also its dependence on both has increased dramatically year over year. The Iranians are also susceptible to increasing gasoline prices as they import about 33% of their gasoline each year. In 2006, Iran is projected to spend another $4 billion on fuel imports to continue the regime's large-scale state subsidy on gasoline.[65] Consequently, if the US can convince its allies, especially, the EU, which as of 2002/2003 supplied 41.5% of Iranian imports, to institute economic sanctions on Iran, it would devastate Iran's economy. More specifically, these sanctions should target non-electric machinery; transportation vehicles; electric machinery, tools and appliances; and iron and steel, which collectively made up approximately 45.9% of Iranian imports. Additionally, EU countries have a monopoly on some of these products like machinery and tools, which would make it difficult for Iran to substitute its loss in trade with the EU with an increase in trade with China or Russia.

---

[62] George Perkovich and Silvia Manzanero, "Plan B: Using Sanctions to End Iran's Nuclear Program," *Arms Control Today*, 34.4 (May 2004): 20-21.

[63] Dr. George Perkovich, personal interview, Washington, D.C., 11 January 2006.

[64] Ray Takeyh and Nikolas K. Gvosdev, "Pragmatism in the Midst of Iranian Turmoil," *The Washington Quarterly* 27.4 (Autumn 2004):37.

[65] U.S. Energy Information Agency (EIA), "Country Analysis Briefs: Iran," [online: web], updated January 2006, cited 19 January 2006, para 2-3, URL: http://www.eia.doe.gov/emeu/cabs/Iran/Full.html.

Top 10 Iranian Suppliers (in $US millions)

Import Category	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003
Total	14,323	12,683	14,347	17,626	22,275
Germany	1,660	1,382	1,504	1,807	3,777
% Total	*11.6%*	*10.9%*	*10.5%*	*10.3%*	*17.0%*
% Growth YoY		*-16.7%*	*8.8%*	*20.1%*	*109.0%*
United Arab Emirates	759	769	1,154	1,633	2,152
% Total	*5.3%*	*6.1%*	*8.0%*	*9.3%*	*9.7%*
% Growth YoY		*1.3%*	*50.1%*	*41.5%*	*31.8%*
Switzerland	326	336	327	435	1,989
% Total	*2.3%*	*2.6%*	*2.3%*	*2.5%*	*8.9%*
% Growth YoY		*3.1%*	*-2.7%*	*33.0%*	*357.2%*
Italy	1,188	901	856	996	1,389
% Total	*8.3%*	*7.1%*	*6.0%*	*5.7%*	*6.2%*
% Growth YoY		*-24.2%*	*-5.0%*	*16.4%*	*39.5%*
France	556	685	617	1,109	1,318
% Total	*3.9%*	*5.4%*	*4.3%*	*6.3%*	*5.9%*
% Growth YoY		*23.2%*	*-9.9%*	*79.7%*	*18.8%*
China	186	215	330	578	1,067
% Total	*1.3%*	*1.7%*	*2.3%*	*3.3%*	*4.8%*
% Growth YoY		*15.6%*	*53.5%*	*75.2%*	*84.6%*
South Korea	687	708	737	958	894
% Total	*4.8%*	*5.6%*	*5.1%*	*5.4%*	*4.0%*
% Growth YoY		*3.1%*	*4.1%*	*30.0%*	*-6.7%*
Russia	549	532	920	914	874
% Total	*3.8%*	*4.2%*	*6.4%*	*5.2%*	*3.9%*
% Growth YoY		*-3.1%*	*72.9%*	*-0.7%*	*-4.4%*
Brazil	472	681	538	896	843
% Total	*3.3%*	*5.4%*	*3.7%*	*5.1%*	*3.8%*
% Growth YoY		*44.3%*	*-21.0%*	*66.5%*	*-5.9%*
United Kingdom	574	439	510	666	769
% Total	*4.0%*	*3.5%*	*3.6%*	*3.8%*	*3.5%*
% Growth YoY		*-23.5%*	*16.2%*	*30.6%*	*15.5%*
Total Top 10 Iranian Suppliers	6,957	6,648	7,493	9,992	15,072
% Total	*48.6%*	*52.4%*	*52.2%*	*56.7%*	*67.7%*
% Growth YoY		*-4.4%*	*12.7%*	*33.4%*	*50.8%*

Source: Adapted from International Monetary Fund, "Islamic Republic of Iran - Statistical Appendix," *IMF Country Report No. 04/307*, 27 August 2004, 52.
1. Imports are for Iranian year ending March 20. Exports are based on year ending December 31.
2. "Customs cleared imports (c.i.f. base) including registration fees classified according to the International Classification of Goods. Defense-related imports and imports of refined oil products are included in the balance of payments, but excluded here. Registration fee is included in trade statistics because customs duties are levied on a registration fee-inclusive basis."

Top 10 Iranian Imports by Category (in $US millions)

Import Category	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003
Total	14,323	12,683	14,347	17,626	22,275
Non-electric machinery	3,501	3,021	2,976	4,051	4,928
% Total	*24.4%*	*23.8%*	*20.7%*	*23.0%*	*22.1%*
% Growth YoY		*-13.7%*	*-1.5%*	*36.1%*	*21.6%*
Transportation vehicles	1,326	803	1,111	1,696	3,484
% Total	*9.3%*	*6.3%*	*7.7%*	*9.6%*	*15.6%*
% Growth YoY		*-39.4%*	*38.4%*	*52.7%*	*105.4%*
Electric machinery, tools and appliances	1,521	961	1,085	1,819	1,808
% Total	*10.6%*	*7.6%*	*7.6%*	*10.3%*	*8.1%*
% Growth YoY		*-36.8%*	*12.9%*	*67.6%*	*-0.6%*
Iron and steel	1,287	1,173	1,819	1,895	1,738
% Total	*9.0%*	*9.2%*	*12.7%*	*10.8%*	*7.8%*
% Growth YoY		*-8.9%*	*55.1%*	*4.2%*	*-8.3%*
Other	115	148	66	55	1,581
% Total	*0.8%*	*1.2%*	*0.5%*	*0.3%*	*7.1%*
% Growth YoY		*28.7%*	*-55.4%*	*-16.7%*	*2774.5%*
Mineral products, fuel, oil products and their derivatives	186	215	330	578	1,067
% Total	*1.3%*	*1.7%*	*2.3%*	*3.3%*	*4.8%*
% Growth YoY		*15.6%*	*53.5%*	*75.2%*	*84.6%*
Grains and derivatives	878	1,319	1,390	1,472	899
% Total	*6.1%*	*10.4%*	*9.7%*	*8.4%*	*4.0%*
% Growth YoY		*50.2%*	*5.4%*	*5.9%*	*-38.9%*
Chemical products: Others	452	543	606	675	718
% Total	*3.2%*	*4.3%*	*4.2%*	*3.8%*	*3.2%*
% Growth YoY		*20.1%*	*11.6%*	*11.4%*	*6.4%*
Chemicals and their compounds	458	470	460	562	642
% Total	*3.2%*	*3.7%*	*3.2%*	*3.2%*	*2.9%*
% Growth YoY		*2.6%*	*-2.1%*	*22.2%*	*14.2%*
Goods classified according to their composition: Others	491	343	517	594	633
% Total	*3.4%*	*2.7%*	*3.6%*	*3.4%*	*2.8%*
% Growth YoY		*-30.1%*	*50.7%*	*14.9%*	*6.6%*
Total Top 10 Imports	10,215	8,996	10,360	13,397	17,498
% Total	*71.3%*	*70.9%*	*72.2%*	*76.0%*	*78.6%*
% Growth YoY		*-11.9%*	*15.2%*	*29.3%*	*30.6%*

Source: Adapted from International Monetary Fund, "Islamic Republic of Iran - Statistical Appendix," *IMF Country Report No. 04/307*, 27 August 2004, 53.
1. Imports are for Iranian year ending March 20. Exports are based on year ending December 31.
2. "Customs cleared imports (c.i.f. base) including registration fees classified according to the International Classification of Goods. Defense-related imports and imports of refined oil products are included in the balance of payments, but excluded here. Registration fee is included in trade statistics because customs duties are levied on a registration fee-inclusive basis."

Trade: Export Sanctions

Iran held 125.8 billion barrels of proven oil reserves as of January 2005 or 10% of the world's total. Most of Iran's oil reserves are in Khuzestan near the Iraqi border. Iran has 40 producing oil fields, including 27 onshore and 13 offshore. Iran produces 4.2 mbpd of oil and exports about 2.7 mbpd to Japan, China, South Korea, Taiwan and Europe. Iran's oil export revenues account for 80-90% of Iran's total export earnings and 40-50% of its government budget, making it vulnerable to economic sanctions.[66]

Economic Impact of Iranian Oil Export Net Supply Disruption

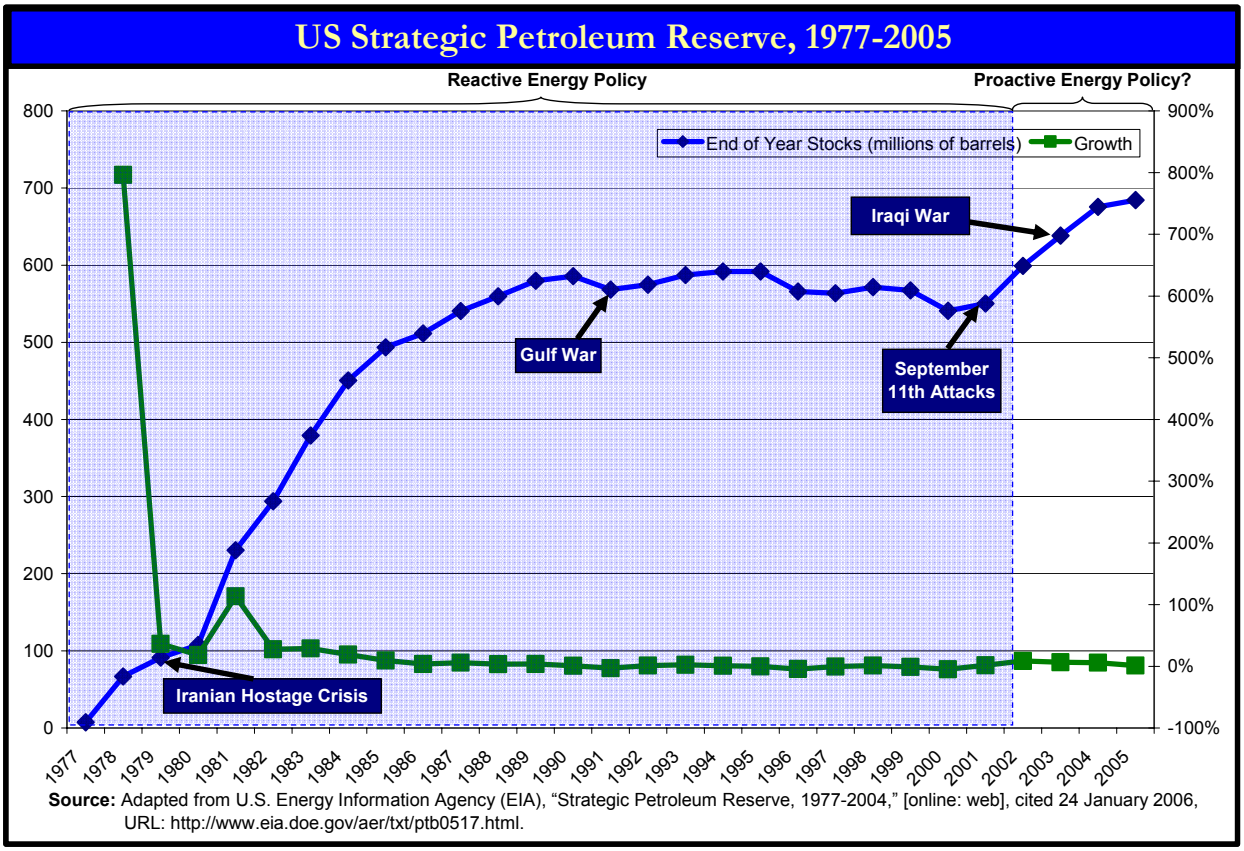
Key Variables	Range of Key Variables in Three Scenarios		
	Low	Moderate	High
Initial Oil Price per Barrel	$54.41	$63.41	$72.41
Net Oil Supply Disruption (mbpd)	1.20 mbpd	2.10 mbpd	2.70 mbpd
% Price Increase per Barrel	12.00%	27.30%	40.50%
Price Increase per Barrel	$6.53	$17.31	$29.33
New Price per Barrel	$60.94	$80.72	$101.74
GDP Growth Rate % Point Decrease	0.06%	0.20%	0.41%
Implied Annual Loss in GDP ($US Bn)	$7.49	$25.56	$50.55
Net Present Value of 2 Year Disruption ($US Bn)	$14.66	$50.01	$98.93
Net Present Value of 3 Year Disruption ($US Bn)	$21.51	$73.42	$145.22
Net Present Value of 5 Year Disruption ($US Bn)	$34.36	$117.25	$231.91
Net Present Value of 10 Year Disruption ($US Bn)	$61.93	$211.33	$418.01

Any export sanctions on Iran would require use of the Organization for Economic Cooperation and Development (OECD) and US strategic petroleum reserves. As of January 17, 2006, the US strategic petroleum reserve had 684.3 mbpd and as of September 2005, the OECD had 4,114 million barrels (3,420 million barrels after subtracting the US strategic petroleum reserve). The US is projected to add a total of 6.1 million barrels in March, April and May.[67] This addition is only a fraction of US daily demand for oil which is 20.6 mbpd. The total demand in OECD countries is approximately 49 mbpd and they can produce approximately 22.5 mbpd domestically.[68] With current OECD petroleum reserves, these countries have enough petroleum to sustain their economies for a little more than five months without oil imports. The US government has enough petroleum reserves to sustain the US economy for a little less than two months without oil imports. Therefore, before one can consider an oil embargo, the US and its OECD allies would have to dramatically increase their oil reserves for the long haul. Past history demonstrates that the US has typically made large increases in the strategic petroleum reserve only after Middle East crises (See US Strategic Petroleum Reserve table below). This trend appears to have diminished after September 11th as the US increased its reserves substantially before the onset of the Iraqi War. This trend continues, possibly indicating that the US is preparing for another Persian Gulf crisis.

[66] Ibid, para 1-3, 8-9, 11.

[67] U.S. Energy Information Agency (EIA), "Strategic Petroleum Reserve Inventory," [online: web], updated 17 January 2006, cited 24 January 2006, para 1, URL: http://www2.spr.doe.gov/DIR/SilverStream/Pages/pgDailyInventoryReportViewDOE_new.html; U.S. Energy Information Agency (EIA), "Industry and Government-Controlled Stocks in OECD Countries, End of September 2005," [online: web], updated September 2005, cited 24 January 2006, para 1, URL: http://www.eia.doe.gov/emeu/ipsr/t16.xls.

[68] U.S. Energy Information Agency (EIA), "World Oil Balance, 2001-2005," [online: web], cited 24 January 2006, para 1, URL: http://www.eia.doe.gov/emeu/ipsr/t21.xls.



Source: Adapted from U.S. Energy Information Agency (EIA), "Strategic Petroleum Reserve, 1977-2004," [online: web], cited 24 January 2006, URL: http://www.eia.doe.gov/aer/txt/ptb0517.html.

While it would be difficult to target Iran's exports without substantially harming the US and its allies through an oil price increase, the US could impose export sanctions on specific companies in Iranian society associated with the current regime. "Iran's Revolutionary Foundations (bunyads) control 35 percent of Iran's import-export business and are directly controlled by Khamenei."[69]

Major Iranian Oil Fields Production (in mbpd)

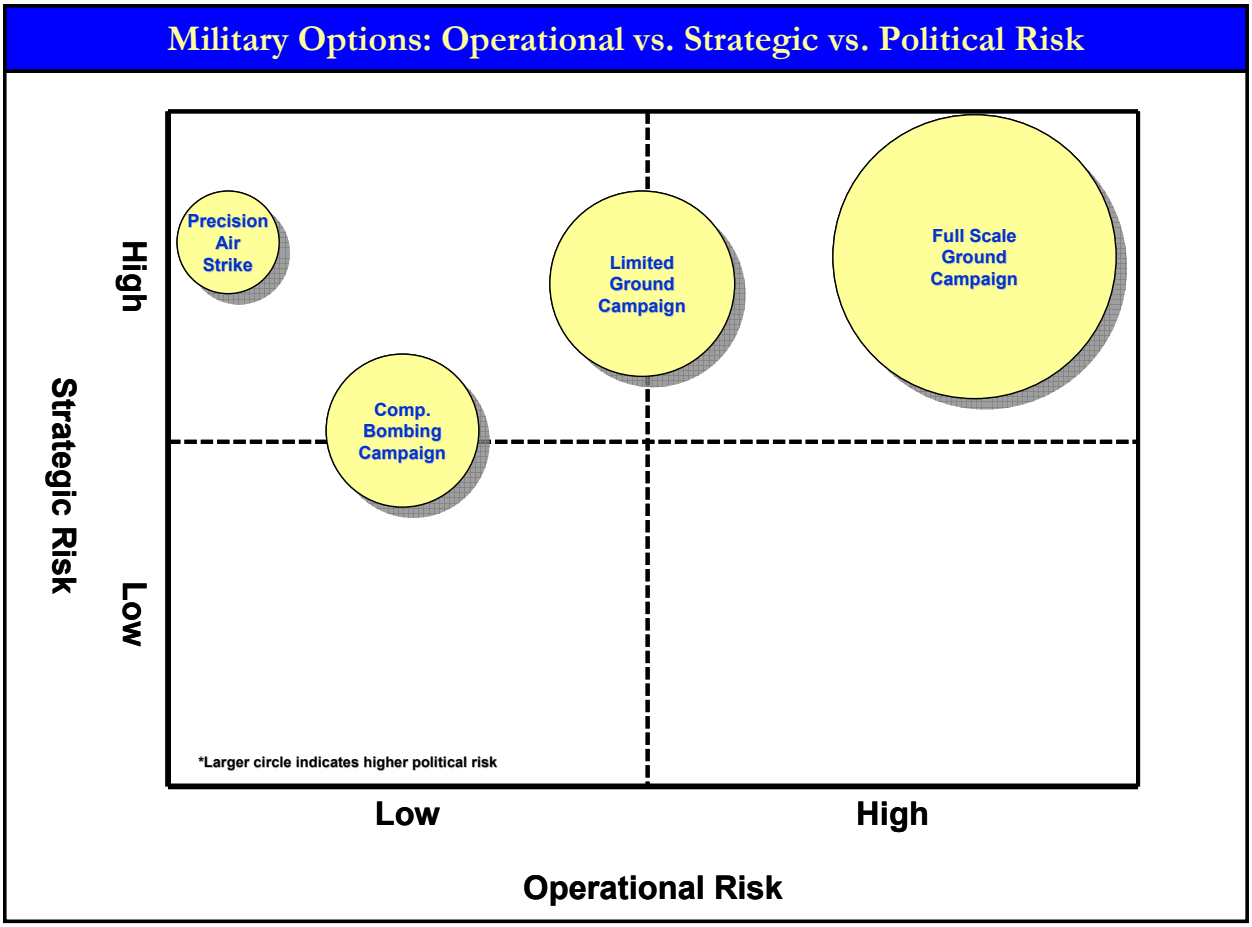
Onshore		Offshore	
Location	**Output (mbpd)**	**Location**	**Output (mbpd)**
AghaJari	0.200 mbpd	**Abuzar**	0.125 mbpd
Ahwaz-Asmari	0.700 mbpd	**Dorood**	0.130 mbpd
Bangestan	0.245 mbpd	**Salman**	0.130 mbpd
BibiHakimeh	0.130 mbpd	**Sirri A&E**	0.095 mbpd
Gachsaran	0.560 mbpd	**Soroush/Nowruz**	0.060 mbpd
Karanj-Parsi	0.200 mbpd	**Total Major Offshore**	0.540 mbpd
Marun	0.520 mbpd	**% of Major Oil Fields**	16.1%
Pazanan	0.070 mbpd	**Total Oil Production**	4.200 mbpd
Rag-e-Safid	0.180 mbpd	**% Major Onshore**	66.79%
Total Major Onshore	2.805 mbpd	**% Major Offshore**	12.86%
% of Major Oil Fields	83.9%	**% Minor Oil Fields**	20.36%

Source: Adapted from U.S. Energy Information Agency (EIA), "Country Analysis Briefs: Iran," [online: web], updated January 2006, cited 19 January 2006, para 1-3, 8-9, 11, URL: http://www.eia.doe.gov/emeu/cabs/Iran/Full.html.

[69] Palmer, op. cit.

Military Pressure

A precision strike focusing only on level 1 targets seems the most pragmatic military action if force is necessary since it has the lowest political and operational risk relative to other options (See chart below).



The advantage of this option is that it shows restraint, it has limited ends and means, and the operation is low risk and minimizes lives lost on both sides. This option has high relative strategic risk because it allows the Iranians to retain full counterstrike capability. To hedge this risk, the US must make it clear to Iran 48 hours before a strike, which targets the US will hit and that the US will cease its pressure once these targets are destroyed. The US must also communicate to Iran that the US will react to a disproportionate Iranian response with overwhelming military force. If the Iranians overact, their overreaction has the international and domestic political advantage of rallying a reluctant US public and international community to the cause of keeping nuclear weapons out of Iranian hands. This option should begin only after NATO or the UN has applied political and economic pressure and the Iranians withdraw from the NPT, eject IAEA inspectors, begin large scale enrichment or are within one month of constructing a bomb. NATO should pursue this option only after exhausting all diplomatic efforts.

Iranian Reactions

Political

The Iranians are likely to react to a coercive policy by withdrawing from international treaties like the NPT and the Comprehensive Test Ban Treaty (CTBT). Iran may also threaten to leave international organizations like the IAEA, though this is unlikely since the organization gives Iran access to nuclear capability. Iran may also use its membership in OPEC and the UN to disrupt US political effort to

pressure Iran. Iran will also try to turn the Muslim world against the US by drawing increased attention to Israel's covert nuclear weapons program, and stir Hezbollah to agitate militants throughout the Middle East. Most importantly, Iran could achieve a decisive political victory if it convinces the Shia-dominated Iraqi government to demand withdrawal of coalition forces from Iraq.

Economic

Iran can retaliate against US economic interests in two ways. First, it can disrupt Gulf shipping lanes by mining, sinking tankers, or using WMD in the Strait of Hormuz. Second, it might attack Saudi oil fields in an effort to disrupt the global supply of oil using ballistic missiles or terrorist acts of sabotage.

Disruption of Shipping Lanes in Persian Gulf via Access Denial of Strait of Hormuz

The Strait of Hormuz is the most critical oil choke point in the world. As of 2004, an estimated 16.5 to 17 million barrels per day (mbpd), about 20% of the world's daily oil production, flowed through this Strait. It "consists of 2-mile wide channels for inbound and outbound tanker traffic, as well as a 2-mile wide buffer zone."[70] The maximum depth of the Strait is 80 meters or 264 feet. Thus, the Strait is highly susceptible to Iranian disruption through the employment of sea mines. According to US experts, Iran has at least 2,000 mines that it can employ with various mine warfare vessels, small boats, helicopters, and submarines to harass Gulf shipping.[71] The discovery of a single mine in the Strait would result in the cessation of commerce for three days to three weeks until the US Navy cleared all mines in the Strait.[72] Iran might also employ a denial access strategy in the Strait by using persistent chemical weapons delivered via SCUD missile to contaminate the Strait and thereby render commerce impossible. Or Iran might sink several massive VLCC super tankers to clog the Strait for weeks as US naval cutters clear the wreckage. With some VLCC tankers having lengths of up to 450m, weighing 564,763 deadweight tons and carrying 2 million barrels of oil, sinking one or two tankers in the Strait would be disastrous.

Closure of the Strait would require use of longer alternative routes that would increase the cost of transporting oil. These routes include the 5 mbpd capacity Petroline (East-West Pipeline), the 0.29 mbpd Abqaiq-Yanbu natural gas liquids line across Saudi Arabia to the Red Sea, the 1.65 mbpd Iraqi Pipeline across Saudi Arabia (IPSA), and the 0.5 mbpd Tapline to Lebanon. More oil could also be pumped north to Ceyhan, Turkey from Iraq if security conditions improve in that country.[73] In the short term, an aggressive US naval presence near the Gulf can guard against any Iranian action in the Strait. In the long term, Saudi Arabia should significantly upgrade the "trans-Saudi Arabian Petroline which would allow 11 million barrels a day to be shipped to ports on the Red Sea." This project could be accomplished by adding technical upgrades to the trans-Saudi Arabian line and by bringing the Iraqi-Saudi pipeline (IPSA-2) back on line with Baghdad's acquiescence. This project's cost is estimated at $600 million. Additional pipelines could be built from Abu Dhabi to ports in Oman to circumvent the Strait of Hormuz.[74]

Destruction of Saudi Oil Fields and Oil Distribution Systems

Iran might also target the Saudi oil infrastructure to put economic pressure on the US and its allies. A key vulnerability in the Saudi infrastructure is the major oil processing facilities located at Abqaiq.[75] These

[70] U.S. Energy Information Agency (EIA), "World Oil Transit Chokepoints: Strait of Hormuz," [online: web], updated November 2005, cited 8 January 2006, para 1, URL: http://www.eia.doe.gov/cabs/World_Oil_Transit_Chokepoints/Hormuz.html.
[71] Cordesman, *Iran's Developing Military Capabilities*, op. cit., 580-59.
[72] Lieutenant Senior Grade James Lemmon, interview, Cambridge, MA, 8 February 2006.
[73] U.S. Energy Information Agency (EIA), "World Oil Transit Chokepoints: Strait of Hormuz," op. cit., para 1.
[74] Henry D. Sokolski (Executive Director, the Nonproliferation Policy Education Center), "Testimony on Policy Toward Iran before the House International Relations Committee," (Date: 16 February 2004), Text from: Federal Document Clearing House Congressional Testimony, Available from: LexisNexis® Congressional; Accessed 21 January 2006.
[75] Sokolski, "Testimony on Policy Toward Iran before the House International Relations Committee," op. cit.

facilities handle about two thirds of the country's oil output of 10.9 mbpd. Additionally, Saudi Arabia's two primary Persian Gulf export terminals are located at Ras Tanura, the world's largest offshore oil loading facility and Ras al-Ju'aymah with daily capacities of 6 mbpd and 3 mbpd, respectively. The Red Sea terminal of Yanbu has a capacity of 5 mbpd and combined, these three terminals can handle around 14 mbpd, around 3 to 3.5 mbpd higher than Saudi Arabia's crude oil production capacity of 10.5-11.0 mbpd. To increase redundancy, the Saudis "are planning to conduct a feasibility study on construction of an oil pipeline from the Empty Quarter of southeastern Saudi Arabia through the Hadramaut in Yemen to the Arabian Sea."[76] A terrorist or missile strike on these facilities could result in an oil disruption of up to 7.3 mbpd if the Iranians destroyed Abqaiq or 5.9 mbpd if they targeted Ras Tanura and Ras al-Ju'aymah.

Military

Any coercive actions taken against Iran, especially military actions, will provoke an Iranian military response. The Iranians might retaliate against the US, its allies, and US interests through: increased international terrorism, support of Shia insurgencies throughout the Gulf, and WMD use.

Increased International Terrorism

Iran could quickly expand the scale and scope of its international terrorist operations through two primary vectors: Hezbollah and support of other movements like al Qaeda. Hezbollah is Iran's most potent weapon against Western interests and has a scale and scope that enables it to launch attacks against international targets. Hezbollah has operated in France, Cyprus, Spain, the Philippines, the triborder region of South America, Singapore, "as well as in more familiar operational theaters in Europe and the Middle East." US federal investigators have even discovered a Hezbollah fundraising cell in North Carolina in 2001.[77] Hezbollah is also closely linked to Tehran which provides the group with approximately $100 million per year. The group maintains close operational ties to Iranian intelligence and the IRGC. "Hezbollah's leaders proclaim their loyalty to Khamenei, and he reportedly acts as an arbiter in their decisions. Tehran exercises particular influence over Hezbollah's overseas activities." For instance, Hezbollah cells ended attacks in Europe after Iran decided to cease its campaign of violence in the region. "Iran gets a valuable weapon against Israel and influence far beyond its border" in exchange for supporting Hezbollah. "In some cases, Tehran has also used Hezbollah to kill dissidents and strike at U.S. targets."[78] The Iranian regime also has loose ties with al-Qaeda and has some unknown al-Qaeda operatives in custody. Should the US provoke Iran, Iran might be willing to cooperate more closely with al-Qaeda and affiliate groups so that Iran might more effectively take the war to the US homeland.

Support of Shia Insurgencies

A potential Iranian military response to US and allied pressure might be the support of either a localized Shia insurgency in Iraq or a greater Shia insurgency in the Arab world.

Iran has been preparing the battlefield in Iraq for the past three years. "Iranian clerics, agents from the IRGC, and Hezbollah operatives have all been involved in undermining U.S. efforts" in Iraq "by radicalizing the population, gathering intelligence, and taking steps to garner support for their cause." From May 2003 to February 2005, over 2,000 Iranian-sponsored clerics infiltrated Iraq from Iran and distributed "incitement materials such as books, CDs and tapes" to the Iraqi people in "an effort to promote militant Islam." Iranian dissidents have reported that IRGC's Qods Force has "established armed underground cells" in Shia-dominated Iraq. MEK reports indicate that Iran ordered about 100 Hezbollah operatives into southern Iraq from both Syria and Iran. On February 9, 2005, Iraq's Interior Minister Falah al-Naquib confirmed this threat when he announced that eighteen members of Hezbollah were

[76] U.S. Energy Information Agency (EIA), "Country Analysis Briefs: Saudi Arabia," [online: web], updated August 2005, cited 22 January 2006, para 28-29, URL: http://www.eia.doe.gov/emeu/cabs/saudi.html.
[77] Byman, "Should Hezbollah Be Next?" op. cit., 58.
[78] Ibid, 61.

detained in Iraq on charges of terrorism. Hazim Shalan, the Iraqi Defense Minister, alleged that "Iran has established military positions on the Iraqi-Iranian border, sent spies and saboteurs into the country, and even infiltrated the new government." Jordan's King Abdullah II has accused Iran of sending 1 million Iranians to vote in recent Iraqi elections and to conduct post election attacks if necessary.[79]

Iranian dissidents also allege that Hezbollah agents "have been involved in surveying coalition assembly centers and tracking the movement of coalition vehicles. Hezbollah agents are reported to have taken videotape of various locations throughout Iraq." Iran deployed IRGC agents "to Najaf in order to gather intelligence on American forces." Both Hezbollah and IRGC established medical centers and charitable organizations throughout Iraq in Najaf, Baghdad, Hillah, Basra, and al-Amarah to influence Iraqis.[80] In December 2004, "The Committee of the Commemoration of Martyrs of the Global Islamic Campaign," an affiliate of the IRGC, registered more than 25,000 "martyrdom seeking" volunteers to join the Iraqi insurgency. Mohammad Ali Samadi claimed that "their actions were in accordance with a message from Supreme Leader Ayatollah Ali Khamenei."[81] Senior Iraqi Interim Government (IIG) officials have publicly expressed concern over Iranian interference in Iraq. Reports indicate that Iran provided "funding, safe transit, and arms to insurgent elements, including Muqtada al-Sadr's forces."[82]

WMD Use against US and/or Allies

Iran might use WMD against the US or its allies. Iran might also use WMD as area denial weapons by firing them into the Strait of Hormuz to restrict commercial access to the waterway. Of course, such actions would hurt the Iranians deeply as well, but they might act in this manner if the US mines Iran's ports thereby cutting off Iran's oil exports. The US can use its nuclear deterrent to discourage such an Iranian action. The US might also destroy Iran's WMD sites and delivery systems.

Key Findings

Finding #1: Transition from Plan A to Plan B Must Be Abrupt and Unambiguous

The US and its allies must clearly outline the timing and triggers of this transition so that it is clear to Iran that military action is imminent if Iran fails to comply with the demands of the international community.

Finding #2: Multilateral Economic Sanctions and Military Action are Most Effective Coercive Tools

The US has already employed the maximum level of unilateral economic and political sanctions over the past thirty years and thus has little leverage left to exploit in these areas. However, US allies, particularly the EU, still consist of a significant percentage of Iranian imports and can be used as leverage to pressure the Iranians. The Iranian nuclear program is also still highly vulnerable to military strikes and if US allies can be convinced to burden share in a future limited precision strike, EU and US leaders should consider eliminating the Iranian program after political and economic pressures are exhausted.

Finding #3: Military Action against Iran Will Have Severe Impact on Global Economy

The Strait of Hormuz poses a clear strategic dilemma for the US and its allies that the Iranians can exploit. The Saudi oil infrastructure is also highly vulnerable to Iranian disruption. Should Iran decide to employ mines or sink oil tankers in the Strait of Hormuz or to launch ballistic missiles at one or two key Saudi oil refineries, oil prices would rise to a point that could significantly hamper US GDP growth and potentially even plunge the world into a global recession.

---

[79] Matthew A. Levitt (Senior Fellow and Director of Terrorism Studies, the Washington Institute for Near East Policy), "Testimony on State Sponsored Terrorism in Iran before the House International Relations Committee, Middle East and Central Asia Subcommittee," (Date: 16 February 2005), Text from: Federal Document Clearing House Congressional Testimony, Available from: LexisNexis® Congressional; Accessed 21 January 2006.
[80] Ibid.
[81] Ibid.
[82] Office of the Coordinator for Counterterrorism, US Department of State, op. cit., 88-89.

Policy Option 2: Strategic Adjustment

Strategic Outlook
A recent Nonproliferation Policy Education Center (NPEC) report for the Strategic Studies Institute concluded that if Iran acquired nuclear weapons, three threats were likely to increase in the region. These threats include increased nuclear proliferation, dramatically higher oil prices, and increased terrorism designed to diminish US influence.[83] Strategic adjustment discusses how US allies might react to this development. Strategic adjustment's objectives are to protect the US and its allies from Iranian use of its nuclear arsenal and from diversion of these weapons to terrorists or other countries.

Allies
A key consideration in strategic adjustment is how the US's allies can support US efforts to contain Iranian aggression and nuclear proliferation should the Iranians produce a bomb before diplomatic inducements and coercion run their course. This section will discuss how US allies and third party actors are likely to support US strategic adjustment through a containment strategy, what actions the US would require from its key regional allies, and what inducements the US can offer them for their cooperation.

US Must Convince EU-3/EU/Japan to Share Greater Burden in Energy Security
Iranian adventurism emboldened by Iran's possession of a nuclear weapon would result in heightened energy prices over longer periods of time as the Middle East continues to remain volatile. At some point, the EU and Japan must make a greater contribution in defending their energy security as energy becomes prohibitively expensive. As such, the US will need to encourage regional military, economic, and political cooperation to ensure that energy prices remain stable. Additionally, tighter energy markets might very well reinvigorate latent great power competition between Japan and China. While this future competition is beyond the scope of this paper, it will play an important role on events in the Gulf region.

US Must Integrate Turkey into Western Alliance by Advocating for its EU Membership
The Turks might also be tempted to develop their own nuclear program. The US must continue to integrate Turkey into the Western world by advocating its case for EU membership. The US can convince its European partners that a friendly Turkey would be an asset in the cold war against Iran.

US Must Induce Russia to Sever Nuclear Relationship with Iran
A nuclear Iran would be a lucrative boon to Russia's nuclear industry. The US must severe this link through positive inducements and energy contracts with Russia's nuclear industry in exchange for Russia's commitment not to do business with Iran. Russian security versus Iran will become increasingly tense given Iran's support of terrorism and the proximity of Iran's nuclear missiles to Russian cities. The US must exploit this fear by continuing to work with Russia on ballistic missile defense.

US Must Manage Chinese, Japanese and US Regional Competition for Energy
Heightened energy prices might spur increased US-China and Japan-China regional competition. The US must continue to engage in dialogue with the Chinese and cooperate so that both nations can manage global energy demand through independent international institutions. Furthermore, the US must manage the developing regional competition between China and Japan to secure Persian Gulf energy resources.

Israel Will Be On a Hair Trigger
One of the biggest challenges for the US will be to keep Israel and Iran from destroying each other. To manage Israel, the US must guarantee Israel of the US's sustained effort to contain Iran.

[83] Sokolski, "Getting Ready for a Nuclear-Ready Iran: Report of the NPEC Working Group," op. cit., 1-2.

US Must Induce and Bully Egypt Not to Develop Nuclear Weapons

Iran's possession of a nuclear weapon would be disastrous for Egyptian leaders. Exposed to the threats of two regional nuclear states – Israel and Iran, Egyptian leaders might feel pressure from both their domestic population and the Arab world to reconsider Egypt's NPT obligations.[84] To adjust to a nuclear Iran, the US would need to prevent Egypt from eschewing the treaty and pursuing the nuclear path. The US and its allies would need to shore up Egyptian leaders by making acquisition of nuclear weapons an unattractive option through positive and negative inducements. Positive inducements would include security guarantees like the extension of a US nuclear umbrella over Egypt to protect it against Iranian aggression. The downside of this guarantee is that Egypt might also demand similar protection from Israel. The principle negative inducement the US could use to influence Egypt is through the reduction of foreign aid. Since 1975, US economic assistance to Egypt through the US Agency for International Development (USAID) has totaled nearly $26 billion[85] and is budgeted to grant Egypt $495 million in 2006.[86] Disruption of these funds would force Egypt to address domestic issues rather than build a bomb.

Iraq Could Become the Neo Germany of the Neo Cold War

An increasingly aggressive Iran might seek to splinter Iraq to disrupt any future US-Iraq alliance. Conversely, Iran might convince Iraq's dominant Shia population to side with the Islamic Republic and the US might be the country that seeks to splinter Iraq. Either way, in a world in which Iran has nuclear weapons, there is an even chance that competing Iranian/US interests could result in Iraq's fragmentation. As such, the US will need to keep a strong troop presence in Iraq to prevent this eventuality.

US Must Convince Gulf Cooperation Council (GCC) States to Help Contain Iran

The GCC States will view Iranian possession of nuclear capability with fear and some like Saudi Arabia might agitate for purchasing or building its own nuclear program. The US must use this fear to encourage GCC-US cooperation in an effort to contain their common Iranian enemy. To ensure GCC-US cooperation against a nuclear-armed Iran, the GCC will require three inducements including: 1) a guarantee of a US nuclear umbrella, 2) increased and noninvasive US troop deployments to GCC states, and 3) increased access to US arms and training. These measures will reduce the likelihood that Iranian nuclear and/or conventional intimidation will negatively impact US Gulf alliances.

Policy Ingredients

Strategic adjustment requires protecting the US and its allies from Iran's nuclear use and diversion to terrorists and other countries by denying Iran nuclear technology, equipment, and personnel, detecting Iran's use or transfer of atomic weapons, deterring Iranian use or diversion and defending regional allies.

Protection – Denial, Detection, Deterrence and Defense

In the strategic adjustment scenario, the US must protect itself and its allies from the Iranian use of nuclear weapons and from Iran's diversion of these weapons, fissile materials, and components to terrorists and other regional Muslim countries. Protection has four components including denial, detection, deterrence, and defense to prevent Iranian nuclear weapons use and/or diversion.

Denial

Denial will continue to be necessary to contain Iran. In this scenario, the US should expand its Proliferation Security Initiative (PSI), seek to recruit and/or interdict Iranian nuclear scientists, and use

[84] Geoffrey Kemp, *U.S. and Iran: The Nuclear Dilemma: Next Steps*, (Washington, D.C.: The Nixon Center, 2004), 23.

[85] U.S. Agency for International Development, "Asia and the Near East: Egypt," [online: website], updated 30 June 2005, cited 16 January 2006, para 1, URL: http://www.usaid.gov/locations/asia_near_east/countries/egypt/.

[86] U.S. Agency for International Development, "Budget: Egypt," [online: website], updated 14 June 2005, cited 16 January 2006, para 1, URL: http://www.usaid.gov/policy/budget/cbj2006/ane/eg.html

Israel covertly as a proxy to destroy Iranian nuclear equipment in the equipment's countries of origin – much like the Mossad operated in France by attaching explosives to Iraq's nuclear reactor cores. The goal of the denial strategy will be to make Iran's continued nuclear program prohibitively expensive and in the long-term, convince its people that the current Iranian regime is driving Iran into the ground.

Detection

Detection is another key component of US and allied regional protection, because it confronts the dual dangers of Iranian use and diversion to terrorists and other countries. Iran could use its nuclear weapons covertly through a terrorist proxy to avoid US retribution. Without the ability to conclude definitively that Iran provided these nuclear materials, US deterrence would fail. Furthermore, the inability of the US to detect Iranian diversion of nuclear materials would harm the US's regional counter proliferation effort.

There are two ways to detect the transfer of nuclear weapons. The first is to use human intelligence (HUMINT) to identify transfers before they happen. Unfortunately, ever since the Shah's overthrow in 1979, human intelligence in Iran has never been strong and most intelligence data comes from Iranian dissident groups like the MEK. The second way to detect this transfer and to attribute use to Iran is through the science of nuclear forensics.

The CIA is uniquely positioned to do both tasks. The President has already authorized the US to increase the number of field operatives. So the CIA should begin to focus on isolating "the unique characteristics of nuclear material produced at Iranian facilities" to enable forensic specialists "to locate the origin of fissile material" and make "it impossible for Iran to remain an anonymous dealer." Because nuclear material is the result of a unique production process that is reflected in the nuclear material's elemental and isotopic composition and its microscopic and macroscopic appearance, nuclear materials have "unique radioactive fingerprints." However, nuclear evidence from seized nuclear materials or from residual samples taken from a detonation site is useless unless it can be matched to nuclear samples from different sources. Without nuclear samples from Iran, the CIA can not currently perform a matching analysis. The CIA must collect Iranian samples from the IAEA or from clandestine operations in Iran.[87]

Iranian leaders will be less likely to divert nuclear material and to use nuclear weapons through covert terrorist proxies if they know that they can not do so as an anonymous dealer. Reliable "nuclear forensics would provide a powerful deterrent to the use or transfer of nuclear weapons."[88]

Deterrence

The US must make Iran understand that Iran's threats to use nuclear weapons against US regional allies will not deter the US. Upon declaration (if the Iranians overtly declare they have an atomic weapon) or determination (if the US determines that Iran has a bomb but it keeps it covert) that Iran produces a nuclear weapon, the US President must publicly announce that the US will meet Iran's use of nuclear weapons with regime change be it through nuclear annihilation or more likely through conventional means even if that use is accidental or a bomb "accidentally" falls into the hands of terrorists. How the US initiates regime change is not necessary in communicating the message to Iran. It is best left ambiguous. Additionally, the US must provide the guarantee of a nuclear umbrella for its regional allies.

Defense

Any strategy to contain Iranian aggression through nuclear blackmail requires providing US allies with the confidence to reject these demands. In addition to establishing a US nuclear umbrella over the region,

[87] Joshua Rovner, "Preparing for a Nuclear Iran: The Role of the CIA," *Strategic Insights* 4.11 (November 2005): [online: web], cited 22 January 2006, para 3, URL: http://www.ccc.nps.navy.mil/si/2005/Nov/rovnerNov05.asp#author.

[88] Ibid, para 26-28.

the US should provide its allies with a layered missile defense system in the Middle East. At the current time, the Theater High Altitude Air Defense (THAAD) System is not complete and the number, accuracy, and coverage of the current PAC-3 missile system provides the US with more of a point-defense against missiles in the region rather than the area defense that THAAD would provide.[89] The US only has 483 Patriot systems in its arsenal that must be deployed throughout the world to defend against threats that include both North Korea and Iran.[90] Additionally, the PAC-3 system has a hit rate of 92% for its flight test program.[91] However, in practice this rate hovers between 70% and 90%.[92] The coverage of an individual PAC-3 missile only has a maximum range of 15 km.[93] Therefore, the PAC-3 System can only be used to defend point targets of critical military and economic value like airfields and oil refineries. Defending one city requires 2 to 4 Patriot battalions. Thus, the US can not defend every potential missile target with 100% coverage or accuracy. Furthermore, the system is only good for short range ballistic missiles (SRBMs) in the terminal phase. If Iran were to launch a Shahab-3 missile from its northeastern geographic corner, to hit targets just outside its borders, the PAC-3 could not intercept these missiles.[94]

While there is strong debate over the technical effectiveness of missile defense, implementing such a system will inspire confidence in US resolve and go a long way in creating the impression that allied nations are safer from Iranian nuclear blackmail. Furthermore, a strong missile defense network ensures that the US can deter Iran without being deterred itself. Henry Obering, III, the head of the Missile Defense Agency, testified in 2005 that "the ability to protect against threats of coercion and actively defend our forces, friends and allies, and homeland against ballistic missiles will play an increasingly critical role in our national security strategy."[95]

The US has recently fielded a variety of components of an integrated missile defense system. The US has installed a total of eight ground-based interceptors in silos. Six are at Fort Greeley, Alaska and two are at Vandenberg Air Force Base in California. The US also upgraded the Cobra Dane radar system in Alaska and modified seven Aegis ships for "long-range surveillance and tracking support." In October 2004, the US received the first Standard Missile-3 (SM-3) for deployment on an Aegis ship and as of May 2005, the US had five of these missiles and was projected to have a total of thirteen by the end of 2005. Obering estimated that by the end of 2005, two Aegis cruisers would be outfitted with the "engagement capability" to track missile threats for the integrated ballistic missile system and a "sea-mobile capability to defeat short- to medium-range ballistic missile in their midcourse phase." The US was also projected to have ten more ground interceptors in Alaska by the end of 2005. The Missile Defense Agency is also on track to deploy its X-band radar against Middle East threats in early 2006. While there have been a number of test aborts in the past year, the US continues to work on different system to address the three layers of missile defense – "boost, midcourse, terminal" and a "diversity of basing modes - land, sea, air and space." By 2007, the US should have about 28 SM-3 interceptors for use on three Aegis cruiser and eight Aegis destroyers. The first Theater High Altitude Air Defense System is projected to be fielded in "the 2008-2009 timeframe with a second unit available in 2011." The US has also been working with other countries "to forge international partnerships that will make missile defense a key element of [US] security relationships around the world." As such, the North Atlantic Treaty Organization (NATO) is working on

[89] Ryan, op. cit.
[90] The International Institute for Strategic Studies, op. cit., 22.
[91] James C. O'Halloran, ed. *Jane's Land-Based Air Defence*, 8th ed. (Coulsdon, Surrey, UK: Jane's Information Group, 2005), 344.
[92] Ryan, op. cit.
[93] O'Halloran, op. cit., 346.
[94] Ryan, op. cit.
[95] Henry A. Obering, III (Director, Missile Defense Agency), "Testimony on FY06, Appropriations: Defense before the Senate Appropriations Committee, Subcommittee on Defense," (Date: 11 May 2005), Text from: Federal Document Clearing House Congressional Testimony, Available from: LexisNexis® Congressional; Accessed 22 January 2006.

a feasibility study for protection of NATO territory against ballistic missile attacks. The US is working with the Israelis on the Arrow System Improvement Program to address Middle Eastern missile threats. The US is also collaborating with the Russians on the ongoing US-Russian Theater Missile Defense exercise program.[96]

Reduction of Negative Impact to Regional Alliances

To reduce the negative impact to US regional alliances, the US must contain Iran. To accomplish this goal, the US must guarantee a nuclear umbrella to its allies, increase troop deployments to protect regional allies, and increase access to US arms and training. These measures will reduce the likelihood that Iranian nuclear and/or conventional intimidation will negatively impact US Gulf alliances.

Guarantee US Nuclear Umbrella to Regional Allies

For a US defense commitment against Iran to regional allies to be credible, the US must provide them with a nuclear umbrella. This guarantee works only so long as the Iranians lack the capability to strike back at the continental US with ballistic missiles. Any threat of nuclear retaliation against Iran for nuclear use against a US regional ally would be credible, because it is unlikely that the Iranians could respond in kind against the United States due to their limited arsenal and their inability to hit US targets with ballistic missiles. Over time, the Iranians will overcome this "range" gap and it is unlikely that US policymakers will sacrifice over eight million New Yorkers to protect several million wealthy Kuwaitis. To mitigate this problem, the US must be steadfast in curtailing Iranian missile technology, continue to improve the US missile defense system, and undermine the Iranian regime to encourage internal regime change.

Increase US Troop Deployments to Protect Regional Allies

Most pundits today decry the US's "imperial overstretch" in the Middle East and scoff at any further military action against Iran arguing that the US is already bogged down in Iraq and Afghanistan. While these arguments are valid, they look backward rather than forward. The paradox of letting Iran pursue nuclear weapons is that a nuclear armed Iran would require an increased engagement of US forces – requiring the US to spend an increasing amount of blood and treasure over a sustained period of time in a cold war against an increasingly aggressive Iran. To reassure its commitments to regional allies, the US would need to keep a sufficient number of troops in the region to shore up allied governments against both external Iranian threats and internal Iranian inspired revolutions of Shia minorities – or majorities in the Iraq's case. The additional complication of widespread distrust and hatred of America in the Islamic world would require these forces to be stationed outside these countries and deploy to them only in crises. As such, the US will be slower to respond to new crises, which would allow the Iranians to exploit the situation to their favor.

Increase Allied Access to US Arms and Training

From 1996 to 2003, UAE made arms transfer agreements totaling $15.7 billion in constant 2003 US dollars, or 10.4% of all developing nations' arms transfers.[97] These arms transfers seem to be motivated by UAE's proximity to Iran. Should Iran acquire nuclear capability, the GCC will demand increased access to US weapons systems and training. In this scenario, it is in the US's interest to meet this need.

Response to Increased Iranian Adventurism: Containing Iran

The increased Iranian activity in the Gulf region must be answered in kind. A more aggressive Iran will most likely trigger a Middle Eastern cold war. The strategy that won the last cold war should be used to win the next one – force Iran to bankrupt itself in a perpetual military contest against the West. This strategy will require a sustained regional commitment of US and EU forces for decades. While the US

[96] Ibid.

[97] Congressional Research Service, Richard F. Grimmett, ed., *Conventional Arms Transfers to Developing Nations, 1996-2003*, August 26, 2004, 30.

might not necessarily need to keep large numbers of troops in the region, it will need to continue to invest in the means to bring them rapidly into theater to confront Iranian threats. Hence the US must make a sustained military commitment similar to that of the Cold War in the Middle East – a commitment that is likely to dwarf that of current US commitments in the Middle East and Central Asia.

The US Can Successfully Contain Iran

A related question to this issue is whether the US can successfully contain Iran. Some have argued that this effort would be difficult if not impossible with the Iranians acting through their proxy agents dispersed among Shia minorities (and Shia majorities in Iraq) in a manner that will give the Iranians plausible deniability after they act. A successful US containment strategy will require patience and time in linking Iranian intelligence operations to its proxies' activities. However, if the US takes the approach of "proportional response" the US can similarly use its own proxies to retaliate against Iran through covert support of Kurds in northwestern Iran, Arabs in Khuzestan, and internal entities in Iran that support overthrow of the regime. The US might also threaten to take certain groups like the MEK off of the US Department of State's designated foreign terrorist organization list until Iran curbs its illicit activities. The US might also exert more pressure on GCC states to engage in political reform to eliminate the grievances that inspire Shia minorities in these countries to cooperate with the Iranians.

Prevention of Regional Proliferation

An NPEC working group concluded that a nuclear Iran will encourage others to develop, declare, or import nuclear weapons. Iran's "continued insistence" that it acquired nuclear technology through legal means under the NPT might convince other countries like Saudi Arabia, Egypt, Iraq, Syria, Turkey and Algeria to make similar arguments to develop nuclear weapons. Iran's possession of nuclear weapons might also embolden the Israelis to publicly declare the existence of their nuclear program and might encourage the Saudis to use their oil wealth to purchase nuclear weapons. A failure to prevent regional proliferation will have impact on global proliferation and will strain relations between the US and its regional allies.[98] In accordance with the NPEC working group's recommendations, to prevent regional proliferation, the US should take two actions. First, the US must offer Russia a nuclear cooperative agreement. Second, the US should encourage the development of advanced nuclear forensic techniques.

Offer Russia a US Nuclear Cooperative Agreement

To allay Russian concerns about their nuclear industry's survival, the US should offer Russia a nuclear cooperative agreement. This deal would allow Russia to store US origin spent fuel in Russia in exchange for $10 to $20 billion. Offered in tandem with country neutral rules for NPT violators, this agreement would provide leverage against Russian defection. "Any resumption of Russian-Iranian nuclear cooperation that violated the resolution…would jeopardize" the lucrative US agreement.[99]

Encourage Development of Advanced Nuclear Forensic Techniques

The US should encourage the development of advanced nuclear forensic techniques to make it impossible for Iran to channel nuclear material covertly to other countries and/or terrorists without exposing itself.

Damage Limitation to Counter proliferation Worldwide

While the second order effect of Iranian proliferation is the increased likelihood of regional proliferation, the third order effect is damage to global counter proliferation efforts. In accordance with the NPEC working group's recommendations, to prevent damage to global counter proliferation efforts, the US should take two steps. First, it should clarify what is considered peaceful under the NPT. Second, the US should establish country neutral rules for NPT violators.

[98] Sokolski, "Getting Ready for a Nuclear-Ready Iran: Report of the NPEC Working Group," op. cit., 1-2.
[99] Ibid, 12-14.

Clarify What is Peaceful Under the NPT
The US and its allies should convene a series of meetings to define explicitly what is meant by peaceful nuclear development in light of the latest information on "the spread of covert centrifuge and reprocessing technology, bomb design, and the availability of separated plutonium and highly enriched uranium." They should also identify which nuclear activities and materials can be safeguarded early on in order to detect potential violations early in a nuclear program. "These meetings could be held under IAEA or UNSC auspices," or by a US-led initiative should this structure be impractical. [100]

Establish Country-Neutral Rules for NPT Violators
The US and its allies should augment France's recent proposals that the UN Security Council "adopt a set of country-neutral rules for dealing with NPT violators, such as Iran and North Korea, which would" mandate that countries that refuse inspections and withdraw from the NPT must surrender and dismantle their "large nuclear capabilities (i.e., large research and power reactors and bulk handling facilities) to come back into compliance." Until the UNSC unanimously drops the ban, violators would lose the right to acquire nuclear technology. Additionally, these rules would stipulate that countries that violate their NPT safeguard obligations no longer receive nuclear assistance from any other country until the IAEA Board of Governors unanimously declares that they are in full compliance. Countries that build nuclear complexes that cannot be economically justified and "monitored in a manner that can assure timely warning of diversion of enough nuclear material to make a bomb," should not get nuclear assistance until the IAEA Board of Governors can unanimously agree that the project in question is "economically imperative or capable of being safeguarded to provide timely warning of potential diversions."[101]

Key Findings
Key Finding #4: A Nuclear Iran Will Engage in More Aggressive Regional Behavior
A nuclear emboldened Iran will be less deterred by US conventional superiority and therefore be increasingly likely to engage in activities which advance its national interests at the expense of US interests. The US must be prepared to fight a second cold war against the Iranians that will require far more blood and treasure than is currently being spent in Iraq.

Key Finding #5: A Nuclear Iran Will Result in Pressure for Other Regional Actors to Proliferate
Other regional actors who feel threatened by Iranian nuclear weapons will face increasing pressure by their people and military establishments to acquire their own nuclear capability. The US will need to stifle this defensive impulse in order to halt regional and global nuclear proliferation.

Key Finding #6: Some Will Perceive Iran's Acquisition of Nuclear Weapons as a US Strategic Failure
US and EU credibility will suffer if Iran goes nuclear because many will consider this eventuality a US strategic defeat. As such, the US and EU must act to convince others that Iran's possession of nuclear weapons is only temporary and they must never admit defeat. Otherwise, future efforts to contain Iran and reassure regional allies against proliferation will fail.

[100] Ibid.
[101] Ibid.

Decision Analysis / Game Theory

This section will quantify the costs associated with US and Iranian policy options associated with coercion and strategic adjustment. After quantifying these costs under several scenarios, this paper will use game theory to determine the dominant strategies for the US and Iran. The results of this analysis are not absolute and are limited by the assumptions of this paper's author. Instead, they enable the author to analyze the problem from an alternative viewpoint.

Key Finding: A Coercive US Policy Will Cost the US and Iran Less than Strategic Adjustment Will
This analysis confirms that a rational Iranian decision-maker who seeks to minimize his strategic costs will pursue a conservative policy regardless of US strategy given the cost assumptions outlined below in either a policy of coercion or strategic adjustment. Furthermore, it confirms that in the coercive scenario a rational US decision-maker who seeks to minimize the costs of Iran's response should pursue the most conservative strategy – namely one with limited ends and means that focuses on rolling back Iran's nuclear program. This analysis also demonstrates that in the strategic adjustment scenario, a rational US decision-maker who seeks to minimize the costs of Iran's response should pursue a moderate strategy – namely one that requires an increased level of US troop presence and engagement in the region. The cost assumptions below imply that a conservative US policy will embolden the Iranians and thereby incur increased costs for the US. Similarly, an aggressive US policy would result in an Iranian response that incurs maximum costs for the US. Therefore, strategic adjustment requires the US to pursue a moderate policy. This analysis demonstrates that the strategic adjustment option will cost both the US and Iran more than a coercive policy if both sides pursue purely rational decision-making processes and the assumptions held below approximate real world conditions. Of course, one can not take these assumptions for granted, as this game theoretic model can not predict every conceivable outcome in an emotionally charged world. However, it can still inform rational decision-making at the highest levels of government and is a useful alternative way to examine this critical national security dilemma.

US Cost Methodology
Any US policy of coercion or strategic adjustment will have political, economic, and military costs. This analysis considers the costs of catastrophic terror attacks to human capital and infrastructure, an extended Strait of Hormuz disruption, other Iran war costs, and the incremental interest lost to a temporary decline in capital markets. This analysis assumes that these costs apply in varying degrees to both options.

This paper assumes that every terror attack that Iran perpetrates in response to US actions will incur some multiple of human capital and infrastructure cost to the damage incurred in the September 11th attacks estimated to be between $10 and $60 billion.[102] The table below lists the estimated costs of a Strait of Hormuz disruption for three scenarios. In all scenarios, this paper uses the moderate option for the cost of this oil disruption.[103]

[102] Bruno S. Frey, Dimon Luechinger, and Alois Stutzer, "Calculating Tragedy: Assessing the Costs of Terrorism," CESIFO Working Paper No. 1341, November 2004, [online: web]. cited 4 March 2006. URL: http://opus.zbw-kiel.de/volltexte/2005/2604/pdf/cesifo1_wp1341.pdf, 17.

[103] To determine the net effect on world oil prices, the author used the rules of thumb for oil supply disruptions as delineated in U.S. Energy Information Agency (EIA), "Energy Security: Rules of Thumb for Oil Supply Disruptions," [online: web], updated 2 September 2004, cited 8 January 2006, para 2-6. URL: http://www.eia.doe.gov/emeu/security/Oil/rule.html. These disruptions imply an increase of 10-15% in the current price of oil per barrel per day per net million barrels of oil disrupted. For instance, at $40 per barrel, a net disruption of 2 million barrels of oil would result in a price increase of $8 to $12 per barrel. Net supply disruptions are calculated by including the amount of oil in the area affected and then subtracting any excess capacity that other *unaffected countries* have available to meet demand. As of November 2005, the EIA estimated that the only country in the world that had excess capacity was Saudi Arabia with a spare capacity of 1.5 mbpd. There are also price and

Economic Impact of Hormuz Strait Net Supply Disruption			
	Range of Key Variables in Three Scenarios		
Key Variables	Low	Moderate	High
Initial Oil Price per Barrel	$54.41	$63.41	$72.41
Net Oil Supply Disruption (mbpd)	7.56 mbpd	8.76 mbpd	9.56 mbpd
% Price Increase per Barrel	75.60%	113.88%	143.40%
Price Increase per Barrel	$41.13	$72.21	$103.84
New Price per Barrel	$95.54	$135.62	$176.25
GDP Growth Rate % Point Decrease	0.38%	0.85%	1.43%
Implied Annual Loss in GDP ($US Bn)	$47.18	$106.61	$179.00
Net Present Value of 2 Year Disruption ($US Bn)	$92.33	$208.63	$350.28
Net Present Value of 3 Year Disruption ($US Bn)	$135.54	$306.26	$514.20
Net Present Value of 5 Year Disruption ($US Bn)	$216.45	$489.08	$821.15
Net Present Value of 10 Year Disruption ($US Bn)	$390.15	$881.55	$1,480.08

To estimate the other costs associated with an Iranian war, this analysis takes the estimated economic costs of the Iraq War of between $1 and $2 trillion and uses a multiple of this number to estimate the cost of an Iranian war.[104] Finally, this paper uses the Wilshire 5000 composite index of US stocks to estimate the total US market capitalization. It assumes that the cumulative abnormal returns in the US stock market would be -6.69% per attack and it would take 13 days for the market to recover to pre-attack levels. It calculates the opportunity cost of interest that could have been earned during these 13 days at the current risk free rate of 4.5%.[105]

Iranian Cost Methodology

Any Iranian strategy implemented in response to US policies of coercion or strategic adjustment will have political, economic, and military costs. This paper considers six primary costs including the costs of increased Hezbollah financial support, an incremental defense budget increase, oil exports, total imports, and oil production disrupted, and the incremental cost of rebuilding Iran's nuclear program.

The increase in Hezbollah support is based on an estimated multiple increase in the current annual contribution of $100 million. The incremental increase in defense spending is denoted by increase as a percentage of Iranian GDP. Oil exports and production are based on Iran's current exports and production rates of 2.7 mbpd and 4.2 mbpd, respectively. Rebuilding Iran's nuclear program is estimated to be $1 billion in all cases.[106]

Policy 1: Coercion

The following section includes a description of the methodology to ascribe real economic costs to US coercive policy versus Iran and the Iranian strategic response to this policy. It includes a section on decision analysis using various combinations of the costs outlined above to replicate policy outcomes.

psychological premia that analysts use in certain scenarios in addition to the base case rules of thumb. There is also a companion rule of thumb for the impact of net oil supply disruptions on US GDP growth. Each 10% sustained increase in oil prices could reduce the growth rate of real US GDP by 0.05 to 0.1 percentage points. First-year impacts are likely to be closer to 0.05, while second year impacts are likely to be near 0.1.

[104] Linda Bilmes and Joseph E. Stiglitz, "The Economic Costs of the Iraqi War: An Appraisal Three Years After the Beginning of the Conflict," Kennedy School of Government Faculty Research Working Paper Series, RWP06-002, January 2006, 30.

[105] Andrew H. Chen and Thomas F. Siems, "The Effects of Terrorism on Global Capital Markets," *European Journal of Political Economy* 20 (2004): 362, [online: web], cited 4 March 2006, URL: http://www.wcfia.harvard.edu/seminars/pegroup/chen_siems.pdf.

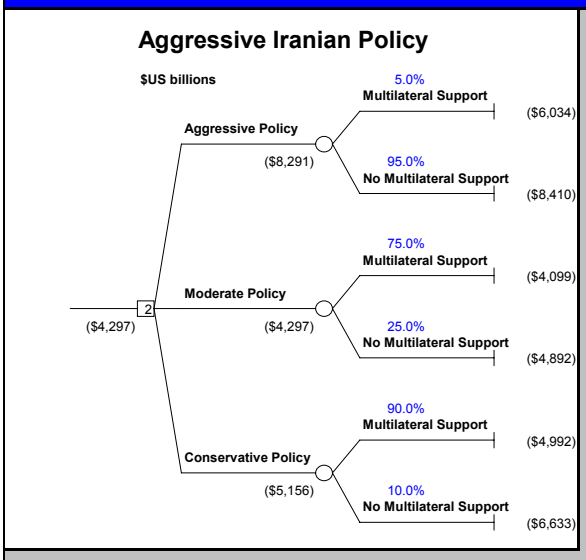
[106] Graham Allison, *Nuclear Terrorism: The Ultimate Catastrophe*, (New York: Times Books, 2004), 212.

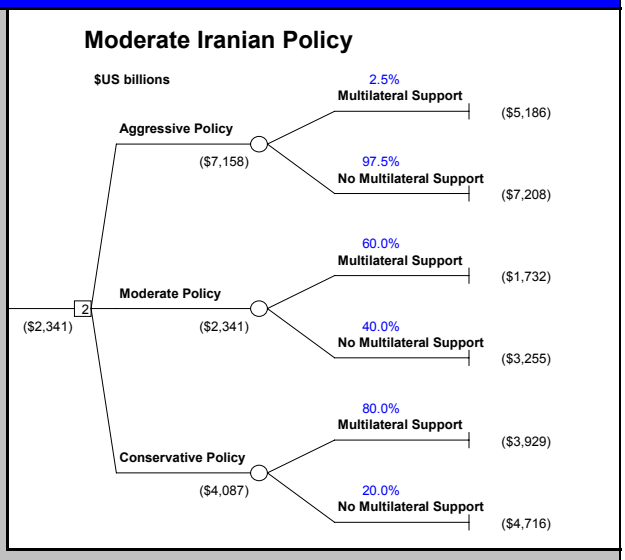
Second, it maps these outcomes to a game theoretic three-by-three matrix to determine the dominant strategies for Iran and the US.

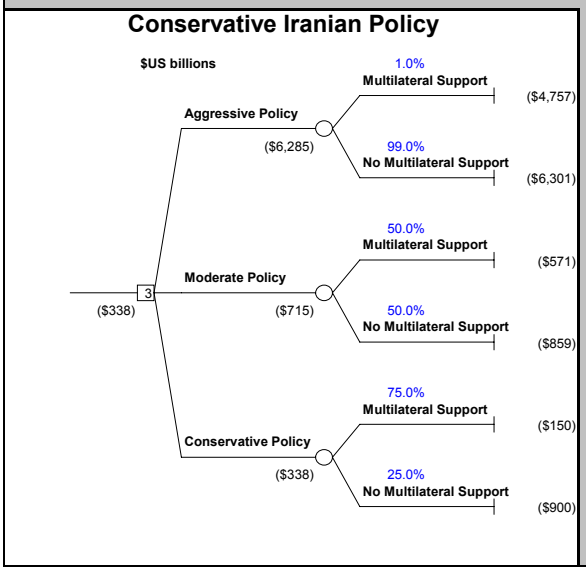
Decision Analysis: Coercion

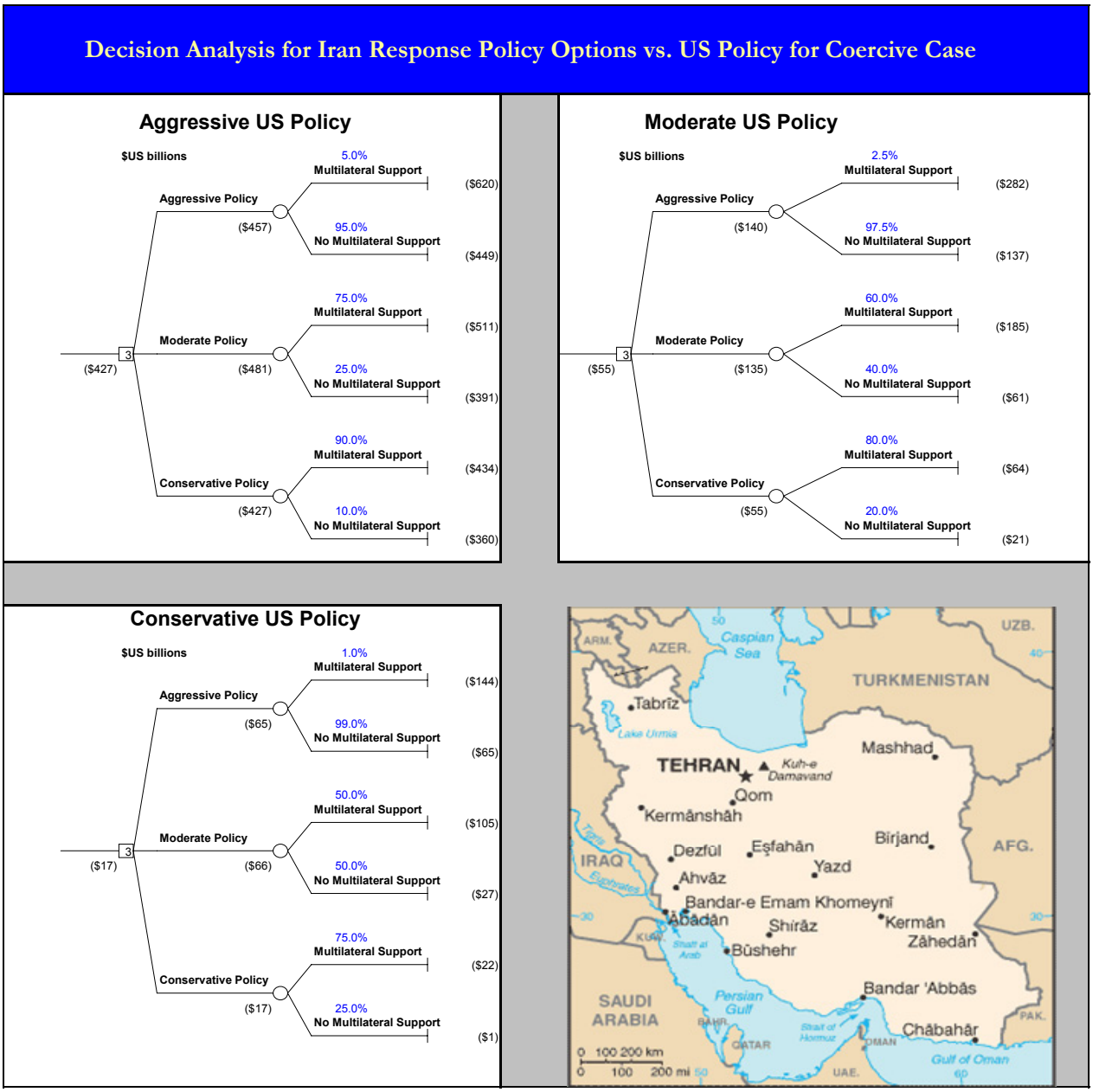
Using the costs outlined above, this paper assumes that Iran and the US can pursue aggressive, moderate, or conservative coercive policies. An aggressive US strategy assumes political and economic sanctions followed by a ground invasion of Iran. A moderate strategy assumes intermediate sanctions followed by a comprehensive bombing campaign and a conservative strategy assumes limited sanctions followed by a precision strike. Similarly, aggressive, moderate and conservative strategies reflect the intensity of Iran's response. This analysis assumes that the US will pursue one of these policies regardless of whether it does so unilaterally or multilaterally. Each strategy has a probability that the US will have multilateral support. The US and Iranian decision trees are listed below. Appendix G includes all other calculations.

Decision Analysis for US Policy Options vs. Iranian Response Policy for Coercive Case









Game Theoretic Analysis: Coercion

When the results of the decision analysis are mapped to a decision table, it becomes clear given the assumptions above, that the dominant Iranian strategy is a conservative strategy because from a purely rational economic approach, it offers the lowest cost no matter what the United States does. Therefore, a rational Iranian actor who knows that under any condition, the US and its allies will destroy Iran's nuclear program, has nothing to gain by aggressively attacking US targets in an indiscriminate manner. However, Iran does have every reason to make US decision-makers believe that it will. Otherwise, it has no choice but to follow its conservative strategy. (See table below for the dominant Iranian strategy).

United States-Iran Policy Game Theoretic Strategic Matrix for Coercive Case
$US Billions

		United States Strategy		
		Aggressive	Moderate	Conservative
Iranian Strategy	Aggressive	($8,291) ($457)	($4,297) ($140)	($5,156) ($65)
	Moderate	($7,158) ($481)	($2,341) ($135)	($4,087) ($66)
	Conservative	($6,285) ($427)	($715) ($55)	($338) ($17)

Dominant Iranian Strategy

In contrast, the US has no dominant strategy, but does have a Nash equilibrium at the intersection of an Iranian and a US conservative strategy. A Nash equilibrium is a point that is Pareto optimal – no move to any other cell on the decision matrix will make the other party worse off. Thus, under the above assumptions, the US should pursue a conservative strategy that ends in a precision strike (See below for the US Nash equilibrium).

United States-Iran Policy Game Theoretic Strategic Matrix for Coercive Case
$US Billions

		United States Strategy		
		Aggressive	Moderate	Conservative
Iranian Strategy	Aggressive	($8,291) ($457)	($4,297) ($140)	($5,156) ($65)
	Moderate	($7,158) ($481)	($2,341) ($135)	($4,087) ($66)
	Conservative	($6,285) ($427)	($715) ($55)	($338) ($17)

US Nash Equilibrium

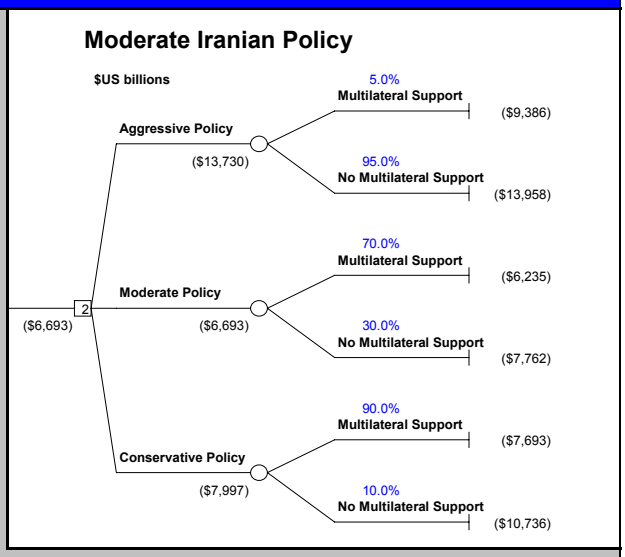
Policy 2: Strategic Adjustment

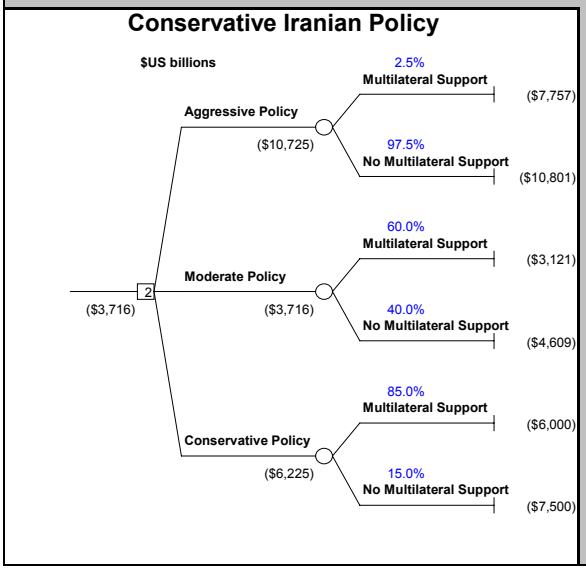
This section includes a description of the methodology to ascribe real economic costs to a US policy of strategic adjustment versus Iran. It includes a section on decision analysis using combinations of the costs outlined above to replicate policy outcomes. It then maps these outcomes to a game theoretic three-by-three matrix to determine the dominant strategies for Iran and the US.

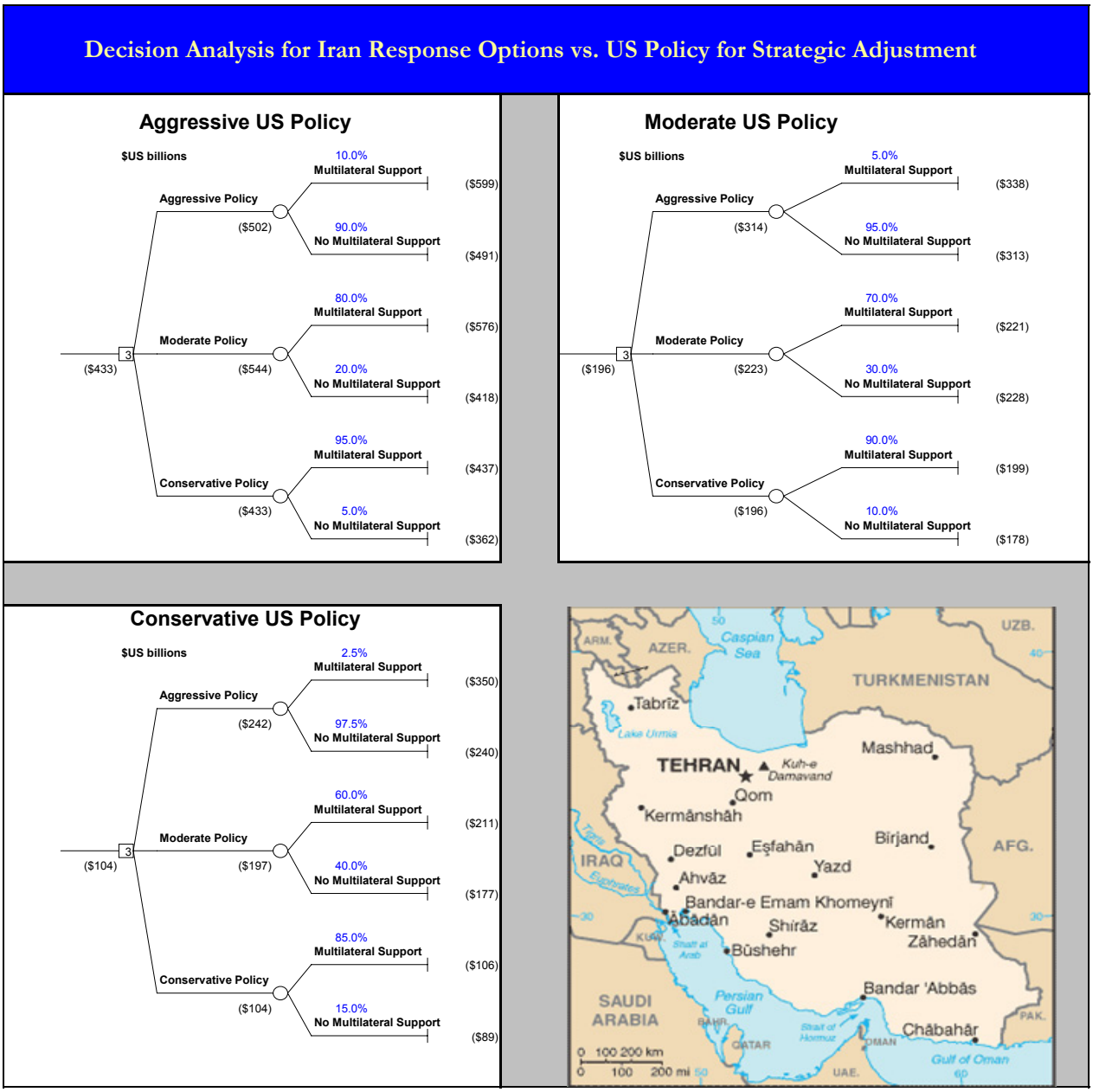
Decision Analysis: Strategic Adjustment

Using the costs outlined above, this paper assumes that Iran and the US can pursue aggressive, moderate, or conservative policies. An aggressive US strategy assumes aggressive political and economic sanctions followed by a concerted effort to minimize Iranian regional influence. A moderate strategy assumes intermediate sanctions followed by a moderate effort to contain Iran and a conservative strategy assumes limited sanctions followed by limited ongoing military actions. Similarly, aggressive, moderate and conservative strategies reflect the intensity of an Iranian response. As in the coercive policy, each policy accounts for the probability of multilateral support. The US and Iranian decision trees are listed below. Appendix G includes all other calculations.

Decision Analysis for US Policy Options vs. Iranian Response for Strategic Adjustment







Game Theoretic Analysis: Strategic Adjustment

When the results of the decision analysis are mapped to a decision matrix, it becomes clear given the assumptions above, that the dominant Iranian strategy is a conservative strategy because from a purely rational economic approach, this strategy incurs the lowest costs no matter what the US does. Therefore, a rational Iranian actor knowing that under any condition, the US and its allies will increase their engagement in the region, has nothing to gain by aggressively attacking US targets indiscriminately. However, Iran does have every reason to make US decision-makers believe that it will. Otherwise, it has no choice but to follow its conservative strategy. (See table below for the dominant Iranian strategy).

United States-Iran Policy Game Theoretic Strategic Matrix for Strategic Adjustment Case
$US Billions

		United States Strategy		
		Aggressive	Moderate	Conservative
Iranian Strategy	Aggressive	($15,581) ($502)	($8,174) ($314)	($9,790) ($242)
	Moderate	($13,730) ($544)	($6,693) ($223)	($7,997) ($197)
	Conservative	($10,725) ($433)	($3,716) ($196)	($6,225) ($104)

Dominant Iranian Strategy

In contrast to a coercive policy, the US has a dominant moderate strategy under a policy of strategic adjustment. Therefore, under the assumptions generated above, the US should pursue a moderate strategy that involves more active US regional involvement (See below for the US dominant strategy).

United States-Iran Policy Game Theoretic Strategic Matrix for Strategic Adjustment Case
$US Billions

		United States Strategy		
		Aggressive	Moderate	Conservative
Iranian Strategy	Aggressive	($15,581) ($502)	($8,174) ($314)	($9,790) ($242)
	Moderate	($13,730) ($544)	($6,693) ($223)	($7,997) ($197)
	Conservative	($10,725) ($433)	($3,716) ($196)	($6,225) ($104)

US Dominant Strategy

There are two primary limitations in this analysis. First, this analysis assumes a one round game – the first move. However, this game is a multi-round game in which the players must react to each others' movements over time. Such a repeated game will tend to moderate each side's actions over time. Second, this analysis assumes only two players. A more complete analysis would include other players like the EU, the GCC, and the Chinese, among many others. Unfortunately, such an analysis would constitute an entire PAE in its own right.

Recommendations

The challenge of Iranian proliferation requires two sets of recommendations for US policymakers – one for coercion and one for strategic adjustment. This section will outline both sets of recommendations.

Policy 1: Coercion

Recommendation #1: Prepare the Battlefield for the Transition from Plan A to Plan B

The US must work with EU allies to prepare the battlefield for a legitimate transition from Plan A to Plan B. A clear time line and definition of triggers is necessary for US efforts to succeed. To prepare for this transition, the US must be mindful of these two key considerations.

The Transition from Plan A to Plan B Requires a Binding UNSC Resolution within One Year

The transition from Plan A to Plan B would begin with a formal UNSC resolution requiring Iran to submit to compulsory inspections and suspend uranium enrichment activity under Chapter 7 of the UN charter. If the US fails to get a binding UNSC resolution within one year, UN diplomacy has failed and the US should prepare to execute political and economic sanctions under the mantle of NATO.

The Triggers for Military Action Are Iranian Withdrawal from the NPT, Expulsion of IAEA Inspectors, Large Scale Uranium Enrichment, and/or Imminent Completion of an Atomic Weapon

The final red line in this process is the one that separates political and economic sanctions from military action. If the Iranians begin large-scale uranium enrichment, expel IAEA inspectors, unilaterally withdraw from the NPT, and/or are within one month of producing an atomic weapon, NATO or the UN should execute a limited precision strike. The US will not achieve its objectives if it fails to convince the UN or NATO to begin a sanctions regime within one year. The loss of US credibility over Iraq will make the cost of unilateral action against Iran outweigh the benefits. Unilateral action is not an option.

Recommendation #2: Coercive Strategy Must Focus Solely on Iranian Nuclear Weapons

This policy requires the US to make a clear linkage of its Iran policy to Iran's pursuit of nuclear enrichment. It also requires the US to limit its ends and means to curbing these activities. The US's Plan B coercive option must proceed in parallel with and mutually reinforce the Plan A diplomatic option. The US must also gain a firm commitment from its European and Japanese allies to fully support a coercive option should diplomacy fail. This policy includes political, economic, and military dimensions that escalate the closer Iran comes to completing its nuclear fuel cycle and it requires a multilateral approach.

Political Pressure Requires Isolating Iran's Leadership

The US must coordinate with EU allies to isolate Iranian leaders from the international community, the Muslim world, and their people by exhausting diplomatic means to resolve the crisis over Iranian nuclear enrichment to discredit the Iranian leadership and convince the international community that the US and EU pursued a legitimate process before resorting to coercive means. The US must limit this isolation to concerns over Iran's nuclear program. The US and its allies can expel or deny Iran's membership in international organizations; exert political pressure on individual Iranian leaders; and encourage independent organizations to condemn Iran. These political pressure components will prepare the political battlefield for future military action should this pressure fail.

Economic Pressure Must Involve Restriction of FDI and Import Sanctions on Iran

The two economic levers that the US and its allies can use are restriction of foreign direct investment and trade sanctions on imports to Iran. Because FDI is fungible, it will be easier for the EU to sell this policy to its citizens. Import sanctions would be a harder sell for EU politicians, but the recent French and Mohammed cartoon riots make European populations increasingly ready to support tougher measures against a threatening Muslim country.

If Political and Economic Pressure Fail, a Precision Air Strike Is Necessary
The final coercive component requires the US and its allies to limit the size and scope of their last ditch military response. By having engaged in over three years of patient diplomatic negotiation and slowly ratcheted up the pressure through political and economic means, the US must continue to demonstrate its restraint by targeting only those facilities that are critical to Iranian enrichment. If Iran responds in a manner disproportionate to a limited US attack, then the US can seize the moral high ground to respond more aggressively to Iran's provocation and insulate itself from the perception that it is striking yet another "innocent" Muslim country.

Recommendation #3: Secure Energy Resources
Prepare US and allied economies with high oil dependencies by increasing strategic petroleum reserves, encouraging investment in alternative fuels, and reducing vulnerability to the Saudi oil production and distribution system to sustain at least three years of high petroleum prices. The US can also accomplish this task by aggressively patrolling the Strait of Hormuz to deter and defeat Iranian attempts at disruption.

Increase Strategic Petroleum Reserves
The US and its OECD allies should aggressively stock their strategic petroleum reserves over the next six months to insulate themselves from a oil supply shock. The US should adjust its SPR target from 700 million barrels to 1 billion barrels over the next three years as a hedge against future oil price volatility associated with an Iranian conflict.

Encourage Investment in Alternative Fuels
The US should investment in a Manhattan Project for alternative energy that makes use of the most effective substitutes for fossil fuels to include nuclear, wind, solar and biomass energy sources. While this policy is beyond the scope of this paper, it is nevertheless tied to an overall US national security strategy.

Reduce Vulnerability to Saudi Oil Production and Distribution
The US and US corporations should continue to support Saudi efforts to divert its pipelines from the Persian Gulf toward safer terminals on the Red Sea. Additionally, the US should deploy air defense assets to the most critical nodes in the Saudi system to include the Ras Tanura and Ras al-Ju'aymah oil terminals and the Abqaiq oil facility – which has already been targeted as recently as February 27, 2006 when al Qaeda suicide bombers attempted to bomb the facility.

Protect the Strait of Hormuz
The fourth way to secure energy resources is to protect the Strait of Hormuz. The US and its allies can accomplish this goal by aggressively patrolling it with the US Navy and threatening to target Iranian oil terminals should the Iranians mine the Strait.

Policy 2: Strategic Adjustment
Recommendation #4: Contain the Increased Iranian Conventional Military Threat
The US must contain an Iran emboldened by its nuclear weapons capability. The US must provide the organizational structure, troops, and arms and training necessary to provide regional allies with the means to resist Iranian external military and internal terrorist and insurgent threats.

Establish Arabian Gulf Treaty Organization (ARGTO)
Establish the Arabian Gulf Treaty Organization (ARGTO) to encourage EU and Gulf allies to support an increased regional security commitment and to strategically encircle Iran.

Increase US Troop Deployments to Protect Regional Allies
The paradox of allowing Iran develop nuclear weapons is that a nuclear armed Iran would require an increased engagement of US armed forces. The US must keep a sufficient number of troops in the region

to shore up regional allied governments against both external Iranian threats and internal Iranian inspired revolutions of local Shia minorities – or majorities in the case of Iraq.

Increase Allied Access to US Arms and Training
Should Iran acquire nuclear capability, the GCC States will demand increased access to US weapons systems and training. In this scenario, it is in the US's interest to meet this need.

Recommendation #5: Reassure Regional Friends and Allies against Proliferation
Containment of Iran will fail if the US does not take steps to reassure regional friends and allies that the US is committed to protecting them from Iranian nuclear weapons. Therefore to reassure regional allies, the US must guarantee a nuclear umbrella to regional allies, increase allied access to US arms and training, and encourage development of advanced nuclear forensic techniques to prevent Iran from using or diverting nuclear materials covertly.

Guarantee US Nuclear Umbrella to Regional Allies
For a US defense commitment against Iran to regional allies in ARGTO to be credible, the US must provide them with a nuclear umbrella.

Deploy Ballistic Missile Defense System to Middle East
The US must also deploy a ballistic missile defense system to the Middle East to allay allied fears of Iranian nuclear weapons and to discourage them from developing their own nuclear capability. The US must be steadfast in curtailing Iranian missile technology, continue to improve the US missile defense system, and undermine the Iranian regime to encourage internal regime change.

Encourage Development of Advanced Nuclear Forensic Techniques
The US should encourage the development of advanced nuclear forensic techniques to make it impossible for Iran or any other nuclear proliferators to channel nuclear material covertly to other countries and/or terrorists without exposing their actions to the scorn of the world community.

Recommendation #6: Continue to Push for a Denuclearized Iran
While allowing Iran to develop nuclear weapons would constitute a strategic defeat for the US, the US must not admit defeat. The US must continue to push for a denuclearized Iran by pursuing diplomatic, political, economic, and military means to persuade and coerce the Iranian regime that continued possession of nuclear weapons will result in continued isolation from the international community.

Offer Russia a US Nuclear Cooperative Agreement
To sever Iran from its key Russian nuclear supplier the US should allay Russian concerns about their nuclear industry's survival by offering Russia a nuclear cooperative agreement. This deal would allow Russia to store US origin spent fuel in Russia in exchange for $10 to $20 billion.

Clarify What is Peaceful Under the NPT
The US and its allies should convene a series of meetings to define explicitly what is meant by peaceful nuclear development in an effort to close legal loopholes in the NPT and to de-legitimize Iran.

Establish Country-Neutral Rules for NPT Violators
The US and its allies should augment France's recent proposals that the UN Security Council adopt country-neutral rules for NPT violators that would prohibit countries from supplying these nations with nuclear materials if they refused inspections or withdrew from the NPT.

Interviews and Consultations

Name	Organization
Dr. Ashton B. Carter	Stanford-Harvard Preventive Defense Project
Xenia Dormandy	Belfer Center for Science and International Affairs
Dr. Geoffrey Kemp	The Nixon Center
Clifford Kupchan	Eurasia Group
Lieutenant James Lemmon	Surface Warfare Officer, United States Navy
Dr. Steve Miller	Belfer Center for Science and International Affairs
Dr. George Perkovich	Carnegie Endowment for International Peace
Dr. Kenneth Pollack	Saban Center, Brookings Institution
General Kevin Ryan	United States Army
Captain Douglas Scott	Senior Air Controller for Forward Operating Base 103, Northern Iraq, United States Army
Henry D. Sokolski	Nonproliferation Policy Education Center
Henry Wooster	Iran Desk Officer, Office of Arabian Peninsula and Iran Affairs, United States Department of State
Dr. Richard Zeckhauser	Harvard University

Bibliography

Executive Summary

Eisenstadt, Michael. "Delay, Deter and Contain, Roll-Back: Toward a Strategy for Dealing with Iran's Nuclear Ambitions." *Iran's Bomb: American and Iranian Perspectives*. ed. Geoffrey Kemp. Washington, D.C.: The Nixon Center, 2004.

The International Institute for Strategic Studies. *The Military Balance: 2005-2006*, ed. Colonel Christopher Langton. London: Routledge, 2005.

Russell, Richard L. "Iran in Iraq's Shadow: Dealing with Tehran's Nuclear Weapons Bid." *Parameters* 34.3 (Autumn 2004):31-45.

Sokolski, Henry D. "Getting Ready for a Nuclear-Ready Iran: Report of the NPEC Working Group." *Getting Ready for a Nuclear-Ready Iran*. ed. Henry D. Sokolski and Patrick Clawson. Carlisle, PA: The Strategic Studies Institute Publications Office, 2005.

Background

Pike, John. ed. "Weapons of Mass Destruction: Special Weapons Facilities." [online: web]. cited 9 January 2006. URL: http://www.globalsecurity.org/wmd/world/iran/facility.htm.

Case Study Findings

Iranian Foreign Policy

BBC News. "Iran Reported to Security Council." [online: web]. updated 4 February 2005. cited 5 February 2005. para 1-20. URL: http://news.bbc.co.uk/1/hi/world/middle_east/4680294.stm.

---. "Russia Forges Ahead with Iran Reactor." [online: web]. updated 26 December 2002. cited 5 February 2006. para 5. URL: http://news.bbc.co.uk/1/hi/world/middle_east/2606097.stm.

---. "Timeline: Iran." [online: web]. updated 4 February 2006. cited 4 February 2006. para 43. URL: http://news.bbc.co.uk/1/hi/world/middle_east/country_profiles/806268.stm.

Berman, Illan. *Tehran Rising: Iran's Challenge to the United States*. Lanham, MD: Rowman and Littlefield, 2005.

Brzezinski, Zbigniew and Gates, Robert M., ed. *Iran: Time for a New Approach*. Report of an Independent Task Force Sponsored by the Council on Foreign Relations. New York: Council on Foreign Relations, 2004.

Bureau of Diplomatic Security, US Department of State. *Significant Incidents of Political Violence Against Americans: 1996*. Andrew Corsun. ed. Washington, D.C.: US Department of State, 1997.

Byman, Daniel. "Testimony on WMD Terrorism and Proliferant States before the House Homeland Security Committee, Subcommittee on the Prevention of Nuclear and Biological Attacks." (Date: 8 September 2005). Text from: Federal Document Clearing House Congressional Testimony. Available from: LexisNexis® Congressional; Accessed 6 February 2006.

CNN. "Iran Tells IAEA to Remove Cameras." [online: web]. updated 6 February 2006. cited 6 February 2006. para 1. URL: http://www.cnn.com/2006/WORLD/meast/02/06/iran.inspections/index.html.

Congressional Research Service, *Iran's Nuclear Program: Recent Developments*. Sharon Squassoni. ed. August 15, 2003.

Corsi, Jerome. *Atomic Iran: How the Terrorist Regime Bought the Bomb and American Politicians*. Nashville, TN: WND Books, 2005.

Cordesman, Anthony. *Iran's Developing Military Capabilities*. Washington, D.C.: Center for Strategic and International Studies Press, 2005.

---. *The Iran-Iraq War and Western Security: Strategic Implications and Policy Options.* London: Jane's, 1987.

---. *The Military Balance in the Middle East*. Westport, CT: Praeger, 2004.

Cumings, Bruce. *Inventing the Axis of Evil: The Truth about North Korea, Iran and Syria*. New York: New Press, 2004.

Eiss, Camille and Lennon, Alexander T.J., ed. *Reshaping Rogue States: Preemption, Regime Change, and US Policy Toward Iran, Iraq, and North Korea*. Cambridge, MA: MIT Press, 2004.

Farber, David. *Taken Hostage: The Iran Hostage Crisis and America's First Encounter with Radical Islam*. Princeton, NJ: Princeton University Press, 2005.

Harris, David. *The Crisis: the President, the Prophet and the Shah – 1979 and the Coming of Militant Islam*. New York: Little, Brown and Company, 2004.

Hiro, Dilip. *The Iranian Labyrinth: Journeys Through Theocratic Iran and its Furies*. New York: Nation Books, 2005.

---. *The Longest War: The Iran-Iraq Military Conflict*. New York: Routledge, Chapman & Hall, Inc., 1991.

Howard, Roger. *Iran in Crisis?: Nuclear Ambitions and the American Response*. New York: Zed Books, 2004.

International Atomic Energy Agency. *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran GOV/2003/40*. 6 June 2003.

---. *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran GOV/2005/67*. 2 September 2005.

---, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran GOV/2005/87*, 18 November 2005.

---. "Developments in the Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran and Agency Verification of Iran's Suspension of Enrichment-related and Reprocessing Activities." *Update Brief by the Deputy Director General for Safeguards*. 31 January 2006.

Kemp, Geoffrey. *Iran and Iraq: The Shia Connection, Soft Power, and the Nuclear Factor*. Washington, D.C.: United States Institute of Peace, 2005.

Nuclear Threat Initiative. "Iran Profile: Nuclear Overview." [online: web]. updated December 2005. cited 5 February 2006. URL: http://www.nti.org/e_research/profiles/Iran/1819.html.

Office of the Coordinator for Counterterrorism, US Department of State. "Iran." *Country Reports on Terrorism 2004*. Washington, D.C.: US Department of State, 2005.

Pollack, Kenneth. *The Persian Puzzle: The Conflict Between Iran and America*, (New York: Random House, 2004.

Ros-Lehtinen, Ileana. (Representative, U.S. Congress). "Testimony on State Sponsored Terrorism in Iran before the House International Relations Committee, Subcommittee on Middle East and Central Asia." (Date: 16 February 2005). Text from: Federal Document Clearing House Congressional Testimony. Available from: LexisNexis® Congressional; Accessed 5 February 2006.

Sciolino, Elaine. *Persian Mirrors: The Elusive Face of Iran*. New York: Free Press, 2000.

Turner, Admiral Stansfield. *Burn Before Reading: Presidents, CIA Directors, and Secret Intelligence*. New York: Hyperion Books, 2005.

---. *Terrorism and Democracy*. Boston: Houghton Mifflin Company, 1991.

Weldon, Curt. *Countdown to Terror: the Top Secret Information that Could Prevent the Next Terrorist Attack on America – and How the CIA Has Ignored It*. Washington, D.C.: Regnery Publications, 2005.

Kosovo

Clark, Wesley. *Waging Modern War*. New York: Carnegie Council on Ethics and International Affairs, 2003.

Cordesman, Anthony. *The Lessons and Non-lessons of the Air and Missile Campaign in Kosovo*. Westport, CT: Praeger, 2001.

Osirak

Claire, Rodger William. *Raid on the Sun: Inside Israel's Secret Campaign that Denied Saddam the Bomb*. New York: Broadway Books. 2004.

Hamza, Khidhir. *Saddam's Bombmaker: the Terrifying Inside Story of the Iraqi Nuclear and Biological Weapons Agenda*. New York: Scribner, 2000.

US Strike Plan on North Korean Reactor

Carter, Ashton B. interview in "Kim's Nuclear Gamble." *PBS Frontline*. March 3, 2003. [online: web]. cited 30 January 2006. para 2-3. URL: http://www.pbs.org/wgbh/pages/frontline/shows/kim/interviews/acarter.html

Carter, Ashton B. and Perry, William J. *Preventive Defense*. Washington, D.C.: Brookings Institution Press, 1999.

Pike, John, ed. "OPLAN 5026 – Air Strikes." [online: web]. cited 30 January 2006. para 4. URL: http://www.globalsecurity.org/military/ops/oplan-5026.htm.

Cuban Missile Crisis
Allison, Graham and Zelikow, Philip. *Essence of Decision: Explaining the Cuban Missile Crisis*. 2nd ed. New York: Addison-Wesley Educational Publishers, Inc., 1999.

US's Strategic Adjustment to China's Nascent Nuclear Weapons Program
Gavin, Francis J.. "Blasts from the Past: Proliferation Lessons from the 1960s." *International Security* (Winter 2004/2005).

Policy 1: Coercion
Allies
EU-3/EU/Japan
"France's Failure: Of Riots and Failure." *The Economist* 377 (12 November 2005): via Factiva [online: web]. cited 22 January 2006. URL: http://global.factiva.com/ha/default.aspx.

China
"China Bids to Revive Mega Iran Energy Deal." *Agence France Presse*. 17 December 2005. via Factiva [online: web]. cited 30 January 2006. URL: http://global.factiva.com/ha/default.aspx.

Russell, Richard L. *Weapons Proliferation and War in the Greater Middle East: Strategic Contest*. New York: Routledge, 2005.

Iraq
Alston, Brigadier General C.D. "Ongoing Security Operations in Iraq." *Special Defense Department Briefing*. [online: web]. updated 29 December 2005. cited 8 February 2005. para 4. URL: http://www.mnf-iraq.com/Transcripts/051229.htm.

Gulf Cooperation Council (GCC) States
Cooperation Council for the Arab States of the Gulf Secretariat General. "Introduction: The Concepts and Foundations." [online: website]. para 1. cited 14 January 2006. URL: http://www.gcc-sg.org/Foundations.html.

Political, Economic, and Military Options/Tools
Economic Tools
Cortright, David and Lopez, George A. *Sanctions and the Search for Security: Challenges to UN Action*. Boulder, CO: Lynne Rienner Publishers, Inc. 2002.

---. ed. *Smart Sanctions: Targeting Economic Statecraft*. Boston, MA: Rowman & Littlefield Publishers, Inc. 2002.

Crawford, Neta C. and Klotz, Audie. ed. *How Sanctions Work: Lessons from South Africa*. New York: St. Martin's Press, 1999.

International Monetary Fund, "Islamic Republic of Iran - Statistical Appendix." *IMF Country Report No. 04/307*. 27 August 2004.

Niblock, Tim. *"Pariah States" & Sanctions in the Middle East: Iraq, Libya, Sudan*. Boulder, CO: Lynne Rienner Publishers, Inc. 2001.

Military Options
BBC News. "The Nuclear Fuel Cycle." [online: web]. cited 4 February 2006. URL: http://news.bbc.co.uk/2/shared/spl/hi/sci_nat/05/nuclear_fuel/html/mining.stm

Central Intelligence Agency. "Iran." *The World Factbook*. [online: web]. updated 10 January 2006. cited 28 January 2006. URL: http://www.odci.gov/cia/publications/factbook/print/iz.html.

---. "Iraq." *The World Factbook*. [online: web]. updated 10 January 2006. cited 28 January 2006. URL: http://www.odci.gov/cia/publications/factbook/print/iz.html.

Defense Manpower Data Center, Statistical Information Analysis Division. *Active Duty Military Personnel Strengths by Regional Area and By Country (309A)*, [online: web]. updated 30 September 2005. cited 8 February 2006. URL: http://web1.whs.osd.mil/mmid/military/history/hst0905.pdf.

The Economist Intelligence Unit. *Country Report December 2005: Iran*. London: The Economist Intelligence Unit, 2005.

---. *Country Report December 2005: Iraq*. London: The Economist Intelligence Unit, 2005.

Feldman, Shai and Shapir, Yiftah. ed. *The Middle East Military Balance 1999-2000*. Cambridge, MA: Belfer Center for Science and International Affairs, 2000.

---. *The Middle East Military Balance 2000-2001*. Cambridge, MA: Belfer Center for Science and International Affairs, 2001.

---. *The Middle East Military Balance 2001-2002*. Cambridge, MA: Belfer Center for Science and International Affairs, 2002.

Kam, Ephraim. "Curbing the Iranian Nuclear Threat: The Military Option." *Strategic Assessment* 7.3 (December 2004): [online: web]. cited 21 January 2006. para 19-30. URL: http://www.tau.ac.il/jcss/sa/v7n3p2Kam.html.

Myers, General Richard B. (Chairman, Joint Chiefs of Staff). "Testimony on FY06, Appropriations: Defense before the Senate Appropriations Committee, Subcommittee on Defense." (Date: 7 April 2005). Text from: Federal Document Clearing House Congressional Testimony. Available from: LexisNexis® Congressional; Accessed 16 January 2006.

National Security Advisory Group II. *The US Military Under Strain and at Risk*. Washington, D.C.: National Security Advisory Group II, 2006.

U.S. Department of Defense. *Casualty Reports*. [online: web]. updated 27 January 2006. cited 28 January 2006. URL: http://www.defenselink.mil/news/casualty.pdf.

Policy Ingredients

Economic Pressure

Perkovich, George and Manzanero, Silvia. "Plan B: Using Sanctions to End Iran's Nuclear Program." *Arms Control Today* 34.4 (May 2004): 20-25.

Takeyh, Ray and Gvosdev, Nikolas K. "Pragmatism in the Midst of Iranian Turmoil." *The Washington Quarterly* 27.4 (Autumn 2004):37.

US Department of State. "Background Note: Iran." [online: web]. updated August 2005. cited 14 January 2006. URL: http://www.state.gov/r/pa/ei/bgn/5314.htm#political.

U.S. Energy Information Agency (EIA). "Country Analysis Briefs: Iran." [online: web]. updated January 2006. cited 19 January 2006. para 1-3, 8-9, 11. URL: http://www.eia.doe.gov/emeu/cabs/Iran/Full.html.

---. "Industry and Government-Controlled Stocks in OECD Countries, End of September 2005." [online: web]. updated September 2005, cited 24 January 2006. para 1. URL: http://www.eia.doe.gov/emeu/ipsr/t16.xls.

---. "Strategic Petroleum Reserve, 1977-2004." [online: web]. cited 24 January 2006. URL: http://www.eia.doe.gov/aer/txt/ptb0517.html.

---. "Strategic Petroleum Reserve Inventory." [online: web]. updated 17 January 2006. cited 24 January 2006. para 1. URL: http://www2.spr.doe.gov/DIR/SilverStream/Pages/pgDailyInventoryReportViewDOE_new.html.

Political Pressure

Palmer, Mark. "Testimony on Policy Toward Iran before the House International Relations Committee." (Date: 16 February 2004). Text from: Federal Document Clearing House Congressional Testimony. Available from: LexisNexis® Congressional; Accessed 21 January 2006.

Iranian Reaction

Military

Byman, Daniel. "Should Hezbollah Be Next?" *Foreign Affairs* 82.6 (November/December 2003): 54-66.

Levitt, Matthew A. (Senior Fellow and Director of Terrorism Studies, the Washington Institute for Near East Policy). "Testimony on State Sponsored Terrorism in Iran before the House International Relations Committee, Middle East and Central Asia Subcommittee." (Date: 16 February 2005). Text from: Federal Document Clearing House Congressional Testimony. Available from: LexisNexis® Congressional; Accessed 21 January 2006.

Economic

Sokolski, Henry D. (Executive Director, the Nonproliferation Policy Education Center). "Testimony on Policy Toward Iran before the House International Relations Committee." (Date: 16 February 2004). Text from: Federal Document Clearing House Congressional Testimony. Available from: LexisNexis® Congressional; Accessed 21 January 2006.

U.S. Energy Information Agency (EIA). "Country Analysis Briefs: Saudi Arabia." [online: web]. updated August 2005. cited 22 January 2006. URL: http://www.eia.doe.gov/emeu/cabs/saudi.html.

U.S. Energy Information Agency (EIA). "World Oil Transit Chokepoints: Strait of Hormuz." [online: web]. updated November 2005. cited 8 January 2006. URL: http://www.eia.doe.gov/cabs/World_Oil_Transit_Chokepoints/Hormuz.html.

Policy 2: Strategic Adjustment

Allies

Egypt

Kemp, Geoffrey. *U.S. and Iran: The Nuclear Dilemma: Next Steps*. Washington, D.C.: The Nixon Center, 2004.

U.S. Agency for International Development. "Budget: Egypt." [online: website]. Updated 14 June 2005.

cited 16 January 2006. para 1. URL: http://www.usaid.gov/policy/budget/cbj2006/ane/eg.html.

U.S. Agency for International Development. "Asia and the Near East: Egypt." [online: website]. updated 30 June 2005. cited 16 January 2006. para 1. URL: http://www.usaid.gov/locations/asia_near_east/countries/egypt/.

Policy Ingredients

Protection – Denial, Detection, Deterrence and Defense

Obering, Henry A., III (Director, Missile Defense Agency). "Testimony on FY06, Appropriations: Defense before the Senate Appropriations Committee, Subcommittee on Defense." (Date: 11 May 2005). Text from: Federal Document Clearing House Congressional Testimony. Available from: LexisNexis® Congressional; Accessed 22 January 2006.

O'Halloran, James C., ed. *Jane's Land-Based Air Defence*. 8th ed. Coulsdon, Surrey, UK: Jane's Information Group, 2005.

Rovner, Joshua. "Preparing for a Nuclear Iran: The Role of the CIA." *Strategic Insights* 1.11 (November 2005): [online: web]. cited 22 January 2006. para 3. URL: http://www.ccc.nps.navy.mil/si/2005/Nov/rovnerNov05.asp#author.

Reduction of Negative Impact to Regional Alliances

Congressional Research Service. Grimmett, Richard F., ed. *Conventional Arms Transfers to Developing Nations, 1996-2003*. August 26, 2004.

Decision Analysis / Game Theory

Allison, Graham. *Nuclear Terrorism: The Ultimate Catastrophe*. New York: Times Books, 2004.

Bilmes, Linda and Stiglitz, Joseph E. "The Economic Costs of the Iraqi War: An Appraisal Three Years After the Beginning of the Conflict." Kennedy School of Government Faculty Research Working Paper Series. RWP06-002. January 2006.

Chen, Andrew H. and Siems, Thomas F. "The Effects of Terrorism on Global Capital Markets." *European Journal of Political Economy* 20 (2004): 349-366. [online: web]. cited 4 March 2006. URL: http://www.wcfia.harvard.edu/seminars/pegroup/chen_siems.pdf.

Frey, Bruno S., Luechinger, Dimon, and Stutzer, Alois. "Calculating Tragedy: Assessing the Costs of Terrorism." CESIFO Working Paper No. 1341. November 2004. [online: web]. cited 4 March 2006. URL: http://opus.zbw-kiel.de/volltexte/2005/2604/pdf/cesifo1_wp1341.pdf.

Global Financial Data. "Iran Central Bank Discount Rate." [online: web]. updated 30 September 2004. cited 4 March 2006. URL: http://www.globalfinancialdata.com.ezp2.harvard.edu/index.php3?action=detailedinfo&id=8869.

---. "USA Federal Funds Official Target Rate." [online: web]. updated 2 March 2006. cited 4 March 2006. URL: http://www.globalfinancialdata.com.ezp2.harvard.edu/index.php3?action=detailedinfo&id=7610.

Schelling, Thomas C. *The Strategy of Conflict*. Cambridge, MA: Harvard University Press, 1960.

U.S. Energy Information Agency (EIA). "Energy Security: Rules of Thumb for Oil Supply Disruptions." [online: web]. updated 2 September 2004. cited 8 January 2006. URL:

http://www.eia.doe.gov/emeu/security/Oil/rule.html.

Wilshire Indexes. "Today's Dow Jones Wilshire 5000 Composite Index." [online: web]. updated 3 March 2006. cited 4 March 2006. URL: http://www.wilshire.com/Indexes/Broad/Wilshire5000.

Appendix C: Location of Major Iranian Oil Fields and Pipelines

University of Texas at Austin, "Major Iranian Oilfields," [online: web], cited 24 January 2006, URL: http://www.lib.utexas.edu/maps/middle_east_and_asia/iran_major_oilfields78.jpg.

About the Author

Sean Hazlett is pursuing joint masters' degrees in public policy and business administration at the Kennedy School of Government and Harvard Business School. He currently serves as Research Assistant for Ford Foundation Professor of Science and International Affairs Ashton B. Carter, Co-Director of the Preventive Defense Project and former Assistant Secretary of Defense for International Security Policy. In the summer of 2004, Sean worked as an intelligence analyst at Booz Allen Hamilton where he developed strategic war games and simulations for the Department of Defense's Office of Net Assessment. In the summer of 2005, Sean interned as an associate at Morgan Stanley's Investment Banking Division in New York. Prior to graduate school, Sean was a cavalry officer in the 11th Armored Cavalry Regiment and helped train U.S. Army brigades for operations in Iraq and Afghanistan at the Army's National Training Center in Fort Irwin, CA. A graduate of Stanford University, he earned a B.S. in Electrical Engineering and B.A. in History. Sean is married to the ever patient Claire McCormack Hazlett and has two children, Erika and Sebastian. Sean will be returning to Morgan Stanley's Investment Banking Division in San Francisco in the fall.

Appendix A: Case Studies

The following section contains three case study categories including Iranian foreign policy, historical coercive strategies to disarm or compel opponents to change their strategic behavior, and the US strategic adjustment to China's development of nuclear weapons in the 1960s. This paper will analyze these different cases and draw parallels between them and the current Iranian crisis to better inform US policy.

Case 1: Iranian Foreign Policy

Because the Iranian situation is unique, a substantial portion of this paper will be dedicated to analyzing Iranian foreign policy since 1979 with a particular emphasis on Iranian terrorism and the Iran-Iraq War. It will also include a brief history on the Iranian nuclear program which began prior to 1979.

Iranian Hostage Crisis

On November 4, 1979, the US's relationship with Iran changed forever when a group of Iranian students seized 66 American hostages at the US Embassy in Tehran, ultimately holding them for a period of 444 days.[107] The crisis made options particularly difficult because any US aggressive action could result in the death of hostages. According to Admiral Stansfield Turner, then Director of Central Intelligence (DCI), non-military options included sending emissaries to negotiate with the Iranians, enlisting friendly countries to encourage Iran to release the hostages, freezing Iranian assets in US banks, asking the UN to pass a condemnatory resolution or economic sanctions, and ceasing purchases of Iranian oil.[108] The US pursued the first two options in the early days of the crisis by sending US representatives to speak with the Iranians and Yasir Arafat of the PLO to speak on the America's behalf. Several days after Arafat's visit, Iran released thirteen hostages. The US also eventually froze Iranian assets in US banks and ceased purchases of Iranian oil.[109] When it appeared that the Iranians had no intention of releasing the remaining hostages, the President's Special Coordinating Committee (SCC) discussed four military options and Admiral Turner would later suggest a fifth.

Military Options

The first option would require a small amphibious force to capture Iran's main oil terminal at Kharg Island, presumably in an attempt to use it as leverage to gain the release of US hostages. The second option was to bomb the principal Iranian oil refinery at Abadan in a punitive strike against the Iranians. The third option involved bombing Iran's US-manufactured and technologically advanced F-14 fighters at their bases throughout Iran. The fourth option, the one that US decision-makers ultimately chose, was a rescue operation. Turner's fifth option was to mine key Iranian ports. Because the SCC did not expect the crisis to last that long, they did not consider options 1-3 and 5 in any detail.[110] This analysis will focus on the rescue operation and its failure as well as Stansfield Turner's arguments for a mining operation.

Rescue Operation

The US rescue operation involved capturing a remote Iranian air base by flying eight helicopters from an aircraft carrier and C-130 aircraft with a team of Delta Force operatives and fuel from Masirah Island, Oman. Delta Force would then refuel the helicopters at Desert One, fly the helicopters to the outskirts of Tehran at Desert Two, approach Tehran in trucks, and then rescue the hostages in two separate raids on

[107] Admiral Stansfield Turner, *Burn Before Reading: Presidents, CIA Directors, and Secret Intelligence*, (New York: Hyperion Books, 2005), 169.
[108] Ibid, 171.
[109] Admiral Stansfield Turner, *Terrorism and Democracy*, (Boston: Houghton Mifflin Company, 1991), 49, 52.
[110] Ibid, 29-34, 36.

the Foreign Ministry and US Embassy. Delta Force would then fly by helicopter to Manzariyeh where it would rendezvous with C-141 aircraft from Egypt to depart Iran[111,112]

The US launched the operation on April 24, 1980. Early in the mission, one helicopter crashed en route to Desert One inside Iran. The remaining seven helicopters flew to Desert One through two severe dust storms with almost exclusive reliance on their instruments for navigation. Upon arrival, an Army Ranger unit encountered civilian traffic and instituted a road block to prevent local Iranians from notifying the regime about the operation. One vehicle escaped and the Rangers accidentally detonated a gasoline truck that attempted to run the roadblock with small arms fire. Another helicopter returned to the *U.S.S. Nimitz* after developing problems and a third arrived at Desert One with a hydraulic failure. At this point, Charlie Beckwith, the commander on the ground, decided to abort the mission. Shortly thereafter, a C-130 and a helicopter collided resulting in fires and explosions that killed eight personnel.[113]

Mining Operation

Admiral Turner advocated a mining operation because it "had the advantage of not being a lethal act." The US could lay its mines, announce that it "had done so, and let the Iranians decide whether to run the minefield at the risk of ships and lives." Additionally, a mining operation would be particularly effective against Iran because of Iran's heavy reliance on merchant shipping and the narrowness and shallowness of its harbor entrances. This operation could shut down Iranian imports and exports to virtually nothing and eliminate most of Iran's external income.[114] In today's current crisis, this option is still appealing and may be useful as a method of escalating a crisis with Iran without passing beyond the point of no return.

Conclusions

The primary lesson of Desert One is that policy-makers can paint themselves into a corner if they do not examine a full array of options, even the unlikely ones, in a confrontation with Iran. Because the SCC believed that the crisis would end shortly, it refused to consider the worst case scenarios. In fact, the SCC considered executing a second rescue attempt in which US forces would storm the Embassy in the open. This option quickly began to morph into a full-scale invasion – something that the SCC had never contemplated prior to the crisis and would be an absurd overreaction by the US government. US decision-makers should be mindful of this failure lest they repeat it in future Iranian operations.

Iran-Iraq War

Iranian conduct during the Iran-Iraq War is useful to study to gain an appreciation in Iranian military, political, and economic strategy as well as the psychology of the Iranian leadership. This section will outline the key events and evolution of the conflict and then conclude with an analysis of Iranian behavior and how it relates to the current conflict with Iran.

War of Movement

On September 22, 1980, the Iraqi Army invaded Iran with a concentrated thrust through oil rich Khuzestan, a southern province of 3.5 million people, of whom 35% to 40% were ethnic Arabs.[115] The Iraqis crossed the border with nine divisions. Three armored and two mechanized infantry divisions were to seize the key roads, cities, towns, oil fields and the Zagros Mountain passes through which Iranian

[111] Turner, *Burn Before Reading: Presidents, CIA Directors, and Secret Intelligence*, op. cit., 177.
[112] Turner, *Terrorism and Democracy*, op. cit., 110-111.
[113] Ibid, 118-119, 121-122.
[114] Ibid, 29-34, 36, 51.
[115] Dilip Hiro, *The Longest War: The Iran-Iraq Military Conflict*, (New York: Routledge, Chapman & Hall, Inc., 1991), 40.

reinforcements would have to travel to defend Khuzestan. The remaining three infantry divisions and armored division were to seize the northern Zagros passes that threatened the road to Baghdad.[116]

Iraq's initial air attacks were relatively ineffective. However, the Iranian air force with about 450 aircraft performed relatively well against the Iraqis. Flying as many as 150 sorties per day, the American-trained Iranian pilots quickly discovered that low-flying missions with 3 or 4 F-4 phantom aircraft could easily evade Iraqi air defenses. On September 25, 1980, the Iraqis targeted the massive oil processing facility at Abadan, after which the Iranians responded with a massive air attack of 143 aircraft on the Basra, Zubair, Mosul and Kirkuk oil facilities. On September 26, both sides suspended their oil deliveries. By September 28, 1980, the Iranians succeeded in halting the Iraqi drive toward the key Iranian cities of Dezful, Ahvaz, and Abadan. An Iranian naval blockade also made the Shatt al Arab unnavigable.[117]

The Iranians were initially caught flatfooted by the assault. The Iranian revolutionaries had purged as many as 12,000 officers and consequently, the Iranians were relatively unprepared for the invasion. Against 2,500 Iraqi tanks, 1,400 artillery pieces and 340 fighter bombers, Iran was outnumbered by 6 to 1 and had no more than 500 operable tanks, 300 artillery pieces, and fewer than 100 operable aircraft. Fortunately, the Iraqis executed, "one of the most incompetent military operations of the twentieth century," which gave the Iranians ample time to respond. The initial Iraqi invasion unified Iran against the invaders as volunteers streamed toward the front. Across Iran, "mullahs began rounding up volunteers, organizing them into Basij formations and dispatching them to the front under Pasdaran control."[118]

The furthest penetration of Iraqi forces was 65 kilometers and in most sectors was only 20-30 kilometers. The only city that the Iraqi's captured was Khorramshahr, but only after the loss of 8,000 casualties and 100 tanks and armored personnel carriers (APCs). By November 1980, Iran reduced Iraqi military superiority to 2 to 1, by sending reinforcements through the Zagros passes, which Iraq failed to block.[119]

Domestic pressure from Iranian President Bani Sadr's political opponents forced him to order an Iranian counterattack at Susangerd in January 1981, when Iranian forces were not yet ready for a major attack and the ground conditions in Khuzestan remained muddy and unfit for maneuver warfare. The resulting battle was disastrous for Iran with one of its armored divisions losing two-thirds of its tanks. The battle also ultimately resulted in Bani Sadr's fall.[120]

After an internal power struggle between the Mujahedin-e-Khalq (MEK) and the Islamic Republic Party (IRP) that included a wave of the assassinations of over two-hundred government officials, the IRP emerged victorious. In April 1981, this new regime launched an offensive near Qar-e Shirin using Pasdarans and Basijis in human-wave attacks despite reservations from Iran's senior military officers. The attackers successfully overran Iraqi lines. As such, the Iranians continued to use these tactics successfully against the Iraqis in other sectors. These tactics developed in further campaigns. To conserve their limited armor, the Iranians would bombard Iraqi positions with artillery, followed by massive human-wave attacks. Once the Iranians secured a breakthrough in Iraqi lines, they would exploit these holes with armored thrusts to envelop Iraqi units. From September 1981 to May 1982, the Iranians launched a series of limited attacks using these tactics to liberate lost territory. At this point, Saddam announced that he was withdrawing his forces from Iran to fight the Israelis in Lebanon thereby ending the war's first phase.[121]

---

[116] Kenneth Pollack, *The Persian Puzzle: The Conflict Between Iran and America*, (New York: Random House, 2004), 184-186.
[117] Hiro, op. cit., 40-42.
[118] Pollack, op. cit., 186-188.
[119] Ibid, 187-188.
[120] Ibid, 189.
[121] Ibid, 190-191.

War of Attrition
On June 21, 1982, Ayatollah Khomeini ordered the invasion of Iraq to export the Islamic revolution. The first military objective was the Shia city of Basra. Iran's Ramadan al-Mubarak Offensive began in mid-July and ended after two weeks of slaughter. Where the Iraqis proved incompetent at maneuver warfare, they excelled at building field fortifications on which the Iranians impaled themselves. But these losses did not shake the Iranian mullahs. They attacked in three separate offensives in August, October, and November 1982 that all ended in failure. When the Saudis brokered an agreement to end the war with Saddam agreeing to pay the Iranians $70 billion in war reparations, the Iranians rejected the agreement.[122]

War of the Cities and the Tanker War
Frustrated at Iran's refusal to end the war, Saddam resorted to bombing Iranian cities and attacking Iran's oil infrastructure. In 1982, Iraq "launched sustained air, rocket, and missile strikes on Iranian cities," but without any clear strategy. He soon discovered that while it was relatively easy for his air force to inflict pain on the Iranians, it was even easier for the Iranians to retaliate against Iraqi cities with SCUD missiles. Because most Iraqi cities were within 200 kilometers of Iran's SCUD launchers, which had a range of 300 miles, the Iranian's could easily hit Iraqi cities like Baghdad, Mosul, Kirkuk, Basra in kind, whereas most of Iran's prominent cities like Tehran were 600 kilometers from Iraq's launchers. Saddam also targeted Iran's oil facilities with the sophisticated F-1 Mirage aircraft, but the Iranians were able to repair Iraqi damage within a matter of weeks or days. When these attacks failed to inflict severe damage on Iran, the Iraqis began to attack Iranian oil tankers in the Gulf. In response, the Iranians diverted most of their oil through pipelines to oil terminals further down the coast where the Iraqis could not reach them. The Iranian Navy's destruction of the Mina al-Bakr terminal two days into the war, Iranian artillery fire across the Shatt al-Arab, and a concerted effort to ally with Syria through Hafiz al-Asad reduced Iraqi export capacity from 2.5 mbpd to 0.6 mbpd. Iraq also resorted to using chemical weapons like mustard gas, phosgene, and nerve agents like tabun, soman, and sarin killing up to 50,000 Iranian soldiers.[123]

Al-Faw Offensive
The US started to tilt toward the Iraqis by taking them off its list of terror-supporting states in 1982, providing them with $400 million of economic aid in 1983 increasing to $652 million in 1987, issuing Iraq high-tech export licenses, and providing the Iraqis satellite intelligence via Saudi Arabia on Iranian deployments. By 1986, the front settled into a routine. The Iranians would launch one major offensive into Iraq a year coupled with a series of smaller attacks every several months. However, when US hostages were taken in Lebanon, Iran used the relationships it had with the hostage takers as leverage to get weapons and intelligence on Iraqi positions from the US government. The US covertly agreed to this exchange allowing the Iranians to get better intelligence on Iraqi defenses. The Iranians quickly discovered a weak point in Iraqi defenses near the al-Faw peninsula and on the night of February 10, 1986, the Iranians crossed the Shatt al-Arab at its widest point armed with American-supplied TOW anti-tank and Hawk anti-air missiles. The next morning, the Iranians broke through Iraqi lines and exploited the breach as the Iraqis panicked to send ground reinforcements and air strikes in their usual counterattack. This time, however, the Iraqis were met with Hawk and TOW missiles, which succeeded in stopping the Iraqi counterattack cold. Unfortunately, Iran's lack of mechanized or motorized units made it impossible for them to complete the destruction of Iraq's retreating armored columns. Only after the Iraqis brought in the Republican Guard were they able to halt the Iranian offensive just short of Basra.[124]

On the one hand, the Iranian victory at al-Faw shocked the Iraqi Army into reform. After the offensive, Saddam delegated war operations to his military professionals. The Iraqi general staff responded by reorganizing the Iraqi army around six Republican Guard divisions putting the best men and material into

[122] Ibid, 193-194.
[123] Ibid, 195-198.
[124] Ibid, 207, 213-221.

these new units. On the other hand, the Iranian leadership was unable to come to a consensus about the follow-on operation to seize Basra. Professional military officers wanted to make small probing attacks on the city's perimeter to catch the Iraqis off balance and then launch a major thrust. Many generals in the Revolutionary Guard advocated a massive and direct thrust through six concentric Iraqi defensive belts that the Iraqis expanded since the beginning of the war. The Revolutionary Guard generals won the contest and the Iranians launched an attack of 200,000 men in January 1987 to seize Basra. After a month of brutal trench warfare, the Iranians breached five out of six concentric defensive rings, but could not sustain the offensive after losing between 70,000 and 80,000 soldiers and after Iraq committed its best Republican Guard divisions to stem the breach.[125]

The West Enters the War

The war suddenly turned for the Iranians when they began to target oil tankers from Gulf States like Kuwait for its support of Iraq. The Kuwaitis quickly requested that both the Americans and the Soviets escort re-flagged Kuwaiti tankers in the Gulf. In response, the Iranians continued to attack tankers and to lay mines throughout the Persian Gulf, but in nearly every engagement in which the Iranians faced the US Navy, the US Navy prevailed. The Europeans also began to aid the Iraqis more directly and helped Iraq double the range of its SCUDs. Starting on February 29, 1988 and on into March and April, Iraq launched over two hundred al-Husayn SCUD missiles against Tehran and Qom. Demoralized, more than a million people deserted Tehran in the first month of the strikes alone. The Iraqi reorganization also paid dividends on the battlefield. From April 1988 to July 1988, the Iraqis launched five offensives that crippled the defending Iranian units in al-Faw so that by the end of July, "Iran's ground forces had been decimated and were incapable of preventing the Iraqi military from driving into Iran and occupying whatever they wanted." The final straw that broke Iran, however, was the USS Vincennes' accidental downing of Iranian Air flight 655 which killed all 290 passengers and crew. The Iranians saw this accident as a deliberate US signal to Tehran that it was bent on doing whatever was necessary to overthrow the Islamic Republic. On July 20, 1988, Khomeini notified the nation by written statement that the war was over.[126]

Iranian Conduct during the War was Highly Rational and Pragmatic

A notable difference between Iraqi and Iranian prosecution of the war is how conservatively Iran fought. On the one hand, Iraq raised its standing army during the war to one million and augmented it with a standing militia of 600,000 – effectively putting 10% of its population of sixteen million under arms. It also spent some $95 billion on the war in just 95 months – roughly 57% of its GDP – financing the war with foreign loans amounting to between $85 and $90 billion. The war also forced Iraq to use foreign labor which represented some 40% of the civilian work force during the war. On the other hand, the Iranians also fielded a force of 1.6 million, despite their three to one advantage in population. Iran also financed the $85 billion it spent on the war on its own – amounting to only 12% of its highest annual GDP and even paid back most of its pre-revolution foreign loans during the war. The Iranians also did not need to use foreign laborers during the war with Iran's unemployment rate of at least 15% per year.[127]

Conclusions

There are a number of key conclusions that one can make about the behavior of the Iranian leadership and people during this conflict. First, the Iranian population rallied to the regime when faced with an Iraqi invasion on its soil. Second, Iran successfully prosecuted its war in both offensive and defense operations under conditions of complete Iraqi air superiority. In any future conflict with the US, the Iranians would face similar conditions. Knowing that they can still fight in these conditions is an important insight for US planners. Third, the Iranian people continued to support the war until the Iraqis brought the fight to their doorsteps with SCUD attacks on Tehran and Qom at the end of the war. This behavior indicates that any

[125] Ibid, 221-223.
[126] Ibid, 223-232.
[127] Hiro, op. cit., 4.

campaign focused on areas peripheral to Iran will have less of a psychological effect on the Iranian people than one in Iran. Fourth, it is clear that the Iranians view restraint as weakness. Throughout the Tanker War the Iranians consistently escalated their attacks on US vessels until the US stopped exercising restraint and began sinking Iranian vessels. It was only until the US committed what the Iranians viewed as a deliberate act of terrorism that the Iranians ended the war. Fifth, despite the high stakes of the war the Iranian mullahs fought conservatively, spending no more than 12% of their highest GDP and financing the war without using foreign loans. This conservatism indicates both a pragmatism and self-sufficiency on the part of the Iranians that the United States should not take for granted in a future conflict.

Iranian Terrorism

To understand Iranian foreign policy, it is critical that one examine Iran's use of state-sponsored terrorism to achieve its political aims. Throughout its history, Iran has sponsored a number of terrorist proxies including Hezbollah and HAMAS, and has had an ambiguous relationship with al Qaeda. This section will catalog Iran's ties to each group and examine how the Iranians have used these different terrorist proxies to achieve Iranian aims over the past three decades.

Hezbollah Continues to be Iran's Chief Terrorist Proxy

Iran's chief terrorist proxy is Hezbollah, "which, since its inception, has been trained, financed, and supported by the Iranian Revolutionary Guard Corps." Experts estimate that Iran provides between $80 and $100 million in funding to Hezbollah each year. Over the past three decades, the Iranians have also provided "up to 13,000 artillery rockets, several hundred Iranian missiles and Syrian mortars, and at least, one recent account of the use of an unmanned aerial vehicle supplied by Iran over Israeli territory."[128]

Hezbollah first caught American attention in April 1983, when Lebanese terrorists killed 63 people, including 17 Americans with suicide attacks on the US Embassy in Beirut. Hezbollah followed these attacks with simultaneous attacks on US Marines and French forces that killed 241 US Marines and 58 French peacekeepers in October 1983. In response, President Reagan withdrew US troops in February 1984. Hezbollah "also took numerous Westerners hostage in the 1980s, executing several of them." Overall, Hezbollah and its affiliates took "17 Americans, 15 Frenchmen, 14 Britons, 7 Swiss, and 7 West Germans hostage, as well as 27 others hostage during the 1980s."[129] Three Hezbollah operatives were also allegedly involved in the 1985 TWA Flight 847 hijacking. Iran has also used Hezbollah to conduct terrorist attacks in the Western Hemisphere. Hezbollah was responsible for the 1992 and 1994 bombings of the Israeli Embassy in Argentina and the AMIA Jewish Community Center in Buenos Aires.[130]

On June 25, 1996, a Saudi Hezbollah group exploded a bomb-laden truck next to the perimeter fence of the al-Khobar military barracks. "Nineteen American military personnel were killed and 502 others, including 240 Americans, were injured."[131] Recent public reports also have suggested that Iran and Syria have used Hezbollah to establish an armed presence in Iraq to destabilize the country, "with the goal of

[128] Ileana Ros-Lehtinen (Representative, U.S. Congress), "Testimony on State Sponsored Terrorism in Iran before the House International Relations Committee, Subcommittee on Middle East and Central Asia," (Date: 16 February 2005). Text from: Federal Document Clearing House Congressional Testimony. Available from: LexisNexis® Congressional; Accessed 5 February 2006; Daniel Byman, "Should Hezbollah Be Next?" *Foreign Affairs*, 82.6 (November/December 2003): 58.

[129] Daniel Byman, "Testimony on WMD Terrorism and Proliferant States before the House Homeland Security Committee, Subcommittee on the Prevention of Nuclear and Biological Attacks," (Date: 8 September 2005), Text from: Federal Document Clearing House Congressional Testimony, Available from: LexisNexis® Congressional; Accessed 6 February 2006.

[130] Ros-Lehtinen, op. cit.

[131] Bureau of Diplomatic Security, US Department of State, *Significant Incidents of Political Violence Against Americans: 1996*, Andrew Corsun, ed., (Washington, D.C.: US Department of State, 1997), 29.

establishing a political and armed presence there."[132] US policymakers should not underestimate Hezbollah's ability to execute terrorist attacks of global scale and scope. Hezbollah is more capable of carrying out a devastating terrorist campaign against US targets around the world, including the US homeland than al Qaeda ever was.

Iranian Support of HAMAS and other Palestinian Terror Organizations Remains Strong
Iran has also used state-sponsored terrorism to destabilize Israel-Palestine in an effort to harm Israel, its mortal enemy. The Iranians have used Hezbollah to aid the Palestinian terrorist campaign in the West Bank and Gaza. Not only has Hezbollah enhanced HAMAS' organizational structure, but also it has been building its own terror cells and infrastructure in those areas. In June 2001, Iran sponsored the "Support for the Palestinian Intifada" conference. This conference gathered Lebanese Hezbollah, the Popular Front for the Liberation of Palestine-General Command, Palestinian Islamic Jihad, and HAMAS. Members of HAMAS and Palestinian Islamic Jihad have also reportedly attended terrorist training camps in Iran and Lebanon run by Hezbollah and the IRGC. The Israeli seizure of over 50 tons of Iranians weapons and explosives in the Karine-A underscored Iran's massive effort to undermine Israeli stability through its support of radical elements of the Palestinian Authority.[133]

In the past two years, Iran has taken an outspoken role in encouraging Palestinian terrorism "rhetorically and operationally." Iranian Supreme Leader Khamenei has publicly praised Palestinian terrorism and Iran has provided Palestinian terror groups like the al-Aqsa Martyrs Brigades, the Palestinian Islamic Jihad, the Popular Front for the Liberation of Palestine-General Command and HAMAS with weapons, training, funding, and safe haven. On November 7, 2004, Lebanese Hezbollah sent an unmanned aerial vehicle provided by Iran into Israeli airspace.[134] In the event of a showdown with the US and its allies, Iran might use its affiliations with Palestinian terror groups to provoke the Israelis to act against Iran and thereby strain any international coalition that the US hopes to build to confront Iran's nuclear ambitions.

Iranian Has "Loose" Cooperation with Al Qaeda
US intelligence reports indicate that Iran's loose relationship with al Qaeda began in the mid 1990s. Osama bin Laden's affiliates approached Iranian Ministry of Intelligence and Security (MOIS) agents in 1995 and 1996 when bin Laden's agents offered to join Iran in its fight against the US. Phone records obtained by US investigators in the 1998 Kenya and Tanzania embassy bombings reveal that 10% of "the calls from the Compact-M satellite phone used by bin Laden and his key lieutenants were to Iran." Defendants in the Kenya and Tanzania bombings also indicated that al-Qaeda and Hezbollah, "with Iranian assistance, have had strategic meetings throughout the years in Sudan and elsewhere." The 9-11 Report has also demonstrated that al-Zarqawi was granted safe haven in Iran in the past.[135]

Iran has been reluctant to turn over senior al-Qaeda operatives that it has had in its custody since 2003 to the US, third party countries, or these operatives' countries of origin. Iran has also publicly refused to reveal the identity of these detainees on "security grounds." Despite the fact that "Iranian judiciary officials claimed to have tried and convicted some Iranian supporters" of al-Qaeda in 2004, they refuse to provide details about these trials. The Iranians have also failed to curb the activities of al-Qaeda operatives that fled to Iran after the fall of the Taliban in Afghanistan.[136] In recent years, public reports have indicated that Iranian intelligence agents have loosely cooperated with al Qaeda affiliates like Ansar

[132] Ros-Lehtinen, op. cit.
[133] Ibid.
[134] Office of the Coordinator for Counterterrorism, US Department of State, "Iran," *Country Reports on Terrorism 2004*, (Washington, D.C.: US Department of State, 2005), 88-89.
[135] Ros-Lehtinen, op. cit.
[136] Office of the Coordinator for Counterterrorism, op. cit., 88-89.

al-Islam to gather intelligence on US forces in Iraq.[137] Therefore, it is possible that the Iranians might increase their support for al-Qaeda as a proxy to attack or threaten the United States in the event of the US imposing political, economic, and military pressure on Iran.

Iranian Nuclear Program

Iran's nuclear program has a long history and has been significantly influenced by western countries and technologies. Iran's nuclear ambitions did not change with the advent of its 1979 revolution and will most likely continue under any future Iranian regime.

Iran's Nuclear Program Receives Western Assistance under the Shah: 1957-1979

Iran has had a nuclear program for nearly 50 years beginning with a US-Iranian nuclear cooperation agreement in 1957 and the purchase of an American research reactor in 1959.[138] In 1967, the US supplied Iran with a 5 MW light reactor and related laboratories at the Tehran Nuclear Research Center. In 1968, Iran signed the Nuclear Nonproliferation Treaty, which it ratified in 1970. In the 1970s, the Shah signed nuclear deals with the US in 1974, Germany in 1976 and France in 1977. In 1974, the Iranians established the Atomic Energy Organization of Iran (AEOI) and announced plans to acquire a full nuclear fuel cycle to generate 23,000 MW of nuclear energy within twenty years. In 1976, Iran signed contracts with Kraftwerk Union AG (KWU), a Germany firm, to build twin 1,300 MW light water reactors at Bushehr and Framatome, a French company, to build two 900 MW light water reactors on the Karun River.[139]

Western Nuclear Assistance Ends with Iran's Revolution: 1979-2002

Upon assuming power, Ayatollah Khomeini disavowed nuclear weapons for the Islamic Republic and Iran's nuclear plans froze. The Iran-Iraq War also slowed down Iran's pursuit of nuclear weapons and in some cases set Iran's efforts back. For instance, in 1984, the Iraqis launched an air attack on the Bushehr nuclear complex, but apparently did not damage the reactor.[140] In 1991, the Chinese shipped 1,000 kg of UF_6, 400 kg of UF_4 and 400 kg of UO_2 to Iran.[141] The Iranians signed an $800 million agreement with Russia to complete the nuclear reactors at Bushehr in 1995.[142] That same year, the Clinton administration imposed oil sanctions on Iran for its efforts to acquire nuclear weapons and its actions to impede the Middle East peace process. During the mid 1990s, the Iranians also purchased designs and components for high-speed gas centrifuges for uranium enrichment from Pakistan via the A.Q. Khan network.[143]

The Current Crisis: 2002-2006

In August 2002, Iranian dissidents reported the construction of a uranium enrichment facility at Natanz and a heavy water plant at Arak – both signs of an illicit nuclear weapons program.[144] In September 2002, the Vice President of the Islamic Republic of Iran stated that Iran was "embarking on a long-term plan to construct nuclear power plants with a total capacity of 6000 MW within two decades."[145] That same month, Russian technicians began construction on the Bushehr reactor despite strong US objections.[146]

---

[137] Ros-Lehtinen, op. cit.
[138] Kemp, op. cit., 3; Congressional Research Service, *Iran's Nuclear Program: Recent Developments*, Sharon Squassoni, ed., August 15, 2003, 1.
[139] Kemp, op. cit., 3.
[140] Ibid, 3
[141] International Atomic Energy Agency, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran GOV/2003/40*, op. cit., 2.
[142] BBC News, "Russia Forges Ahead with Iran Reactor," [online: web], updated 26 December 2002, cited 5 February 2006, para 5, URL: http://news.bbc.co.uk/1/hi/world/middle_east/2606097.stm
[143] Kemp, op. cit., 3.
[144] Ibid, 4.
[145] International Atomic Energy Agency, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran GOV/2003/40*, op. cit., 1.
[146] BBC News, "Timeline: Iran," op. cit., para 43.

US officials declared that satellite imagery of the Natanz and Arak facilities was consistent with Iran's "across-the-board pursuit of weapons of mass destruction," in December 2002. That same month the Iranians agreed to IAEA inspections of these nuclear facilities.[147]

On February 21 and 22, 2003, the Director General of the IAEA visited Iran. During this visit, the Iranians informed him of their uranium enrichment program that consisted of two new facilities at Natanz that included a pilot fuel enrichment plant (PFEP) and a large commercial-scale fuel enrichment plant (FEP). Iran also confirmed that a heavy water production plant was under construction in Arak. During the same visit, the Iran informed the Director General that it would accept modifications to its Subsidiary Arrangements as the Board of Governors requested in 1992. This action required Iran to the "early provision of design information on new facilities and on modifications to existing facilities, as well as the early provision of information on new locations outside of facilities where nuclear material is customarily used." The Iranians also admitted to receipts of 1,000 kg of UF_6, 400 kg of UF_4 and 400 kg of UO_2 from China in 1991 which they failed to report to the IAEA. In a letter dated 5 May 2003, Iran informed the IAEA of its intent to construct a heavy water research reactor at Arak and a fuel manufacturing plant (FMP) at Esfahan.[148]

In June 2003, the IAEA Director General ElBaradei reported that the Iranians failed to abide by the conditions under the Safeguards Agreement and imposed an October 31, 2003 deadline for Iran to agree to more intrusive nuclear inspections. The following August, the IAEA discovered traces of HEU at Natanz. In response, the Iranians argued that the HEU was residue from Pakistani supplied equipment.[149] During its August IAEA meetings Iran also provided evidence of its NPT technical violations by admitting that it carried out 113 uranium conversion experiments "involving the production of uranium metal from imported UF_4 and the production of UF_4 from imported UO_2, as well as laboratory-scale experiments in the 1980s involving the production of heavy water."[150] After the IAEA discovered more traces of HEU at other Iranian facilities in September, Tehran agreed to sign the NPT Additional Protocol which allowed for more intrusive inspections of Iran's nuclear facilities. On October 21, 2003, the EU-3 negotiated a deal with Iran to cease uranium enrichment and to formally sign the Additional Protocol.[151]

On December 18, 2003, Iran signed the Additional Protocol. Since this agreement, the IAEA gained greater access within Iran and inspectors had could pursue more intrusive inspections.[152] In February 2004, reports show that Iran purchased nuclear weapons technology from A.Q. Khan. That same month, the IAEA claimed that Iran "conducted experiments with fissile material that can be used to trigger [a] nuclear bomb chain reaction."[153] While the IAEA viewed Iran's subsequent cooperation as positive, it was not absolute. On June 18, 2004, the IAEA voted to "reprimand Iran for not providing the agency with more timely and comprehensive support" because Iran kept postponing IAEA visits to locations related to Iran's P-2 centrifuge enrichment program. The IAEA also criticized Iran for not revealing that it possessed P-2 design drawings and conducted other related research in its October 21, 2003 declaration.[154]

[147] Kemp, op. cit., 4.
[148] International Atomic Energy Agency, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran GOV/2003/40*, op. cit., 1-6.
[149] Kemp, op. cit., 4.
[150] Nuclear Threat Initiative, op. cit., para 15.
[151] Kemp, op. cit., 4.
[152] Nuclear Threat Initiative, op. cit., para 20.
[153] Kemp, op. cit., 4.
[154] Nuclear Threat Initiative, op. cit., para 20.

In September 2004, Iran announced that it resumed a "large-scale" enrichment program. In response, the IAEA ordered Iran to halt its enrichment activity and to reveal all of its nuclear programs by 25 November 2004. US Secretary of State Powell urged the UNSC to impose sanctions on Iran.[155] On November 29th, the IAEA Board of Governors passed a resolution that required Iran to implement the NPT Safeguards Agreement and forced Iran to suspend all nuclear activities until the IAEA could conduct a formal investigation of Iran's nuclear program. Iran agreed to follow the resolution, "but repeatedly declared that Iran ha[d] no intention of completely abandoning its nuclear program as the agreement is temporary." On December 2, 2004, the IAEA sought access to two secret Iranian military sites at Parchin and Lavizan II because intelligence data indicated "explosives testing and the purchase of equipment that may be used for uranium enrichment."[156] In January 2005, Iran allowed IAEA inspectors to visit the nuclear site at Parchin.[157] In March 2005, the Iranians refused to allow IAEA inspectors a second visit to Parchin on the grounds that such a visit was unjustified. This denial hindered the IAEA's investigation into the source of nuclear contamination that it discovered in prior visits.[158]

In April 2005, Iran announced that its resumption of uranium conversion at Esfahan. In response, the US sold Israel 100 GBU-28B "bunker buster" bombs, conceivably for Israeli use in an attack on Iran's nuclear facilities. In May 2005, the EU announced that Iran's resumption of its uranium enrichment program would cancel the trade and energy package that the EU-3 was poised to offer Iran in exchange for nuclear cooperation. On August 5, 2005, the EU-3 offered Iran economic incentives and security guarantees in exchange for Iran's abandoning a full nuclear cycle. Three days later, the Iranians rejected the offer describing it as "absurd, demeaning, and self-congratulatory." Tehran also announced that it would resume an "irreversible" enrichment program as was its right under Article IV of the NPT. On August 10, 2005, Iran broke IAEA seals on equipment at its Esfahan facility under IAEA supervision. The IAEA installed surveillance cameras at the site to ensure that Iran would not divert any uranium. The next day, the IAEA adopted a resolution calling for Iran to cease its reprocessing activities at Esfahan.[159]

On September 2, 2005, the IAEA released a report that outlined Iran's failures to report its 1991 uranium shipment, "the activities involving the subsequent processing and use of the imported natural uranium," use of imported natural UF_6 for testing centrifuges at the Kalaye Electric Company workshop in 1999 and 2002, "the import of natural uranium metal in 1993 and its subsequent transfer for use in laser enrichment experiments," and other violations related to the production of uranium derivative compounds. The report also outlined Iran's failure to declare the pilot nuclear enrichment facility at the Kalaye Electric workshop, "the laser enrichment plants at [the Tehran Nuclear Research Center (TNRC)] and the pilot uranium laser enrichment plant at Lashkar Ab'ad."[160]

On September 24, 2005, the IAEA adopted a formal resolution that urged the Islamic Republic of Iran to "to implement transparency measures,…which…include access to individuals, documentation relating to procurement, dual use equipment, certain military owned workshops and research and development locations." The resolution also asked Iran "to reestablish full and sustained suspension of all enrichment-related activity…, and reprocessing activity; To reconsider the construction of a research reactor

[155] Kemp, op. cit., 5.
[156] Nuclear Threat Initiative, op. cit., para 24-25.
[157] Kemp, op. cit., 5.
[158] Nuclear Threat Initiative, op. cit., para 24-26.
[159] Kemp, op. cit., 5-6.
[160] International Atomic Energy Agency, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran GOV/2005/67*, 2 September 2005, 2-3.

moderated by heavy water; Promptly to ratify and implement in full the Additional Protocol;" and "to continue to act in accordance with the provisions of the Additional Protocol."[161]

On November 1, 2005, the Iranians granted IAEA inspectors access to Parchin, where inspectors took environmental samples that are still currently being analyzed. In mid November, the Russians offered the Iranians with a US and EU backed proposal to enrich Iranian uranium in Russia to prevent Iran from completing a full nuclear cycle. Iran expressed immediate skepticism over the offer. On December 5, 2005, the IAEA asked Iran to provide information regarding an alleged undeclared study known as the Green Salt Project which involved converting UO_2 into UF_4 or "green salt," as well as "tests related to high explosives and the design of a missile re-entry vehicle, all of which could have a military nuclear dimension and which appear to have administrative interconnections." Iran responded on December 16, 2005 that the "issues related to baseless allegations." Iran finally agreed on January 23, 2006 to meet with IAEA officials to clarify the Green Salt Project, but declined to discuss the other issues.[162]

Iran notified the IAEA in a letter dated 3 January 2006, that it had decided to resume, as of 9 January 2006, "those R&D on the peaceful nuclear energy programme which ha[d] been suspended as part of its expanded voluntary and non-legally binding suspension." The IAEA received a second letter from Iran on January 7, 2006 that requested that the IAEA remove seals "applied at Natanz, Farayand Technique and Pars Trash for the monitoring of suspension of enrichment related activities." Iran removed the seals on January 10th and 11th under IAEA supervision.[163]

On February 4, 2005, the IAEA voted to report Iran to the UNSC for its nuclear activities with a vote of 27 in favor, 3 against and 5 abstentions. The resolution postponed all action until IAEA Director General ElBaradei delivered his report on March 6, 2006. In response, Iran threatened to downgrade its cooperation with the IAEA and "end any chance of a compromise on enrichment." One Iranian official threatened that Iran would begin full-scale uranium enrichment.[164] On February 6th, Iran ordered the IAEA to remove its surveillance cameras and equipment from Iran's nuclear sites by mid-February.[165]

Conclusions

Iran's behavior over the past 50 years shows that regardless of regime, Iran has always sought to achieve a nuclear fuel cycle. Furthermore, the current regime is seeking nuclear weapons capability as evidenced from 18 years of documented covert nuclear activity which includes its failure to report activities ranging from nuclear weapons secrets acquired from the A.Q. Khan network to the illicit shipment of 1.8 metric tons of Chinese uranium in 1991. Iran has also indicated that it is deft at manipulating the international community by cooperating with the IAEA when Iran's illicit nuclear activities are exposed to buy time for its nuclear program to survive. Iran has also used the legal ambiguities of Article IV of the NPT to justify its pursuit of a nuclear fuel cycle for "peaceful purposes." Confronting Iran over its nuclear program will require a careful mixture of diplomacy, economic carrots and sticks, and, if need be, military action.

Key Lessons

Iranian foreign policy over the past three decades allows one to draw three primary conclusions. First, the Iranians are determined to develop nuclear capability whether or not there is a regime change. While a

[161] International Atomic Energy Agency, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran GOV/2005/87*, 18 November 2005, 1.
[162] International Atomic Energy Agency, "Developments in the Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran and Agency Verification of Iran's Suspension of Enrichment-related and Reprocessing Activities," op. cit., 2-3.
[163] Ibid, 3-4.
[164] BBC News, op. cit., para 1-20.
[165] CNN, op. cit., para 1.

future regime might not pursue nuclear weapons, it will certainty continue to pursue a full nuclear fuel cycle to reduce its dependency on foreign powers. Second, Iran has access to a sophisticated and international terror apparatus that consists of strong ties to Hezbollah and HAMAS and loose ties to other terrorist groups like al-Qaeda. Any US coercive action must contend with the eventuality that it will provoke the Iranians to unleash these unconventional forces against the US and allied homelands. Third, a US coercive policy against Iran requires the US and its allies to be willing to consider all options – even a full scale military invasion once the US decides to commit itself to this policy. Once threatened, the Iranians can be a shrewd and determined foe that will continue to fight even under conditions in which their enemy has complete air superiority. Furthermore, the last time the US sent ground troops into Iran, it was unprepared for any option other than a rescue attempt and thus failed to respond effectively against Iranian aggression. Such failure to act would be unacceptable in a future coercive Iranian policy.

Case 2: Coercive Options – Osirak, North Korea, Kosovo and Others

This case study will focus on the operational challenges inherent in striking a nation's nuclear program by examining the Israeli military operation against Iraq's nuclear program and the US's plan to eliminate North Korea's nuclear program. It will also examine similar military operations like the Kosovo bombing campaign and the US quarantine of Cuba in the Cuban Missile Crisis. This PAE will use these cases to address the operational challenges inherent in a US or Israeli military strike on Iran's nuclear program.

Osirak

On June 7, 1981, eight Israeli F-16s bombed the Iraqi Osirak reactor with seven out of eight F-16s acquiring their targets with 100% accuracy and no pilots lost. Their actions resulted in the Osirak reactor's total destruction and set back Iraq's nuclear program for at least a decade. This section will examine the first case in history of a precision strike on a nuclear reactor and compare it to the current scenario envisioned for Iran. It will look at the key considerations that the Israelis identified before launching the strike, the strike's operational challenges and components, the international reaction following the strike, and how this scenario compares to the current scenario envisioned for Iran.

Israeli Key Considerations

Israel had three considerations before launching the strike including 1) strategic military concerns, 2) international political reaction and 3) domestic political reaction. Strategically, whether to launch the strike hinged on when the Israelis estimated that the Osirak reactor would go hot. Because the Iraqis did not have underground structures in their nuclear complex, the Israelis knew with near 100% certainty from satellite intelligence that this date would be some time in June 1981. A strike after this date would risk an estimated one hundred thousand civilian casualties in Iraq as a strike would most likely initiate a nuclear reaction. As such, Israel's key strategic military consideration was that the strike had to occur before August 1981.[166] The second consideration was how such a strike would affect Israel's position in the international community. The Israeli's were not concerned about how their Arab neighbors would view the attack, but whether this attack would isolate Israel from Europe and the United States.[167] The third consideration was how the strike would play in Israeli domestic politics. Israeli national elections were scheduled in the fall and the Labor Party was already enjoying a significant lead in the polls. Menachem Begin, a member of the opposing Likud Party, was determined to end the Iraqi threat before Labor took power because he felt that Labor did not have the stomach to end the crisis militarily. Much like President Bush today, Begin also faced challenges on the reliability of Israeli intelligence. Following the Israeli intelligence failure of not predicting the 1973 Arab-Israeli War, many of Begin's political opponents were openly dubious of Israeli intelligence on Iraq's nuclear program.[168]

[166] Rodger William Claire, *Raid on the Sun: Inside Israel's Secret Campaign that Denied Saddam the Bomb*, (New York: Broadway Books, 2004), 98-99.
[167] Ibid, 98.
[168] Ibid, 99, 135.

Israeli Operational Challenges/Components

Israel had three key operational components in its attempt to prevent Iraqi nuclear proliferation including 1) clandestine operations to destroy key inputs to the Iraqi nuclear program, 2) intelligence gathering to prepare for a military strike, and 3) the precision air strike to destroy the Osirak reactor.

Israel's first key operational component, clandestine operations, consisted of three phases including 1) recruitment of Iraqi scientists, 2) assassination of Iraqi scientists and 3) sabotage of Iraqi reactor components. The Mossad attempted to recruit Iraqi scientists who visited European countries to gain detailed information abut Iraq's nuclear weapons program and to assist the Mossad in recruiting other Iraqi nuclear scientists. For instance, the Mossad recruited an unwitting Iraqi scientist, Butrus Eben Halim who worked at the French nuclear reactor at Sarcelles.[169]

When Mossad operatives failed to recruit these scientists, they neutralized them through assassination. Shortly after Yahia al-Meshad, an Egyptian-born nuclear scientist and administrator under Iraqi scientist, Khidhir Hamza in Iraqi Atomic Energy, refused to give up Iraqi state secrets, a French housekeeper found Meshad's body "lying on the floor beside the bed in a pool of blood, his throat slit," in the Meridien Hotel in Paris on June 13, 1980 during one of Meshad's trips to France to check on equipment and the enrichment quality of the uranium that France was due to ship to al-Tuwaitha, Iraq.[170] A number of other incidents followed. The prostitute who was with Meshad the night he was killed was hit by a black Mercedes on July 10, 1980, two days before she was scheduled to speak with French authorities about Meshad's death.[171] Two other Iraqi scientists died of mysterious illnesses during their visits to Europe.[172]

Using intelligence from agents like Halim, the Mossad conducted operations to destroy nuclear components inbound for Iraq. One operation occurred in April 6, 1979 when Mossad agents infiltrated a shipping facility in the Mediterranean port town of La Seyne-sur-Mer and attached five explosive charges to critical components of the Osirak reactor's cores. After the explosions, the two reactor cores showed hairline fractures. "Designed to withstand intense heat and radiation, the cores had been manufactured to exacting specifications. The slightest fissure could lead to a meltdown." Nevertheless, Iraq's atomic energy officials accepted the cores anyway, necessitating an escalated Israeli military response.[173]

Israel's second key operational component, intelligence gathering for a potential air strike, was close to perfect. Through its clandestine operations, Mossad obtained blueprints of the Osirak reactor in al-Tuwaitha from its Paris station. The Israeli Defense Forces also dispatched two Israeli nuclear engineers to the US Nuclear Regulatory Commission (NRC) under the cover story that Israel wanted to protect key vulnerabilities of its nuclear reactors from a terrorist strike. The visit's true purpose was to assess if a 1,000 kg (2,200 lbs.) bomb could destroy a reactor of Osirak's dimensions and design. The Israelis also managed over several years to circumvent Carter Administration restrictions on US allied satellite use and had unofficial and nearly unfettered access to the US's state-of-the-art KH-11 satellites to monitor the Iraqi reactor. Finally, Mossad agents in al-Tuwaitha had hard intelligence on the shift routines of the Iraqi air defense personnel on site, which broke for dinner at 6 pm local time every day.[174]

Israel's third key operational component, code-named Operation Babylon, was a precision air strike that was to be a non-stop, non-refueling, low-level navigation flight from Israel to al-Tuwaitha for 8 F-16 aircraft each carrying two MK-84 "dumb" gravity bombs. 6 F-15s would fly in over watch to engage any air threats and 2 more F-15s would serve as a communication link between the F-16s and Israeli

[169] Ibid, 54-60.
[170] Ibid, 58, 61.
[171] Ibid, 63.
[172] Ibid, 65.
[173] Ibid, 58, 48-49.
[174] Ibid, 101-106.

headquarters. An Israeli combat search and rescue team (CSAR) would stand by in Israel in the event of a downed pilot. The attack would begin at sunset on a Sunday to ensure the maximum safety of French and Italians technicians who were working on the project. The attack would also give the Israeli CSAR all night to rescue downed pilots. The operational target was the Osirak reactor's 30 foot high dome.[175]

The air strike had three key operational challenges including 1) the time Israel had to prepare for the operation, 2) the distance the aircraft would have to travel to reach their target and 3) the enemy air defenses that Israeli pilots would face at the target. The first key operational challenge was to eliminate the Iraqi reactor before it went hot. The Israelis estimated that this date was June 1981. A strike after this date would risk an estimated one hundred thousand civilian casualties from the nuclear reaction that the bombing might start. As such, Israeli pilots had to train rapidly to learn how to fly the newly acquired F-16s in a shorter time period than was necessary.[176] The second key operational challenge was the distance that Israeli pilots had to fly to reach their target at al-Tuwaitha and return to Israel. The one way distance of 600 miles to al-Tuwaitha exceeded the range of 540 to 560 miles that the F-16s tasked for the mission could travel without aerial refueling. However, bringing tankers over Arab territory would expose those crews to danger and risk Israel's element of surprise. To mitigate this problem, the Israeli's modified their newly acquired F-16s by adding external fuel tanks and making other modifications to their aircraft such as choosing less sophisticated and lighter bombs for the mission.[177] The air strike's third key operational challenge was the Iraqi air defense system. The Iraqis had some of the most sophisticated air defense systems at the time that included SAM-6 systems. Furthermore, Israel's focus on a precision strike eliminated the opportunity of the Israeli Air Force to neutralize these defenses before the operation. The Israelis also had to prepare for Iraqi MiG-21s that might challenge them on ingress and egress.[178]

International Reactions

Overall international reaction to the Israeli strike was not positive, but for the most part, was short-lived. The US responded negatively in the short-term with its State Department issuing a statement strongly condemning Israel. Secretary of State Haig invoked the US Arms Export Control Act because Israel used US supplied arms in an offensive rather than a defensive manner. The immediate result was that any further sales of US F-16s were suspended to Israel, including four aircraft that were ready for immediate delivery.[179] The US also approved passage of UN Resolution 487, which strongly condemned Israel's attack and called for Israel to make redress to Iraq.[180]

The surrounding Arab nations clamored for "a full investigation of Israel's nuclear capabilities and her immediate disarmament." They also called for IAEA nuclear inspections of Israel.[181] Iraq fully exploited its newly acquired victim status to call on the international community to "help the Arabs in one way or another acquire atomic weapons" to offset Israeli "nuclear capability."[182]

The major European powers also condemned the attacks and some even took further actions to embarrass Israel. In addition to condemning the attacks, the French began "leaking classified information to the world press about the secret nuclear and plutonium reprocessing facilities the country had helped Israel construct in Dimona decades earlier."[183] The British denounced the bombing and lodged complaints of

[175] Ibid, 99, 101, 108.
[176] Ibid, 98-99.
[177] Ibid, 100.
[178] Ibid, 137.
[179] Ibid, 220.
[180] Ibid, 229.
[181] Ibid, 228, 233.
[182] Ibid, 230.
[183] Ibid, 228.

Israel's use of US KH-11 satellites. These complaints forced CIA Director Casey to adhere to the original 1979 Carter Administration restrictions on Israeli use of KH-11 satellites which denied Israel flexibility in observing its hostile Arab neighbors.[184]

Osirak vs. Iranian Precision Strike
The Israeli attack on the Osirak reactor is only similar in one way to the current Iranian situation – both the Israelis at the time and the current Bush administration suffered from lost credibility due to previous intelligence failures. The Israelis failed to predict the 1973 Arab invasion and the United States falsely concluded that Iraq had WMD. As such, before their attack, the Israelis had to convince others of the accuracy of their intelligence on Iraq's nuclear program, just as the US would have to overcome its intelligence credibility gap before embarking on an attack on Iran's nuclear complex.

While the similarities between Iran today and Osirak in 1981 are sparse, the differences are legion. The Israelis had detailed intelligence on Osirak, the Osirak reactor was a single, above-ground target, the Iraqis were fully engaged in a war with Iran, the Iraqis did not have a transnational network of terrorist assets, and Iraq did not have the capability to affect Israel economically. In contrast, the intelligence on Iran's nuclear program is clouded by uncertainty, its nuclear complex is spread throughout the country and underground, Iran is not distracted by any major wars with its neighbors, it has a transnational network of Hezbollah and IRGC operatives ready to retaliate on Iran's behalf, and it has the capability to harm the US and EU economies significantly through disruption of the Strait of Hormuz.

US Strike Plan on North Korean Reactor
In the early 1980s, the Democratic People's Republic of Korea (DPRK) initiated a nuclear reactor program in Yongbyon. The program eventually included "a small test operating reactor, larger reactors under construction, and a large processing facility that could convert spent fuel from the reactors into weapon-usable plutonium." As an NPT signatory, North Korea had to undergo IAEA inspections. North Korea "had constant disputes with the IAEA about access for inspectors," and in 1989, the DPRK unloaded some of the reactor's spent fuel without IAEA supervision. Intelligence estimates told senior defense officials that if the North Koreans had reprocessed all of the spent fuel, they would have enough nuclear material for one or two nuclear bombs.[185]

By the fall of 1993, the North Korean reactor was nearing the end of its fuel cycle when its fuel would be ready for reprocessing. If the North Koreans reprocessed all of this fuel, they would have enough plutonium for five or six additional nuclear bombs. If they moved the reactor into full-scale operation, they could produce enough plutonium for ten or twelve nuclear bombs a year and if the larger reactor went on line, they could produce enough materials for "scores of bombs per year." As such, as the North Koreans prepared to unload this fuel in late 1993 and early 1994, US diplomats worked intensely with the IAEA to persuade the North Koreans to subject their nuclear program to inspections of the defueling operation – an NPT signatory requirement – in addition to special inspections intended to investigate whether the North Koreans has reprocessed spent fuel in 1989.[186]

By spring 1994, the DPRK refused to submit special IAEA inspections, negotiations had broken down and North Korea expelled IAEA inspectors. At this point, Secretary of Defense William Perry faced the prospect of a North Korea armed with five or six bombs worth of plutonium in several months. To hedge against this development, he asked General Shalikashvili and General Luck to update Operation Plan

[184] Ibid.
[185] Ashton B. Carter and William J. Perry, *Preventive Defense*, (Washington, D.C.: Brookings Institution Press, 1999), 124-126.
[186] Ibid, 126-127.

(OPLAN) 5027, the US military's plan to defend against a DPRK invasion and OPLAN 5026, a plan to attack the reactor site.[187]

OPLAN 5026: Air Strike on Yongbyon
OPLAN 5026 could be "executed with only a few days' alert, and it would entail little or no risk of US casualties during the attack." It also entailed a low risk of DPRK casualties and very low risk of an atmospheric radiation release. The strike's objective was to set the DPRK nuclear program back several years.[188] Because the reactor was a graphite-moderated Chernobyl model plant that had flammable graphite, there was a risk that a strike would ignite a fire that would disperse radioactive material from the core downwind causing casualties associated with radioactive fallout. To mitigate this risk, US planners were confident that they could execute a strike with conventional precision munitions on Yongbyon that would destroy the reactor, entomb the plutonium," and not cause the "reactor to create a Chernobyl-like radiological plume downwind."[189] OPLAN 5026 required the deployment of additional squadrons of aircraft to South Korea, including F-117s, an additional aircraft carrier battle group with strike aircraft and tomahawk cruise missiles, and several reinforcement battalions to bolster the 2nd Infantry Division.[190]

Senior US officials concluded that an attack would likely trigger a North Korean invasion of South Korea resulting in hundreds of thousands to millions of casualties before the US and South Korea defeated the North Koreans. Additionally US and South Korean forces had to be prepared for North Korean use of nuclear, biological, and chemical (NBC) weapons against key ports and airfields to deny access to US reinforcements. The US also had to counter any action that Saddam Hussein might take in Iraq to exploit the US's strategic distraction with North Korea. Ultimately, Secretary Perry supported Secretary Warren Christopher's approach of tough sanctions. However, these sanctions, which North Korea threatened would lead to war, were never executed because of last minute diplomacy by former President Jimmy Carter. This diplomacy ultimately led to The Agreed Framework to freeze the Yongbyon reactor.[191]

The Korean Crisis of 1994 is eerily similar to the Iran situation today. Both situations involve violation of international IAEA safeguards to pursue nuclear weapons development and in both cases the US had an option to execute a surgical strike on these nuclear facilities. However, in North Korea, like Osirak, there was only one central target – the Yongbyon reactor – that the US needed to destroy. In Iran, there are multiple hidden targets. However, the North Korean situation also differed in the magnitude of damage that North Korea could inflict on South Korea had the US provoked it with a precision strike. While the Iranians certainly could turn southern Iraq into chaos and might strike some limited targets with WMD, the North Koreans could have leveled Seoul with their conventional artillery alone. Finally, the Korean Crisis also made it clear that it is possible to reduce greatly the risk of fallout with precision weaponry.

Kosovo
The Kosovo crisis began as early as 1996, when elements of the Kosovo Liberation Army (KLA) began to conduct low level attacks against Serbian forces for which the Serbs responded by repressing the whole of the Kosovo population. The level of fighting slowly escalated in 1997, when the international community began to act. At this point, the UN, NATO, the EU, the OSCE, and the Contact Group, consisting of Germany, Italy, the UK, France, the US and Russia, began to treat the situation as a potential crisis. The situation continued to escalate to the point that the Serbs launched an offensive in

[187] Ibid, 128.
[188] Ibid.
[189] Ashton B. Carter, interview in "Kim's Nuclear Gamble," *PBS Frontline*, March 3, 2003, [online: web], cited 30 January 2006, para 2-3, URL: http://www.pbs.org/wgbh/pages/frontline/shows/kim/interviews/acarter.html.
[190] John Pike, ed., "OPLAN 5026 – Air Strikes," [online: web], cited 30 January 2006, para 4, URL: http://www.globalsecurity.org/military/ops/oplan-5026.htm.
[191] Carter and Perry, op. cit., 128-132.

Kosovo in February 1998 that used excessive force and targeted ethnic Albanian civilians. Between February and September 1998, the UNSC adopted two resolutions that urged the Serbians to commit to a cease fire. During this time period, Milosevic also committed to talks and even granted access to diplomatic observers as part of the Kosovo Diplomatic Observer Mission (KDOM) in June 1998, a 2,000 man OSCE ground verification presence and a NATO air surveillance mission in October 1998. Milosevic also issued a unilateral statement that was consistent with many of European community's demands. However, while Milosevic appeared to negotiate in good faith, the ground operation continued in Kosovo to the point that the North Atlantic Council (NAC) approved the Limited Air Option. However, on October 16, 1998, the Serbs agreed to the creation of the OSCE Kosovo Verification Mission (KVM), which was to ensure that the Federal Republic of Yugoslavia (FRY) complied with UNSC Resolutions 1160 and 1199. This agreement delayed the Limited Air Option's implementation. Both sides agreed to the establishment of the KVM and NATO aerial surveillance force which were endorsed by UNSC Resolution 1203, as well as a NATO Extraction Force deployment in Macedonia, which would extract the KVM if it was necessary to conduct a limited evacuation. The KVM began operations in November 1998 and the FRY withdrew some 4,000 special police forces from Kosovo.[192]

This relative period of peace was short-lived as the situation in Kosovo flared up again in January 1999 as KLA units provoked Serbian forces and the Serbians retaliated with excessive force against civilians that culminated in the death of 45 Albanian civilians in the village of Racak. Once again, the Europeans responded to this outrage by pursuing a peaceful diplomatic solution. However, on January 29, 1999, NATO issued a "solemn warning" to the Kosovo Albanian leadership and Milosevic to conclude a settlement under the Contact Group that would provide "enhanced status for Kosovo, preserve the territorial integrity of the FRY, and protect the rights of all ethnic groups." On January 29, the Contact Group met and subsequently decided to conduct discussions at Rambouillet, France with representatives from the FRY and Kosovo Albanians. These talks began on February 6, 1999. Ultimately both sides could not come to an agreement, but committed to attend another conference in France on March 15. Despite the seeming willingness to negotiate, the Serbs continued to launch offensives in Kosovo throughout February and March. After talks from March 15 to 19th failed in Paris, it appeared increasingly likely that the Serbs were prepared to launch a major offensive in Kosovo as one third of their total armed forces massed in and around Kosovo. The threat of imminent invasion led the OSCE to withdraw KVM forces on the night of March 19-20 and one day later FRY forces launched a major offensive code-named Operation Horseshoe against Kosovo. In a last ditch diplomatic effort, Richard Holbrooke flew to Belgrade on March 22 to convince Milosevic to accept the terms of the Rambouillet Accords, but Milosevic rejected the agreement. On March 23, Javier Solana, the Secretary General of NATO, ordered NATO's Supreme Allied Commander Europe (SACEUR) to commence Operation Allied Force on the following day. Throughout this process, the West tried to gain international support, but no matter what options they pursued they could not prevent Russia from supporting Serbia nor convince China to support the West's efforts to get involved in a nation's internal ethnic affairs.[193]

Military Options

In May 1998, NATO pursued planning of a variety of military options that involved both air and ground operations. As it became clear that there was no firm consensus to commitment to the ground option, planning ultimately centered on two options – both air campaigns. One option, known as the Limited Air Response, relied primarily on cruise missiles to strike selected military targets inside the FRY should the situation continue to deteriorate in Kosovo. This stand alone option was eventually incorporated into Phase I of the alternative option. The alternative was to consist of a phased air and missile campaign. Phase 0 would move air assets into the region. Phase I would establish air superiority over Kosovo south

[192] Anthony H. Cordesman, *The Lessons and Non-Lessons of the Air and Missile Campaign in Kosovo*, (Westport, CT: Praeger, 2001), 9-13.
[193] Ibid, 13-16.

of 44 degrees north latitude. Phase II would target military units inside Kosovo and FRY targets south of 44 degrees north latitude. Phase III would focus on strategic targets within the FRY including the Serbian security apparatus and other high value targets. Phase IV would redeploy units as necessary.[194] The problem with these two plans is that they failed to account realistically for any sort of escalation in the conflict. When NATO launched its campaign on March 24, it soon would become clear that it would have to commit itself beyond either of these plans to include preparation for a ground campaign.

Operation Allied Force

The objective of Operation Allied Force was a classic example of compellence – using one's power to force one's enemy to do something. In this case, the objective was to compel Milosevic to remove Serbian forces from Kosovo. The 78-day campaign began on March 24th with a cruise missile campaign to destroy Serbian air defenses so that manned aircraft could proceed to their targets unchallenged. Additionally, NATO had to manage the possibility that the Serbs would attack or harass NATO and UN forces in Bosnia and or Macedonia. The 2,000 soldier NATO Extraction Force in Macedonia was particularly vulnerable to Serbian retaliation. Additionally, NATO had to coordinate with the UN High Commissioner on Refugees (UNHCR), who would be responsible for the refugee situation. The UNHCR predicted that the crisis would result in the movement of up to 200,000 refugees. General Clark worried that if the number exceeded this estimate, that NATO might be required to pick up the slack.[195]

As the campaign unfolded, General Clark found that prosecuting an allied war effort required tremendous bureaucratic patience. During the campaign, the political leadership in Washington announced a process of target-by-target approval. Soon other countries followed by imposing their on idiosyncratic legal systems on the process, hereby diluting the solidarity of the NATO effort. Additionally, General Clark's request for Apache attack helicopters to strike at Serbian ground forces in Kosovo received little support in Washington because of the fear of conflict escalation and military casualties. As all these conflicts played out, the situation on the ground worsened with estimates of as high as 350,000 internally displaced refugees in Kosovo fleeing the ongoing Serbian offensive. As the air campaign continued to escalate, Javier Solana quietly supported General Clark's looking into the planning a ground campaign that would begin in July 1999, should the air campaign fail to achieve NATO objectives. The US soon deployed Task Force Hawk, a contingent of 5,000 troops and Apache helicopters to Tirana, Albania.[196]

By April 19, 1999, the situation in Kosovo had deteriorated to the point that there were about 900,000 refugees throughout Kosovo. After the first four weeks, NATO was engaged in an effort involving almost 600 aircraft. NATO forces had targeted Serbian "military installations, petroleum, military sustainment, transportation, and communications." NATO forces lost only one aircraft thus far, and the Serbs had not attacked NATO forces in Albania, Bosnia, or Macedonia. Events took a turn for the worse when a second Apache aircraft crashed in training in Albania and both crewmen died on May 5, 1999.[197]

On May 17, 1999, General Clark briefed his commanders on a ground option. To attack a Serbian force of between 50,000 and 60,000 soldiers reinforced with mines and bunkers, Clark proposed using six divisions of a heavy/light mix of US Army and Marine forces. US forces would be augmented by 35,000 to 50,000 British, 10,000 to 20,000 French, at least 3,500 Italian, and other contingents of NATO troops totaling between 175,000 and 200,000 soldiers and the force would attack from Albania and Macedonia through tough mountainous terrain.[198]

---

[194] Ibid, 18-19.
[195] Wesley Clark, *Waging Modern War*, (New York: Carnegie Council on Ethics and International Affairs, 2003), 194, 199-200.
[196] Ibid, 224-233, 241, 252.
[197] Ibid, 260, 267, 281.
[198] Ibid, 301, 339.

By May 23rd, 850 aircraft were in theater and participating in the bombing campaign. NATO was increasingly targeting Serb communications centers, more Belgrade headquarters, and major bridges in Belgrade. There were also scattered reports of Serb mutinies and desertions and public protests in southern Serbia. By June 10th, NATO through Russian mediation reached an agreement with the Serbs. The Serbs would withdrawal while Kosovo Force (KFOR) units from NATO along with a Russian contingent would move in to occupy five sectors in Kosovo.[199]

Why Serbia Conceded

The British Ministry of Defense theorized that Milosevic ultimately conceded for four reasons. All four factors contributed to isolating Milosevic, personally, and Serbia, in general, from the international community. First, the unity of NATO, the international community, other Balkan states, and ultimately Serbia's Russian ally grew stronger during the campaign leading to Serbia's increasing isolation. Second, the increasing ferocity and tempo of the air campaign amplified the effect of Serbia's increasing isolation. Third, personally isolating Milosevic from Serbia through his indictment in the International Criminal Tribunal added additional psychological pressure. Fourth, the threat of the increasing likelihood of a ground operation made NATO's demands seem more attractive than the alternative.[200]

Conclusions

Politically, the Kosovo humanitarian crisis is similar to the current nuclear crisis with Iran. When NATO countries agreed in fall 1998 to present a clear threat to Milosevic, he initially backed down to diffuse NATO's solidarity. When he broke his promises to NATO when the KLA provoked Serbian forces in December 1998 and the Serbs responded by massacring Kosovar civilians at Racak in January 1999, NATO countries gravitated toward a diplomatic, not a military solution. As General Wesley Clark notes:

> "All along, Western nations had been dealing with the emerging problem of Kosovo on the basis of a political dynamic, following the traditional pattern of diplomacy, identifying through discussion and dialogue the compatible interest between the parties to the dispute. And then, having identified these interests, Western diplomats sought negotiated agreements through compromises. They attempted to create good will and understanding trough open, transparent discussion, and to use artful language and ambiguities to bridge the remaining issues…But to create an opening for dialogue, negotiation, compromise, and consensus, the West had to rely on the threat of force from NATO to convince Milosevic that continued repression in Kosovo would lead to unacceptable damage to other interests."[201]

The Iranian situation is similar today. Iran has exploited of margin of safety between Europe's unrealistic dogmatic adherence to diplomacy and the US's reckless reliance on force to solve all problems. While the US and EU have nicely complemented both sides in current negotiations, it seems to be clear to the Iranians that it is unlikely that the Europeans would ever support force and that the US would never support diplomacy. As in Kosovo, diplomacy in this situation without the serious commitment by both the EU and the US to use the threat force is not diplomacy at all.

The crises are also similar politically, because both the Serbs and the Iranians proceed to negotiate in good faith only to later violate prior agreements. Both nations have an incentive to pursue this tactic, because by cooperating, stalling, obfuscating, and then retracting, they can exploit their principle advantage – time. The Serbs believed that they could delay negotiations long enough to defeat the KLA decisively before NATO could impose a diplomatic settlement on them. Similarly, the Iranians must stall for just long enough to produce one atomic weapon, after which diplomacy will no longer be necessary.

---

[199] Ibid, 315, 375.
[200] Cordesman, *The Lessons and Non-Lessons of the Air and Missile Campaign in Kosovo*, op. cit., 32-33.
[201] Clark, op. cit., 420.

The Kosovo crisis is also similar to the Iranian one in that the US had to be mindful of its other commitments and enemies. At the time, the US had 30,000 troops in Bosnia – an area that Serbian forces could influence, much like the Iranians can influence the 150,000 US troops in Iraq and over 20,000 US forces in Afghanistan. Furthermore, the US was also simultaneously executing Operation Desert Fox against Saddam Hussein in Iraq while simultaneously deterring North Korea. While the scale of these operations clearly dwarfed those currently in Iraq and Afghanistan, they can still be instructive in charting current US policy and strategy against Iran.[202]

The Kosovo campaign also underscored the effectiveness of a political and military strategy to isolate both the individual leadership and the country from the international community. Not only did Serbia stand alone once the Russians joined NATO's effort, but Milosevic faced increasing personal legal costs if he continued his intransigence. Ultimately, both were a factor in bringing Serbia back to the negotiating table. Similarly, future policy in Iran should isolate the regime leaders from the rest of the populace in a divide and conquer strategy. Not only will the regime have to contend with the external pressures of the international community, but it will also have to answer to its own people.

Finally, the Kosovo air and missile campaign provides a cautionary tale for future US military action against Iran. In any scenario contemplated for degrading and/or destroying Iran's nuclear program, US and allied policy-makers must understand that any military action taken, or for that matter, any economic sanctions, could very likely escalate into a full-scale military invasion of Iran. The earlier that policy-makers embrace this reality, the more likely they will be prepared to deal with the aftermath of a worst case scenario. If the Iranians remain unconvinced that the international community has the staying power to occupy Tehran, then they will remain intransigent and seek to divide the US and EU on this issue.

Cuban Missile Crisis

For thirteen days in October 1962, the United States and Soviet Union faced the mutual threat of nuclear annihilation when the US challenged the Soviet Union's installation of nuclear-capable ballistic missiles in Cuba. Both sides narrowly avoided the death of over 100 million Soviets and nearly 100 million Americans. Ultimately, the Soviets withdrew their missiles after the United States imposed a naval quarantine of Cuba. A careful of analysis of US options in this crisis might provide useful decision rules for application in the current confrontation with Iran.

US Options

US leaders spent five days after discovering Soviet missiles in Cuba weighing six alternatives including: do nothing, diplomatic pressures, a secret approach to Castro, invasion, air strike, and blockade.[203]

Do Nothing

McGeorge Bundy briefly advocated the do nothing option under the logic that the US was already under threat of Soviet nuclear ballistic missiles and the new threat in Cuba hardly changed this strategic calculation. Additionally, if the United States made an aggressive move in Cuba, it would only serve to sanction a Soviet countermove in Berlin. The Kennedy Administration quickly ruled out this option for international and domestic political reasons. First, the administration believed that a failure to show resolve against the Soviet Cuban missile threat would shake confidence in the US's NATO alliance and improperly condition Khrushchev for future US actions. Second, many of Kennedy's advisors argued that a failure to respond to the threat would guarantee the President's impeachment.[204]

---

[202] Ibid, 178, 199.

[203] Graham Allison and Philip Zelikow, *Essence of Decision: Explaining the Cuban Missile Crisis*, 2nd ed., (New York: Addison-Wesley Educational Publishers, Inc., 1999), 111-119.

[204] Ibid, 111-114.

Diplomatic Pressures
The US considered two alternatives of diplomatic pressure. The first approach was unilateral and involved threatening Krushchev in secret to give him an opportunity to remove the missiles. The second approach was multilateral and involved bringing the issue before the UN or the Organization of American States to negotiate the removal of these missiles. The first approach's key drawback was that it might force Krushchev to commit himself to a strategic countermove should the US invade Cuba. The second approach's key drawback was that it would force the US to make a complementary concession to the Soviets for removal of missiles in Cuba, most likely the removal of Jupiter missiles in Turkey and thereby encourage future brinksmanship for concessions on the part of Krushchev.[205]

Secret Approach to Castro
In this alternative, the US would give Castro an ultimatum that required him to divorce Cuba from the Soviet Union or face US invasion. This option was also ruled out because it might point to future US intentions, commit Castro to an irrevocable countermove, and did not address the reality that the missiles were firmly under Soviet – not Cuban – control.[206]

Invasion
This alternative envisioned a massive air, sea and land campaign of a quarter of a million servicemen against Cuba to forcibly remove its missiles and to overthrow Castro's regime. The Executive Committee ruled out this option because it was too costly, it would involve the first direct clash of American and Soviet ground troops, it might provoke a similar Soviet conventional seizure of Berlin, and in the worst case spark a nuclear exchange.[207]

Air Strike
This alternative involved a precision conventional air strike on the missiles before they became operational and before the Soviets discovered that the United States knew of their existence and took countermeasures to conceal the missiles. It involved the element of surprise and would prevent the Soviets from making diplomatic and military countermoves that would make it increasingly difficult for the US to remove the missiles. However, there were four complications that made this option difficult. First, it would be difficult to keep the air strike small and focused. If the Soviets retaliated by bombing American cities in the southeastern United States, which had weak air defenses, the US population would be furious at the perceived carelessness of the administration to defend them. Therefore, there was a near-consensus among Kennedy's advisors to expand the air strikes to include Soviet air defenses and bombers. Such an operation required hundreds of aircraft on targets across Cuba. Second, an air attack would kill Russians and almost assuredly result in a similar attack on US forces in Berlin or Turkey. Third, there was a question of whether to give the Soviets an advance warning, because a surprise attack might have the same effect on the Russian population that Pearl Harbor had on the US population in World War II. Fourth, there was no guarantee that an air strike would eliminate all of the Russian missiles and it also might lead to an escalation in the conflict that ended in a full-scale war with the Soviets.[208]

Blockade
This option became more attractive to President Kennedy after his advisors pointed out the risks in the other alternatives. However, this alternative had a number of risks. First, could the US institute a blockade of Cuba without the Soviets negating its effect by instituting a similar blockade of Berlin, and thereby rendering the entire exercise useless? Second, if Soviet ships did not stop, US forces would be required to

[205] Ibid, 114-115.
[206] Ibid, 115.
[207] Ibid.
[208] Ibid, 115-118.

fire at Soviet vessels and thereby invite retaliation – starting a similar cycle of escalation to that of an air strike. Third, the Soviets might simply delay until the missiles became operational.[209]

President Kennedy ultimately decided to impose a blockade coupled with an ultimatum to the Soviets to remove their missiles from Cuba. This alternative had four advantages to the other options. First, it was a moderate response that was aggressive, but not so aggressive that it precipitated a cycle of escalation. Second, it put the burden on Krushchev to avoid a military confrontation. Third, the US military was well-prepared to execute a naval blockade in its backyard. Fourth, a blockade would allow the US to threaten further conventional actions in an area where it possessed a strategic and tactical overmatch versus the Soviet Union if the Soviets decided to escalate tensions. Coupled with the credible threat of invasion evidenced by the mobilization of 200,000 invasion troops in Florida, the activation of 24 air transport squadrons in the Air Force Reserve, and the movement of hundreds of tactical fighters to airports in the southeastern United States, the Soviet Union ultimately decided not to test the resolve of US forces by ordering the removal of its missiles from Cuba.[210]

Conclusions

All six Cuban Missile Crisis options can be applied to the Iranian case, although their effects would be much different. For instance, a blockade of Iran affects many more parties than the Cuban blockade because of many nations' dependence on Iranian oil. An air strike in the Iranian situation is much more attractive, because the potential of a full-scale war with Iran, while unattractive, is much more manageable than one with the Soviet Union in both conventional and nuclear dimensions. The option of diplomatic pressure was much more attractive against the Soviets than the Iranians, because the US did not necessarily require a coalition to be successful. Today, the US has already come close to maximizing its unilateral diplomatic pressure on the Iranians. Any further pressure requires the full cooperation of the Europeans and at least tacit backing of the Chinese and the Russians. A coalition of parties with these many diverging interests is infinitely more complicated and difficult to manage than the US acting alone.

However, the similarities between these two crises provide useful lessons. First, while an air strike on Iranian nuclear facilities might have more palatable consequences than on the Soviet missiles in Cuba, such a strike still has similar consequences of "mission creep." For instance, a clean surgical strike has the potential to morph into a full-scale bombing campaign to target Iranian air defenses and retaliatory capabilities and then ultimately, into a full-scale land campaign. Any analysis of US options should carefully consider this problem. Second, the two crises have similarities in the US's inherent inability to defend parts of the homeland against enemy retaliation. The Soviets could strike the southeastern United States with conventional bombers with relative immunity just as Iran's apparatus of terror could strike the US civilian population.

Key Lessons

There are several key lessons from the examination of these four coercive cases that inform future coercive policy in Iran. The first lesson is that in precision operations in which one is targeting an enemy's nascent nuclear capability, intelligence must be near perfect. In the Osirak example, the intelligence was nearly perfect and the Israelis proceeded with the strike. In the Cuban Missile Crisis, the key decision-makers sensed that the intelligence was not fool proof and chose not to strike. The Iranian situation has this inherent risk as it is highly probable that US intelligence will not find every Iranian nuclear site. Another key lesson is that crises like these four cases involve the risk of an escalation spiral. In Kosovo, NATO counted on a pure air and missile campaign and ended up preparing for a 175,000 troop invasion of Kosovo. Likewise, the Kennedy Administration chose not to do a precision strike on Cuba because the operation would have continued to expand as the Air Force and Navy sought to

[209] Ibid, 118-119.
[210] Ibid, 120, 122-123.

eliminate Cuba and Soviet air defenses. Similarly, the US ultimately did not execute a precision strike against North Korea because of the high probability of military escalation versus Seoul. US planners in any Iranian scenario should heed these historical precedents. A third key lesson is that in three out of four of these operations, the strategic consequences of the operations outweighed the inherent risk of the operation itself. For instance, a precision strike against the Yongbyon reactor could be executed with cruise missiles at minimal losses to US forces. However the consequence of the North Koreans initiating an invasion of South Korea was too much of a risk for US forces to take. The fourth lesson is that fighting with allies brings a great deal of legitimacy along with enhanced military inefficiency. The Kosovo campaign is a clear model of this fact. If the US intends to pursue a policy of coercion against Iran with a strong NATO coalition, it must sacrifice military expediency for political legitimacy.

Case 3: US Strategic Adjustment to China's Nascent Nuclear Weapons Program

When China developed its nuclear program in the early 1960s, the US considered eliminating it, but decided against it. Instead, it made a strategic adjustment. This case will focus on this adjustment.

China's Nascent Nuclear Weapons Program

In the early 1960s, the US faced a similar threat as China attempted to acquire nuclear weapons capability. At the time, China was considered a reckless and dangerous adversary. China was already pursuing an expansionist foreign policy by attacking India in 1962, continuing to threaten Taiwan, and influencing events in Indonesia. Of even greater concern to the US was China's increasing support for North Vietnam and the Vietcong insurgency. This support threatened to increase the likelihood of a future nuclear confrontation between the US and China over Vietnam. Furthermore, policy-makers at the time feared that allowing China to go nuclear had implications ranging from weakening the US's position in Asia, to spurring worldwide proliferation, to undermining "geopolitical stability" in Europe.[211]

US Options

Nearly two weeks after China's first nuclear detonation at Lop Nor on October 16, 1964, President Johnson commissioned the Gilpatric Committee "to reexamine every aspect of US nonproliferation policy and to predict the likely influence of China's test on international politics." He also asked the committee "to explore the widest range of measures that the United States might undertake in conjunction with other governments or by itself" to reduce nuclear weapons proliferation.[212]

The Gilpatric Committee identified four major policy options including: 1) "permissive and selective proliferation," 2) slowing proliferation, 3) taking "substantial costs and risks" to halt the spread of nuclear weapons, and 4) making nonproliferation the most important foreign policy objective of the United States. All of these options considered the deployment of anti-ballistic missile systems to defend against minor nuclear states and accidental launches from the Soviet Union.[213]

Permissive and Selective Proliferation

This option argued that it was in the US's interest to help countries who were determined to acquire nuclear weapons. For instance, if India and Japan were determined to develop nuclear weapons, then the US might win favor by helping them. The consequences of this option included ending US attempts to remain involved as a world policeman and would allow countries like India, Indonesia, Japan, Pakistan, Brazil, Australia, and Mexico to pursue nuclear capability. It would also allow Israel and Egypt to

[211] Francis J. Gavin, "Blasts from the Past: Proliferation Lessons from the 1960s," *International Security* (Winter 2004/2005): 105, 111.
[212] Ibid, 101, 112.
[213] Ibid, 113, 134-135.

continue their atomic weapons programs without penalty or restriction. This policy might eventually lead to US withdrawal from different global regions once leading regional nations became nuclear powers.[214]

Slowing Down Proliferation

This option, deemed the "most prudent course," advocated that the US take steps to slow proliferation, but only if these steps did not involve a major risk to US interests. In this scenario, the US would proceed with discussions on creating a Multilateral Force (MLF), but with hints of a US veto and no firm US commitments to a European deterrent. The MLF would allow Europe to develop a seaborne nuclear force that would be manned by any NATO country that wanted to participate. The US would retain a veto on the use of these weapons. The point of the MLF was to give the Europeans a role in nuclear policy in order to cement their allegiance with the US and discourage them from developing nuclear weapons on their own. The flaw of this alternative was that because the US would make no specific military commitments, it would be hard to stop "India, Israel, Japan, and other Nth nations" from researching and developing nuclear weapons.[215]

Actively Halting Proliferation

This alternative advocated that the US accept substantial costs to stem proliferations short of rolling back nuclear programs. This alternative recommended dropping the MLF proposal in Europe and making substantial security guarantees to Japan and also potentially India. It was estimated that this action might delay West Germany's development of nuclear weapons by 5 to 10 years. Decision makers also anticipated that this effort would also keep India non-nuclear long enough to delay nuclear weapons acquisition for at least 5-10 years. It might also delay Israeli, the United Arab Republic (UAR), and Japanese nuclear acquisition indefinitely. Another advantage of this option was that it was also in the Soviet Union's vital interest to prevent proliferation among states like West Germany and China.[216]

Making Nonproliferation the Primary US Foreign Policy Objective

This option operated on the rationale that an aggressive US strategy in the short-term might anger US allies, but was necessary in the long-term to avoid a world with dozens of nuclear powers. This option would require the US to offer security guarantees and economic inducements to nations like India and Japan to convince them not to develop nuclear weapons. Security guarantees might include troop deployments and extension of a nuclear umbrella over these countries. If these countries failed to halt their programs, the US would have to apply economic pressure and threats of military abandonment to convince them otherwise. This option also involved a component of nuclear roll back. It contemplated a strike on Chinese nuclear facilities and covert operations against France to sabotage its nuclear operations through Australian and Indonesian proxies. The US would also bully France to acquiesce to US non-proliferation policies by expelling it from NATO and the European Common Market. One problem with this approach was that a US nuclear umbrella might lack credibility because the US would not willingly put American lives at risk for a war in which it had no interests. Llewellyn Thompson, a former US ambassador to the Soviet Union and presidential advisor, commented on a nuclear guarantee to India: "I would not like to see 100 million American lives placed in escrow for renewed hostilities in Ladakh, at some distant time when the Chinese might have established an effective military alliance with the Soviet Union." A nuclear umbrella might also lack credibility if it were extended to too many nations at once.[217]

Conclusions

The Gilpatric committee issued its report on January 21, 1965. The committee recommended that the US take a stronger approach in non-proliferation efforts and that a case-by-case approach to proliferation was

[214] Ibid, 113-114.
[215] Ibid, 111, 113, 117.
[216] Ibid, 118-119.
[217] Ibid, 115, 130.

no longer effective. In fact, the committee recommended that nonproliferation goals override all other policy interests. It also recommended a "full-blown US effort to negotiate a nuclear nonproliferation agreement, a comprehensive test ban treaty, and regional nuclear-free zones." It encouraged the US to isolate France and encourage the British to discard their independent nuclear deterrent. It advised the US to deemphasize NATO's nuclear options, to cooperate with the Soviets in nonproliferation efforts, and to reexamine US policy toward China in light of its nuclearization. The committee recommended that the US continue to explore the MLF alternatives, but only in so far as they would "permanently inhibit Germany from acquiring nuclear weapons." The Gilpatric Committee ultimately rejected attacking China's nuclear facilities and any other nation's facilities in general.[218] Ultimately, the Chinese "rogue" regime never used atomic weapons. However, its possession of nuclear weapons did lead to a string of proliferators on its borders to include India, Pakistan, and North Korea.

Key Lessons

There are two key lessons from this case that one can apply to the Iranian case. First, extending a nuclear umbrella to one nation is expensive, especially if one's enemies can target the country extending the nuclear umbrella with their nuclear weapons. The more nations to which a country extends a nuclear umbrella, the less credible the guarantee is. Fortunately, in the Iranian case, if Iran acquires nuclear weapons before the US can preempt them, it will still be a decade or so away from possessing a ballistic missile that can reach the continental United States. Hence, a nuclear umbrella would be credible in the Iranian case so long as Iranian missile systems are incapable of reaching American cities. Second, adjusting to a nuclear proliferator has a cost – the emergence of more proliferators. While in the intervening years, the US was successful at slowing down this process, it was unable to stem the increase in the number of nuclear nations.

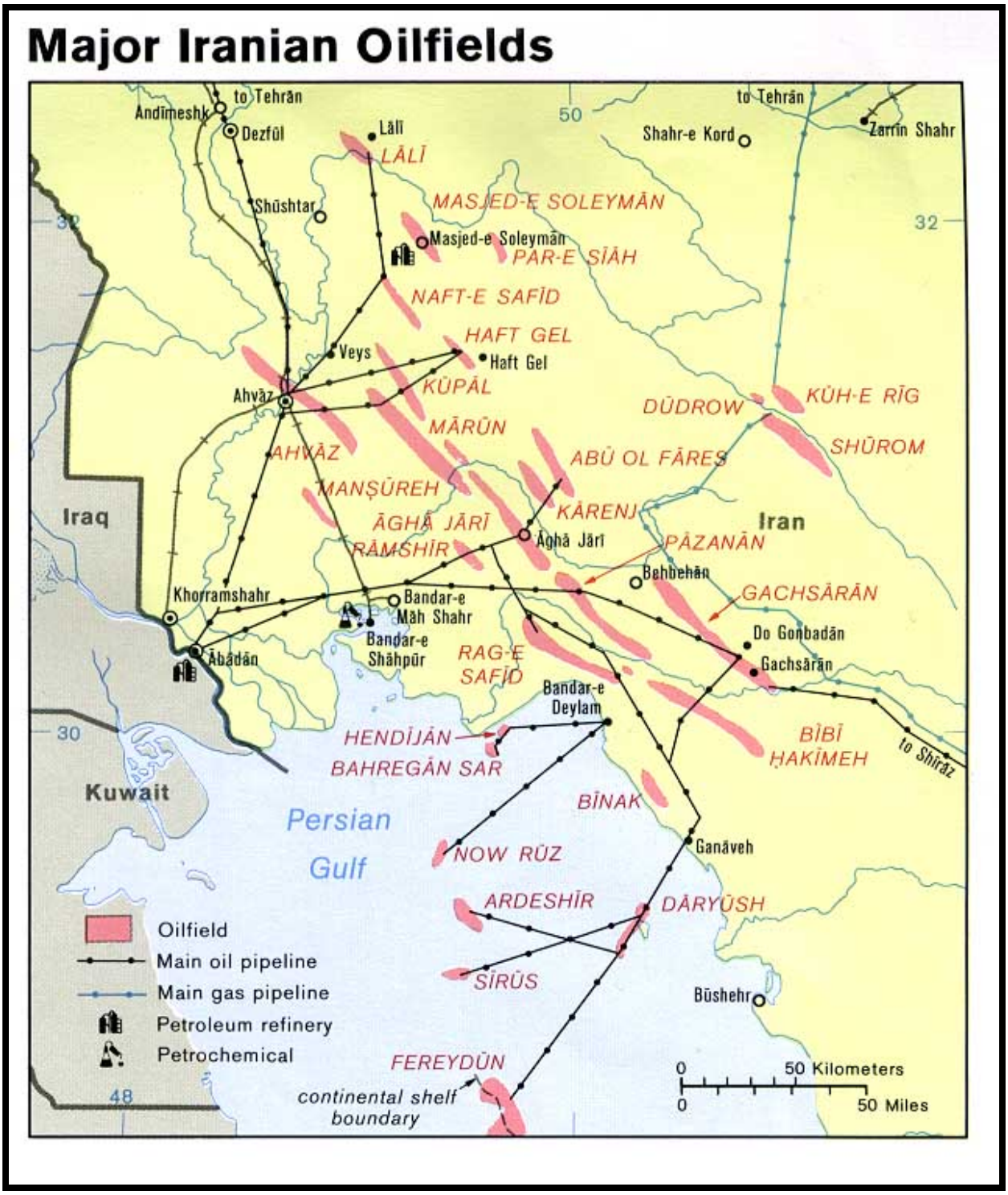
[218] Ibid, 149-150.

Appendix B: Location of Major Iranian Weapons Programs

Iranian WMD Programs			
	Location		Function
Nuclear	Anarak		Waste disposal site.
	Arak		Iran is buidling an IR-40 reactor which is planned to go into operation in 2014. Iran is also building a heavy water production plant. Unconfirmed reports point to a covert reactor at Arak.
	Ardekan (Ardakan)		Nuclear fuel site. Some reports indicate that a uranium mill with an annual output of 50 metric tons of uranum is being built 35 km north of Ardakan.
	Bushehr		Nuclear facility and light water nuclear reactor. Unit 1 of this facility is a 1,000 MW light water reactor designed to use low enriched uranium oxide (< 5% U-235). Unit 1 is scheduled to reach first criticality in 2006. The Unit 1 reactor will use 90 tons of Russian supplied enriched uranium. Bushehr has a second reactor site, but no reactor work is currently being done.
	Chalus		Potential location for an underground nuclear weapons development facility located inside a mountain south of Chalus. Unconfirmed reports suggest a covert reactor at Chalus.
	Darkovin		Suspected IRGC underground nuclear weapons facility. This site is also known as Ahvaz, Darkouin, Esteghal, and Karun. Unconfirmed reports point to a covert reactor at Darkovin.
	Esfahan (Isfahan)		Iran's largest nuclear technology research center. Contains a fuel fabrication facility, uranium chemistry laboratory, a UCF, and fuel manufacturing plant.The site also possesses two nuclear reactors, subject to IAEA inspectors. The first reactor, the Miniaturized Neutron Source Reactor is a 30kW light water reactor and uses uranium/aluminum alloy (Ul/Al) fuel enriched to 90.2% U-235. The second reactor, the Heavy Water Zero Power Reactor (HWZPR) uses natural uranium metal fuel. This site also has a light water subcritical reactor and a decommissioned graphite subcritical reactor. Some reports indicate that Esfahan is the center of the Iranian nuclear weapons program.
	Gchine		Uranium Mine and Mill. The production design capacity is 21 tons of uranium per year.
	Karaj / Karai / Hashgerd		Facility includes a dosimetry laboratory and an agricultural radiochemistry laboratory. It will contain a Chinese calutron electromagnetic isotope separation system. These systems are not easily adapted for nuclear weapons design efforts.
	Kolahdouz (Kolahdouz, Koladooz, or Koladoz)		Nuclear facility and location of Iran's "armored weapons facilities." Iranian dissidents claim it also contains a concealed nuclear weapons plant, including uranium enrichment facilites. The IAEA could not confirm this claim when it conducted an inspection of the site.
	Lashkar Ab'ad		Pilot plant for isotope separation.
	Lavizan I and II		Nuclear Weapons Development Center for high explosives testing.
	Meysami		Research Center. May have a role in nuclear weapons development.
	Natanz (Kashan)		Reputedly a covert facility for heavy wate production and centrifuge activity. Iranian dissidents report the existence of a fuel enrichment plant of 50,000 centrifuges capable of producing enough highly enriched uranium for up to 20 nuclear weapons per year. Other estimates put the number of centrifuges at 5,000 capable of producing enough HEU for several nuclear weapons per year. Dissidents report two covert uranium enrichment plants at Lashgarabad and Ramandeh.
	Parchin		Satellite photos support reports of a high explosives testing site to simulate nuclear weapons.
	Qatran		Dissidents claim a secret nuclear facility exists and a a possible heavy water plant is under construction.
	Saghand (Sagend)		Uranium Ore Deposit with reserves estimated at between 3,000 and 5,000 tons of uranium oxide.
	Tabas		Unconfirmed reports have been made of a covert reactor at Darkovin.
	Tehran		Nuclear Research Center. There is a 5 MW research reactor at this site.
	Uranium Mines		Iran has opened at least 10 uranium mines since 1988, with reserves of 3,000 tons of uranium. However, Iran might be capable of producing between 20,000 and 30,000 tons of U-308. Some of these mines are located in Saghand, Khorassan, Sistan va Baluchestan, Hormozgan, Bandar-e-Abbas and Badar-e-Lengeh.
Chemical	Abu Musa Island		Chemical weapons storage facility, principally of 155 mm artillery shells and weaponized biological agents
	Bandar Khomeni		Potential chemical weapons facility run by Razi chemical corporation.
	Damghan		Reported chemical weapons and warhead production facility. Produces 155 mm shells and SCUD warheads
	Esfahan (Isfahan)		Reported chemical weapons production facility, possibly operated by the Poly-Acryl Corporation.
	Karaj		Alleged chemical manufacturing and storage facility for chemical weapons.
	Marvdasht		Potential mustard gas manufacturing facility run by the Chemical Fertilizers Company.
	Mashar		Unconfirmed reports of a warhead-filling facility at this location.
	Parchin		Reported chemical weapons production facility and munitions factory.
	Qazvin		Reported chemical weapons production facility, particulary nerve gas.
Biological	Damghan		Unverified reports of a biological research and production facility.
	Tabriz		Reports of an anthrax and Botulinum storage facility.
	Tehran		Unconfirmed reports of a biological weapons production facility at a pesticide plant near Tehran
Missile	Abadan		Russian reports point to an unguided missile production facility.
	Abu Musa Island		Deployment of Chinese HY-2 Silkworm anti-ship missiles.
	Aliabad		Storage facility for equipment for missile trial launches.
	Arak		Facilities involved in the R&D of unguided missiles, and modifications of the Scud-S missile.
	Bandar Abbas		Cruise missile production facility and land-based launch site.
	Dasht-e-Kavir		Site of August 11, 2004 test of intermediate range Shahab-3 missile.
	Dorud		Russian reports claim that Dorud is an unguided missile R&D site.
	Emamshahr (Shahrud)		Military testing range for Shahab-3 and Scud C missiles.
	Esfahan (Isfahan)		Iran's largest missile assembly and production plant.
	Fasa		Potential storage site for large missiles.
	Gamsar		Missile test range.
	Gostaresh		Center for missile engineering research.
	Hama		Potential Scud C missile manufacturing plant.
	Islaker		Potential missile manufacturing plant.
	Karaj		R&D and production facility of unguided missiles and primary design center for Iran's missile program.
	Khorramabad		Missile launching sites of Shahab-3 missiles and assembly facility of unguided missiles.
	Kukh-e-Barjamali		Test range for liquid propellant missiles engines and storage site for missile testing equipment.
	Lavizan		Missile production and design center.
	Maghdad		Potential missile manufacturing plant.
	Manzariyeh		R&D center for unguided missiles and producer of propellant.
	Mashhad		Unguided missile production site and test and production site for solid-propellant missile engines.
	Okaraman		Production site for SCUD missiles.
	Pairzan		Potential missile manufacturing facilities.
	Parchin		Production site for solid propellant for missiles, unguided missiles, and SCUD missile assembly.
	Qeshm Island		Deployment of Chinese HY-2 Silkworm anti-ship missiles.
	Saidabad		Potential ballistic missile production facility.
	Sultanatabad		Missile production and design center.
	Sarji		Production site for unguided missiles.
	Semnan		Ballistic missile test range and production facility.
	Shahriyar		Planned location for a Chinese-produced missile production facility.
	Shiraz		Potential missile manufacturing facility.
	Seman		Potential missile manufacturing facility.
	Shahroud		Potential HY-2 Silkworm missile production complex and missile testing facility.
	Sharqfabad		Planned location for manufacturing site for missile guidance and steering systems.
	Sirri Island		Deployment of Chinese HY-2 Silkworm anti-ship missiles.
	Sirjan		Unguided missile and propellant R&D site. Storage facility for Chinese HY-2 Silkworm and M-11 missiles.
	Taba		Range telemetry station.
	Tabriz		Production site for SCUD-S unguided missiles.
	Tehran		Iran's main missile production office. R&D facilities for unguided missiles.

Source: Anthony Cordesman, *Iran's Developing Military Capabilities*, (Washington, D.C.: Center for Strategic and International Studies Press, 2005).

Appendix C: Location of Major Iranian Oilfields and Pipelines



Source: University of Texas at Austin, "Major Iranian Oilfields," [online: web], cited 24 January 2006, URL: http://www.lib.utexas.edu/maps/middle_east_and_asia/iran_major_oilfields78.jpg

Appendix D: Iranian Imports and Exports

Iranian Composition of Imports and Exports by Trading Partner (in $US millions)

Country	1998/1999		1999/2000		2000/2001		2001/2002		2002/2003	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
Total	14,323	21,030	12,683	25,063	14,347	23,149	17,626	21,436	22,275	30,001
Japan	1,005	3,479	590	4,869	684	4,561	787	4,311	714	6,764
% Total	*7%*	*16%*	*5%*	*20%*	*5%*	*20%*	*4%*	*19%*	*3%*	*29%*
% Growth YoY			*-41%*	*40%*	*16%*	*-6%*	*15%*	*-5%*	*-9%*	*57%*
Germany	1,660	576	1,382	960	1,504	670	1,807	720	3,777	1,078
% Total	*12%*	*3%*	*11%*	*4%*	*10%*	*3%*	*10%*	*3%*	*17%*	*5%*
% Growth YoY			*-17%*	*67%*	*9%*	*-30%*	*20%*	*7%*	*109%*	*50%*
United Kingdom	574	1,349	439	2,175	510	1,908	666	1,214	769	1,472
% Total	*4%*	*6%*	*3%*	*9%*	*4%*	*8%*	*4%*	*5%*	*3%*	*6%*
% Growth YoY			*-24%*	*61%*	*16%*	*-12%*	*31%*	*-36%*	*15%*	*21%*
France	556	576	685	960	617	670	1,109	720	1,318	1,078
% Total	*4%*	*3%*	*5%*	*4%*	*4%*	*3%*	*6%*	*3%*	*6%*	*5%*
% Growth YoY			*23%*	*67%*	*-10%*	*-30%*	*80%*	*7%*	*19%*	*50%*
Italy	1,188	1,500	901	2,032	856	1,920	996	1,620	1,389	1,947
% Total	*8%*	*7%*	*7%*	*8%*	*6%*	*8%*	*6%*	*7%*	*6%*	*8%*
% Growth YoY			*-24%*	*35%*	*-5%*	*-6%*	*16%*	*-16%*	*39%*	*20%*
Canada	311	NA	531	NA	477	NA	383	NA	199	NA
% Total	*2%*	*NA*	*4%*	*NA*	*3%*	*NA*	*2%*	*NA*	*1%*	*NA*
% Growth YoY			*71%*	*NA*	*-10%*	*NA*	*-20%*	*NA*	*-48%*	*NA*
United Arab Emirates	759	1,584	769	286	1,154	316	1,633	332	2,152	370
% Total	*5%*	*7%*	*6%*	*1%*	*8%*	*1%*	*9%*	*1%*	*10%*	*2%*
% Growth YoY			*1%*	*-82%*	*50%*	*10%*	*42%*	*5%*	*32%*	*11%*
Russia	549	3,238	532	46	920	39	914	49	874	46
% Total	*4%*	*15%*	*4%*	*0%*	*6%*	*0%*	*5%*	*0%*	*4%*	*0%*
% Growth YoY			*-3%*	*-99%*	*73%*	*-15%*	*-1%*	*26%*	*-4%*	*-6%*
Kazakhstan	87	NA	132	NA	345	NA	270	NA	262	NA
% Total	*1%*	*NA*	*1%*	*NA*	*2%*	*NA*	*2%*	*NA*	*1%*	*NA*
% Growth YoY			*52%*	*NA*	*161%*	*NA*	*-22%*	*NA*	*-3%*	*NA*
Turkey	272	723	228	742	233	763	291	837	369	1,692
% Total	*2%*	*3%*	*2%*	*3%*	*2%*	*3%*	*2%*	*4%*	*2%*	*7%*
% Growth YoY			*-16%*	*3%*	*2%*	*3%*	*25%*	*10%*	*27%*	*102%*
South Korea	687	60	708	989	737	206	958	620	894	1,174
% Total	*5%*	*0%*	*6%*	*4%*	*5%*	*1%*	*5%*	*3%*	*4%*	*5%*
% Growth YoY			*3%*	*1548%*	*4%*	*-79%*	*30%*	*201%*	*-7%*	*89%*
India	204	718	199	428	254	462	561	492	717	596
% Total	*1%*	*3%*	*2%*	*2%*	*2%*	*2%*	*3%*	*2%*	*3%*	*3%*
% Growth YoY			*-2%*	*-40%*	*28%*	*8%*	*121%*	*6%*	*28%*	*21%*
China	655	771	613	1,426	565	2,203	887	2,133	1,046	3,007
% Total	*5%*	*4%*	*5%*	*6%*	*4%*	*10%*	*5%*	*9%*	*5%*	*13%*
% Growth YoY			*-6%*	*85%*	*-8%*	*54%*	*57%*	*-3%*	*18%*	*41%*
Thailand	162	NA	214	NA	228	NA	108	NA	123	NA
% Total	*1%*	*NA*	*2%*	*NA*	*2%*	*NA*	*1%*	*NA*	*1%*	*NA*
% Growth YoY			*32%*	*NA*	*7%*	*NA*	*-53%*	*NA*	*14%*	*NA*
Indonesia	139	NA	111	NA	156	NA	92	NA	103	NA
% Total	*1%*	*NA*	*1%*	*NA*	*1%*	*NA*	*1%*	*NA*	*0%*	*NA*
% Growth YoY			*-20%*	*NA*	*41%*	*NA*	*-41%*	*NA*	*12%*	*NA*
Singapore	106	771	100	1,426	155	2,203	159	2,133	321	3,007
% Total	*1%*	*4%*	*1%*	*6%*	*1%*	*10%*	*1%*	*9%*	*1%*	*13%*
% Growth YoY			*-6%*	*85%*	*55%*	*54%*	*3%*	*-3%*	*102%*	*41%*
Brazil	472	NA	681	NA	538	NA	896	NA	843	NA
% Total	*3%*	*NA*	*5%*	*NA*	*4%*	*NA*	*5%*	*NA*	*4%*	*NA*
% Growth YoY			*44%*	*NA*	*-21%*	*NA*	*67%*	*NA*	*-6%*	*NA*
Argentina	632	NA	131	NA	304	NA	319	NA	95	NA
% Total	*4%*	*NA*	*1%*	*NA*	*2%*	*NA*	*2%*	*NA*	*0%*	*NA*
% Growth YoY			*-79%*	*NA*	*132%*	*NA*	*5%*	*NA*	*-70%*	*NA*
Australia	358	0	298	159	403	135	455	148	357	152
% Total	*2%*	*0%*	*2%*	*1%*	*3%*	*1%*	*3%*	*1%*	*2%*	*1%*
% Growth YoY			*-17%*	*NA*	*35%*	*-15%*	*13%*	*10%*	*-22%*	*3%*
Spain	410	468	341	764	343	752	308	639	300	948
% Total	*3%*	*2%*	*3%*	*3%*	*2%*	*3%*	*2%*	*3%*	*1%*	*4%*
% Growth YoY			*-17%*	*63%*	*1%*	*-2%*	*-10%*	*-15%*	*-3%*	*48%*
Switzerland	326	NA	336	NA	327	NA	435	NA	1,989	NA
% Total	*2%*	*NA*	*3%*	*NA*	*2%*	*NA*	*2%*	*NA*	*9%*	*NA*
% Growth YoY			*3%*	*NA*	*-3%*	*NA*	*33%*	*NA*	*357%*	*NA*
Sweden	148	718	120	428	310	462	377	492	350	596
% Total	*1%*	*3%*	*1%*	*2%*	*2%*	*2%*	*2%*	*2%*	*2%*	*3%*
% Growth YoY			*-19%*	*-40%*	*158%*	*8%*	*22%*	*6%*	*-7%*	*21%*
Belgium	899	NA	597	NA	426	NA	440	NA	396	NA
% Total	*6%*	*NA*	*5%*	*NA*	*3%*	*NA*	*2%*	*NA*	*2%*	*NA*
% Growth YoY			*-34%*	*NA*	*-29%*	*NA*	*3%*	*NA*	*-10%*	*NA*
Austria	267	NA	304	NA	277	NA	239	NA	252	NA
% Total	*2%*	*NA*	*2%*	*NA*	*2%*	*NA*	*1%*	*NA*	*1%*	*NA*
% Growth YoY			*14%*	*NA*	*-9%*	*NA*	*-14%*	*NA*	*5%*	*NA*
Netherlands	362	139	213	313	270	82	346	132	308	55
% Total	*3%*	*1%*	*2%*	*1%*	*2%*	*0%*	*2%*	*1%*	*1%*	*0%*
% Growth YoY			*-41%*	*125%*	*27%*	*-74%*	*28%*	*61%*	*-11%*	*-58%*
Greece	NA	472	NA	478	NA	330	NA	273	NA	292
% Total	*NA*	*2%*	*NA*	*2%*	*NA*	*1%*	*NA*	*1%*	*NA*	*1%*
% Growth YoY			*NA*	*1%*	*NA*	*-31%*	*NA*	*-17%*	*NA*	*7%*
Iceland	NA	810	NA	1,079	NA	879	NA	415	NA	882
% Total	*NA*	*4%*	*NA*	*4%*	*NA*	*4%*	*NA*	*2%*	*NA*	*4%*
% Growth YoY			*NA*	*33%*	*NA*	*-19%*	*NA*	*-53%*	*NA*	*113%*
Morocco	NA	0	NA	0	NA	256	NA	272	NA	330
% Total	*NA*	*0%*	*NA*	*0%*	*NA*	*1%*	*NA*	*1%*	*NA*	*1%*
% Growth YoY			*NA*	*NA*	*NA*	*NA*	*NA*	*6%*	*NA*	*21%*
New Zealand	NA	468	NA	764	NA	752	NA	639	NA	948
% Total	*NA*	*2%*	*NA*	*3%*	*NA*	*3%*	*NA*	*3%*	*NA*	*4%*
% Growth YoY			*NA*	*63%*	*NA*	*-2%*	*NA*	*-15%*	*NA*	*48%*
Norway	NA	234	NA	275	NA	510	NA	300	NA	581
% Total	*NA*	*1%*	*NA*	*1%*	*NA*	*2%*	*NA*	*1%*	*NA*	*2%*
% Growth YoY			*NA*	*18%*	*NA*	*85%*	*NA*	*-41%*	*NA*	*94%*
Philippines	NA	0	NA	723	NA	690	NA	394	NA	589
% Total	*NA*	*0%*	*NA*	*3%*	*NA*	*3%*	*NA*	*2%*	*NA*	*2%*
% Growth YoY			*NA*	*NA*	*NA*	*-5%*	*NA*	*-43%*	*NA*	*49%*
Portugal	NA	0	NA	99	NA	96	NA	93	NA	115
% Total	*NA*	*0%*	*NA*	*0%*	*NA*	*0%*	*NA*	*0%*	*NA*	*0%*
% Growth YoY			*NA*	*NA*	*NA*	*-3%*	*NA*	*-3%*	*NA*	*24%*
United States	NA	858	NA	1,199	NA	519	NA	543	NA	686
% Total	*NA*	*4%*	*NA*	*5%*	*NA*	*2%*	*NA*	*2%*	*NA*	*3%*
% Growth YoY			*NA*	*40%*	*NA*	*-57%*	*NA*	*5%*	*NA*	*26%*
Others	2,540	1,519	2,118	2,441	2,438	1,760	2,978	1,915	3,072	1,596
% Total	*18%*	*7%*	*17%*	*10%*	*17%*	*8%*	*17%*	*8%*	*14%*	*7%*
% Growth YoY			*-17%*	*61%*	*15%*	*-28%*	*22%*	*9%*	*3%*	*-17%*

Source: Adapted from International Monetary Fund, "Islamic Republic of Iran - Statistical Appendix," *IMF Country Report No. 04/307*, 27 August 2004, 49, 52.
1. Imports are for Iranian year ending March 20. Exports are based on year ending December 31.
2. "Customs cleared imports (c.i.f. base) including registration fees classified according to the International Classification of Goods. Defense-related imports and imports of refined oil products are included in the balance of payments, but excluded here. Registration fee is included in trade statistics because customs duties are levied on a registration fee-inclusive basis."

Iranian Composition of Imports by Category (in $US millions)

Import Category	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003
Total	14,323	12,683	14,347	17,626	22,275
Food and live animals	1,583	1,953	1,979	2,107	1,522
% Total	*11.1%*	*15.4%*	*13.8%*	*12.0%*	*6.8%*
% Growth YoY		*23.4%*	*1.3%*	*6.5%*	*-27.8%*
Dairy and eggs	77	37	62	32	66
% Total	*0.5%*	*0.3%*	*0.4%*	*0.2%*	*0.3%*
% Growth YoY		*-51.9%*	*67.6%*	*-48.4%*	*106.3%*
Grains and derivatives	878	1,319	1,390	1,472	899
% Total	*6.1%*	*10.4%*	*9.7%*	*8.4%*	*4.0%*
% Growth YoY		*50.2%*	*5.4%*	*5.9%*	*-38.9%*
Sugar, its derivatives and honey	230	281	213	219	161
% Total	*1.6%*	*2.2%*	*1.5%*	*1.2%*	*0.7%*
% Growth YoY		*22.2%*	*-24.2%*	*2.8%*	*-26.5%*
Coffee, tea, cocoa, spices, etc	37	62	74	50	21
% Total	*0.3%*	*0.5%*	*0.5%*	*0.3%*	*0.1%*
% Growth YoY		*67.6%*	*19.4%*	*-32.4%*	*-58.0%*
Fruits and vegetables	3	6	14	47	68
% Total	*0.0%*	*0.0%*	*0.1%*	*0.3%*	*0.3%*
% Growth YoY		*100.0%*	*133.3%*	*235.7%*	*44.7%*
Others	358	248	226	287	307
% Total	*2.5%*	*2.0%*	*1.6%*	*1.6%*	*1.4%*
% Growth YoY		*-30.7%*	*-8.9%*	*27.0%*	*7.0%*
Beverages and tobacco	9	6	17	18	138
% Total	*0.1%*	*0.0%*	*0.1%*	*0.1%*	*0.6%*
% Growth YoY		*-33.3%*	*183.3%*	*5.9%*	*666.7%*
Raw non-edible products (excl. petroleum fuels)	596	648	707	675	742
% Total	*4.2%*	*5.1%*	*4.9%*	*3.8%*	*3.3%*
% Growth YoY		*8.7%*	*9.1%*	*-4.5%*	*9.9%*
Raw caoutchouc	52	58	63	76	89
% Total	*0.4%*	*0.5%*	*0.4%*	*0.4%*	*0.4%*
% Growth YoY		*11.5%*	*8.6%*	*20.6%*	*17.1%*
Textile fibers unlisted elsewhere	201	219	195	209	214
% Total	*1.4%*	*1.7%*	*1.4%*	*1.2%*	*1.0%*
% Growth YoY		*9.0%*	*-11.0%*	*7.2%*	*2.4%*
Non-classified goods	343	371	449	390	439
% Total	*2.4%*	*2.9%*	*3.1%*	*2.2%*	*2.0%*
% Growth YoY		*8.2%*	*21.0%*	*-13.1%*	*12.6%*
Mineral products, fuel, oil products and their derivatives	186	215	330	578	1,067
% Total	*1.3%*	*1.7%*	*2.3%*	*3.3%*	*4.8%*
% Growth YoY		*15.6%*	*53.5%*	*75.2%*	*84.6%*
Vegetable and animal shortening	654	516	417	388	488
% Total	*4.6%*	*4.1%*	*2.9%*	*2.2%*	*2.2%*
% Growth YoY		*-21.1%*	*-19.2%*	*-7.0%*	*25.8%*
Vegetable shortening	633	499	408	382	477
% Total	*4.4%*	*3.9%*	*2.8%*	*2.2%*	*2.1%*
% Growth YoY		*-21.2%*	*-18.2%*	*-6.4%*	*24.9%*
Others	21	17	9	6	11
% Total	*0.1%*	*0.1%*	*0.1%*	*0.0%*	*0.0%*
% Growth YoY		*-19.0%*	*-47.1%*	*-33.3%*	*83.3%*
Chemical products	1,774	1,894	2,027	2,384	2,580
% Total	*12.4%*	*14.9%*	*14.1%*	*13.5%*	*11.6%*
% Growth YoY		*6.8%*	*7.0%*	*17.6%*	*8.2%*
Chemicals and their compounds	458	470	460	562	642
% Total	*3.2%*	*3.7%*	*3.2%*	*3.2%*	*2.9%*
% Growth YoY		*2.6%*	*-2.1%*	*22.2%*	*14.2%*
Raw materials for paints, dyes and tanning	135	129	125	154	171
% Total	*0.9%*	*1.0%*	*0.9%*	*0.9%*	*0.8%*
% Growth YoY		*-4.4%*	*-3.1%*	*23.2%*	*11.0%*
Plastic, cellulose and artificial resins	413	391	428	579	597
% Total	*2.9%*	*3.1%*	*3.0%*	*3.3%*	*2.7%*
% Growth YoY		*-5.3%*	*9.5%*	*35.3%*	*3.1%*
Other unlisted chemicals	316	361	408	414	452
% Total	*2.2%*	*2.8%*	*2.8%*	*2.3%*	*2.0%*
% Growth YoY		*14.2%*	*13.0%*	*1.5%*	*9.2%*
Others	452	543	606	675	718
% Total	*3.2%*	*4.3%*	*4.2%*	*3.8%*	*3.2%*
% Growth YoY		*20.1%*	*11.6%*	*11.4%*	*6.4%*
Goods classified according to their composition	2,520	2,213	3,185	3,319	3,221
% Total	*17.6%*	*17.4%*	*22.2%*	*18.8%*	*14.5%*
% Growth YoY		*-12.2%*	*43.9%*	*4.2%*	*-3.0%*
Paper, cardboard and derivatives	266	292	422	358	395
% Total	*1.9%*	*2.3%*	*2.9%*	*2.0%*	*1.8%*
% Growth YoY		*9.8%*	*44.5%*	*-15.2%*	*10.3%*
Various textile yarns and related products	310	266	303	289	255
% Total	*2.2%*	*2.1%*	*2.1%*	*1.6%*	*1.1%*
% Growth YoY		*-14.2%*	*13.9%*	*-4.6%*	*-11.8%*
Nonmetal mineral goods	166	139	124	183	200
% Total	*1.2%*	*1.1%*	*0.9%*	*1.0%*	*0.9%*
% Growth YoY		*-16.3%*	*-10.8%*	*47.6%*	*9.3%*
Iron and steel	1,287	1,173	1,819	1,895	1,738
% Total	*9.0%*	*9.2%*	*12.7%*	*10.8%*	*7.8%*
% Growth YoY		*-8.9%*	*55.1%*	*4.2%*	*-8.3%*
Others	491	343	517	594	633
% Total	*3.4%*	*2.7%*	*3.6%*	*3.4%*	*2.8%*
% Growth YoY		*-30.1%*	*50.7%*	*14.9%*	*6.6%*
Transportation vehicles, machinery and tools	6,348	4,785	5,172	7,566	10,220
% Total	*44.3%*	*37.7%*	*36.0%*	*42.9%*	*45.9%*
% Growth YoY		*-24.6%*	*8.1%*	*46.3%*	*35.1%*
Non-electric machinery	3,501	3,021	2,976	4,051	4,928
% Total	*24.4%*	*23.8%*	*20.7%*	*23.0%*	*22.1%*
% Growth YoY		*-13.7%*	*-1.5%*	*36.1%*	*21.6%*
Electric machinery, tools and appliances	1,521	961	1,085	1,819	1,808
% Total	*10.6%*	*7.6%*	*7.6%*	*10.3%*	*8.1%*
% Growth YoY		*-36.8%*	*12.9%*	*67.6%*	*-0.6%*
Transportation vehicles	1,326	803	1,111	1,696	3,484
% Total	*9.3%*	*6.3%*	*7.7%*	*9.6%*	*15.6%*
% Growth YoY		*-39.4%*	*38.4%*	*52.7%*	*105.4%*
Miscellaneous finished products	538	305	447	536	716
% Total	*3.8%*	*2.4%*	*3.1%*	*3.0%*	*3.2%*
% Growth YoY		*-43.3%*	*46.6%*	*19.9%*	*33.6%*
Scientific and professional tools	380	237	288	374	461
% Total	*2.7%*	*1.9%*	*2.0%*	*2.1%*	*2.1%*
% Growth YoY		*-37.6%*	*21.5%*	*29.9%*	*23.3%*
Artificial goods not listed elsewhere	155	67	154	156	240
% Total	*1.1%*	*0.5%*	*1.1%*	*0.9%*	*1.1%*
% Growth YoY		*-56.8%*	*129.9%*	*1.3%*	*53.8%*
Others	3	1	5	6	15
% Total	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.1%*
% Growth YoY		*-66.7%*	*400.0%*	*20.0%*	*150.0%*
Other	115	148	66	55	1,581
% Total	*0.8%*	*1.2%*	*0.5%*	*0.3%*	*7.1%*
% Growth YoY		*28.7%*	*-55.4%*	*-16.7%*	*2774.5%*

Source: Adapted from International Monetary Fund, "Islamic Republic of Iran - Statistical Appendix," *IMF Country Report No. 04/307*, 27 August 2004, 53.
1. Imports are for Iranian year ending March 20. Exports are based on year ending December 31.

2. "Customs cleared imports (c.i.f. base) including registration fees classified according to the International Classification of Goods. Defense-related imports and imports of refined oil

Appendix E: US Economic Impact of Iranian Oil Embargo

Assumptions for Analysis of Net Iranian Oil Export Supply Disruptions

Daily Oil Supply in Millions of Barrels per Day (mbpd)

Minimum Iranian Daily Oil Export Capacity	2.70 mbpd
Daily Oil Capacity Increment	0.00 mbpd
World Unaffected Exess Daily Capacity Max	1.50 mbpd
Unaffected Excess Daily Capacity Increment	0.30 mbpd
Current Oil Price per Barrel (4 Jan 2006)	$63.41
Oil Price Increment	$1.00
% Increase in Oil Price	10.00%
% Increase Increment	1.00%
Max % Point Decrease in GDP growth per 10% Oil price increase	0.10%
Min % Point Decrease in GDP growth per 10% Oil price increase	0.05%
% Point GDP Increment	0.0028%
US 2005 GDP (in billions - Estimate from the Economist Intelligence Unit)	$12,482.30
US Cost of Capital (Risk Free Rate)	4.50%

Implied Range of Net Iranian Oil Exports

Daily Oil Supply in Millions of Barrels per Day (mbpd)

Gross Oil Iranian Exports	2.70 mbpd	2.70 mbpd	2.70 mbpd	2.70 mbpd	2.70 mbpd	2.70 mbpd
Less Unaffected Exess Capacity	1.50 mbpd	1.20 mbpd	0.90 mbpd	0.60 mbpd	0.30 mbpd	0.00 mbpd
Net Oil Disrupted	**1.20 mbpd**	**1.50 mbpd**	**1.80 mbpd**	**2.10 mbpd**	**2.40 mbpd**	**2.70 mbpd**

Implied Increase in Oil Price per Barrel per 1 mbpd Net Supply Disruption

	% Increase in Price due to Disruption					
Initial Oil Price per Barrel	10%	11%	12%	13%	14%	15%
$54.41	$5.44	$5.99	$6.53	$7.07	$7.62	$8.16
$55.41	$5.54	$6.10	$6.65	$7.20	$7.76	$8.31
$56.41	$5.64	$6.21	$6.77	$7.33	$7.90	$8.46
$57.41	$5.74	$6.32	$6.89	$7.46	$8.04	$8.61
$58.41	$5.84	$6.43	$7.01	$7.59	$8.18	$8.76
$59.41	$5.94	$6.54	$7.13	$7.72	$8.32	$8.91
$60.41	$6.04	$6.65	$7.25	$7.85	$8.46	$9.06
$61.41	$6.14	$6.76	$7.37	$7.98	$8.60	$9.21
$62.41	$6.24	$6.87	$7.49	$8.11	$8.74	$9.36
$63.41	$6.34	$6.98	$7.61	$8.24	$8.88	$9.51
$64.41	$6.44	$7.09	$7.73	$8.37	$9.02	$9.66
$65.41	$6.54	$7.20	$7.85	$8.50	$9.16	$9.81
$66.41	$6.64	$7.31	$7.97	$8.63	$9.30	$9.96
$67.41	$6.74	$7.42	$8.09	$8.76	$9.44	$10.11
$68.41	$6.84	$7.53	$8.21	$8.89	$9.58	$10.26
$69.41	$6.94	$7.64	$8.33	$9.02	$9.72	$10.41
$70.41	$7.04	$7.75	$8.45	$9.15	$9.86	$10.56
$71.41	$7.14	$7.86	$8.57	$9.28	$10.00	$10.71
$72.41	$7.24	$7.97	$8.69	$9.41	$10.14	$10.86

Implied Increase in Oil Price per Barrel for Implied Ranges of Net Supply Disruption

Initial Oil Price per Barrel	1.20 mbpd						1.50 mbpd						1.80 mbpd						2.10 mbpd						2.40 mbpd						2.70 mbpd					
	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%
$54.41	$6.53	$7.18	$7.84	$8.49	$9.14	$9.79	$8.16	$8.98	$9.79	$10.61	$11.43	$12.24	$9.79	$10.77	$11.75	$12.73	$13.71	$14.69	$11.43	$12.57	$13.71	$14.85	$16.00	$17.14	$13.06	$14.36	$15.67	$16.98	$18.28	$19.59	$14.69	$16.16	$17.63	$19.10	$20.57	$22.04
$55.41	$6.65	$7.31	$7.98	$8.64	$9.31	$9.97	$8.31	$9.14	$9.97	$10.80	$11.64	$12.47	$9.97	$10.97	$11.97	$12.97	$13.96	$14.96	$11.64	$12.80	$13.96	$15.13	$16.29	$17.45	$13.30	$14.63	$15.96	$17.29	$18.62	$19.95	$14.96	$16.46	$17.95	$19.45	$20.94	$22.44
$56.41	$6.77	$7.45	$8.12	$8.80	$9.48	$10.15	$8.46	$9.31	$10.15	$11.00	$11.85	$12.69	$10.15	$11.17	$12.18	$13.20	$14.22	$15.23	$11.85	$13.03	$14.22	$15.40	$16.58	$17.77	$13.54	$14.89	$16.25	$17.60	$18.95	$20.31	$15.23	$16.75	$18.28	$19.80	$21.32	$22.85
$57.41	$6.89	$7.58	$8.27	$8.96	$9.64	$10.33	$8.61	$9.47	$10.33	$11.19	$12.06	$12.92	$10.33	$11.37	$12.40	$13.43	$14.47	$15.50	$12.06	$13.26	$14.47	$15.67	$16.88	$18.08	$13.78	$15.16	$16.53	$17.91	$19.29	$20.67	$15.50	$17.05	$18.60	$20.15	$21.70	$23.25
$58.41	$7.01	$7.71	$8.41	$9.11	$9.81	$10.51	$8.76	$9.64	$10.51	$11.39	$12.27	$13.14	$10.51	$11.57	$12.62	$13.67	$14.72	$15.77	$12.27	$13.49	$14.72	$15.95	$17.17	$18.40	$14.02	$15.42	$16.82	$18.22	$19.63	$21.03	$15.77	$17.35	$18.92	$20.50	$22.08	$23.66
$59.41	$7.13	$7.84	$8.56	$9.27	$9.98	$10.69	$8.91	$9.80	$10.69	$11.58	$12.48	$13.37	$10.69	$11.76	$12.83	$13.90	$14.97	$16.04	$12.48	$13.72	$14.97	$16.22	$17.47	$18.71	$14.26	$15.68	$17.11	$18.54	$19.96	$21.39	$16.04	$17.64	$19.25	$20.85	$22.46	$24.06
$60.41	$7.25	$7.97	$8.70	$9.42	$10.15	$10.87	$9.06	$9.97	$10.87	$11.78	$12.69	$13.59	$10.87	$11.96	$13.05	$14.14	$15.22	$16.31	$12.69	$13.95	$15.22	$16.49	$17.76	$19.03	$14.50	$15.95	$17.40	$18.85	$20.30	$21.75	$16.31	$17.94	$19.57	$21.20	$22.83	$24.47
$61.41	$7.37	$8.11	$8.84	$9.58	$10.32	$11.05	$9.21	$10.13	$11.05	$11.97	$12.90	$13.82	$11.05	$12.16	$13.26	$14.37	$15.48	$16.58	$12.90	$14.19	$15.48	$16.76	$18.05	$19.34	$14.74	$16.21	$17.69	$19.16	$20.63	$22.11	$16.58	$18.24	$19.90	$21.55	$23.21	$24.87
$62.41	$7.49	$8.24	$8.99	$9.74	$10.48	$11.23	$9.36	$10.30	$11.23	$12.17	$13.11	$14.04	$11.23	$12.36	$13.48	$14.60	$15.73	$16.85	$13.11	$14.42	$15.73	$17.04	$18.35	$19.66	$14.98	$16.48	$17.97	$19.47	$20.97	$22.47	$16.85	$18.54	$20.22	$21.91	$23.59	$25.28
$63.41	$7.61	$8.37	$9.13	$9.89	$10.65	$11.41	$9.51	$10.46	$11.41	$12.36	$13.32	$14.27	$11.41	$12.56	$13.70	$14.84	$15.98	$17.12	$13.32	$14.65	$15.98	$17.31	$18.64	$19.97	$15.22	$16.74	$18.26	$19.78	$21.31	$22.83	$17.12	$18.83	$20.54	$22.26	$23.97	$25.68
$64.41	$7.73	$8.50	$9.28	$10.05	$10.82	$11.59	$9.66	$10.63	$11.59	$12.56	$13.53	$14.49	$11.59	$12.75	$13.91	$15.07	$16.23	$17.39	$13.53	$14.88	$16.23	$17.58	$18.94	$20.29	$15.46	$17.00	$18.55	$20.10	$21.64	$23.19	$17.39	$19.13	$20.87	$22.61	$24.35	$26.09
$65.41	$7.85	$8.63	$9.42	$10.20	$10.99	$11.77	$9.81	$10.79	$11.77	$12.75	$13.74	$14.72	$11.77	$12.95	$14.13	$15.31	$16.48	$17.66	$13.74	$15.11	$16.48	$17.86	$19.23	$20.60	$15.70	$17.27	$18.84	$20.41	$21.98	$23.55	$17.66	$19.43	$21.19	$22.96	$24.72	$26.49
$66.41	$7.97	$8.77	$9.56	$10.36	$11.16	$11.95	$9.96	$10.96	$11.95	$12.95	$13.95	$14.94	$11.95	$13.15	$14.34	$15.54	$16.74	$17.93	$13.95	$15.34	$16.74	$18.13	$19.52	$20.92	$15.94	$17.53	$19.13	$20.72	$22.31	$23.91	$17.93	$19.72	$21.52	$23.31	$25.10	$26.90
$67.41	$8.09	$8.90	$9.71	$10.52	$11.32	$12.13	$10.11	$11.12	$12.13	$13.14	$14.16	$15.17	$12.13	$13.35	$14.56	$15.77	$16.99	$18.20	$14.16	$15.57	$16.99	$18.40	$19.82	$21.23	$16.18	$17.80	$19.41	$21.03	$22.65	$24.27	$18.20	$20.02	$21.84	$23.66	$25.48	$27.30
$68.41	$8.21	$9.03	$9.85	$10.67	$11.49	$12.31	$10.26	$11.29	$12.31	$13.34	$14.37	$15.39	$12.31	$13.55	$14.78	$16.01	$17.24	$18.47	$14.37	$15.80	$17.24	$18.68	$20.11	$21.55	$16.42	$18.06	$19.70	$21.34	$22.99	$24.63	$18.47	$20.32	$22.16	$24.01	$25.86	$27.71
$69.41	$8.33	$9.16	$10.00	$10.83	$11.66	$12.49	$10.41	$11.45	$12.49	$13.53	$14.58	$15.62	$12.49	$13.74	$14.99	$16.24	$17.49	$18.74	$14.58	$16.03	$17.49	$18.95	$20.41	$21.86	$16.66	$18.32	$19.99	$21.66	$23.32	$24.99	$18.74	$20.61	$22.49	$24.36	$26.24	$28.11
$70.41	$8.45	$9.29	$10.14	$10.98	$11.83	$12.67	$10.56	$11.62	$12.67	$13.73	$14.79	$15.84	$12.67	$13.94	$15.21	$16.48	$17.74	$19.01	$14.79	$16.26	$17.74	$19.22	$20.70	$22.18	$16.90	$18.59	$20.28	$21.97	$23.66	$25.35	$19.01	$20.91	$22.81	$24.71	$26.61	$28.52
$71.41	$8.57	$9.43	$10.28	$11.14	$12.00	$12.85	$10.71	$11.78	$12.85	$13.92	$15.00	$16.07	$12.85	$14.14	$15.42	$16.71	$18.00	$19.28	$15.00	$16.50	$18.00	$19.49	$20.99	$22.49	$17.14	$18.85	$20.57	$22.28	$23.99	$25.71	$19.28	$21.21	$23.14	$25.06	$26.99	$28.92
$72.41	$8.69	$9.56	$10.43	$11.30	$12.16	$13.03	$10.86	$11.95	$13.03	$14.12	$15.21	$16.29	$13.03	$14.34	$15.64	$16.94	$18.25	$19.55	$15.21	$16.73	$18.25	$19.77	$21.29	$22.81	$17.38	$19.12	$20.85	$22.59	$24.33	$26.07	$19.55	$21.51	$23.46	$25.42	$27.37	$29.33

Implied Decrease in GDP Growth Due to Net Oil Supply Disruption (Assuming 10% Increase in Oil Price Implies a Given Percentage Point Decrease in GDP Growth Rate)

GDP Growth % Decrease	1.20 mbpd						1.50 mbpd						1.80 mbpd						2.10 mbpd						2.40 mbpd						2.70 mbpd					
	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%
0.050%	0.06%	0.07%	0.07%	0.08%	0.08%	0.09%	0.08%	0.08%	0.09%	0.10%	0.11%	0.11%	0.09%	0.10%	0.11%	0.12%	0.13%	0.14%	0.11%	0.12%	0.13%	0.14%	0.15%	0.16%	0.12%	0.13%	0.14%	0.16%	0.17%	0.18%	0.14%	0.15%	0.16%	0.18%	0.19%	0.20%
0.053%	0.06%	0.07%	0.08%	0.08%	0.09%	0.10%	0.08%	0.09%	0.10%	0.10%	0.11%	0.12%	0.10%	0.10%	0.11%	0.12%	0.13%	0.14%	0.11%	0.12%	0.13%	0.14%	0.16%	0.17%	0.13%	0.14%	0.15%	0.16%	0.18%	0.19%	0.14%	0.16%	0.17%	0.19%	0.20%	0.21%
0.056%	0.07%	0.07%	0.08%	0.09%	0.09%	0.10%	0.08%	0.09%	0.10%	0.11%	0.12%	0.13%	0.10%	0.11%	0.12%	0.13%	0.14%	0.15%	0.12%	0.13%	0.14%	0.15%	0.16%	0.18%	0.13%	0.15%	0.16%	0.17%	0.19%	0.20%	0.15%	0.17%	0.18%	0.20%	0.21%	0.23%
0.058%	0.07%	0.08%	0.08%	0.09%	0.10%	0.11%	0.09%	0.10%	0.11%	0.11%	0.12%	0.13%	0.11%	0.12%	0.13%	0.14%	0.15%	0.16%	0.12%	0.13%	0.15%	0.16%	0.17%	0.18%	0.14%	0.15%	0.17%	0.18%	0.20%	0.21%	0.16%	0.17%	0.19%	0.20%	0.22%	0.24%
0.061%	0.07%	0.08%	0.09%	0.10%	0.10%	0.11%	0.09%	0.10%	0.11%	0.12%	0.13%	0.14%	0.11%	0.12%	0.13%	0.14%	0.15%	0.17%	0.13%	0.14%	0.15%	0.17%	0.18%	0.19%	0.15%	0.16%	0.18%	0.19%	0.21%	0.22%	0.17%	0.18%	0.20%	0.21%	0.23%	0.25%
0.064%	0.08%	0.08%	0.09%	0.10%	0.11%	0.12%	0.10%	0.11%	0.12%	0.12%	0.13%	0.14%	0.12%	0.13%	0.14%	0.15%	0.16%	0.17%	0.13%	0.15%	0.16%	0.17%	0.19%	0.20%	0.15%	0.17%	0.18%	0.20%	0.21%	0.23%	0.17%	0.19%	0.21%	0.22%	0.24%	0.26%
0.067%	0.08%	0.09%	0.10%	0.10%	0.11%	0.12%	0.10%	0.11%	0.12%	0.13%	0.14%	0.15%	0.12%	0.13%	0.14%	0.16%	0.17%	0.18%	0.14%	0.15%	0.17%	0.18%	0.20%	0.21%	0.16%	0.18%	0.19%	0.21%	0.22%	0.24%	0.18%	0.20%	0.22%	0.23%	0.25%	0.27%
0.069%	0.08%	0.09%	0.10%	0.11%	0.12%	0.13%	0.10%	0.11%	0.13%	0.14%	0.15%	0.16%	0.13%	0.14%	0.15%	0.16%	0.18%	0.19%	0.15%	0.16%	0.18%	0.19%	0.20%	0.22%	0.17%	0.18%	0.20%	0.22%	0.23%	0.25%	0.19%	0.21%	0.23%	0.24%	0.26%	0.28%
0.072%	0.09%	0.10%	0.10%	0.11%	0.12%	0.13%	0.11%	0.12%	0.13%	0.14%	0.15%	0.16%	0.13%	0.14%	0.16%	0.17%	0.18%	0.20%	0.15%	0.17%	0.18%	0.20%	0.21%	0.23%	0.17%	0.19%	0.21%	0.23%	0.24%	0.26%	0.20%	0.21%	0.23%	0.25%	0.27%	0.29%
0.075%	0.09%	0.10%	0.11%	0.12%	0.13%	0.14%	0.11%	0.12%	0.14%	0.15%	0.16%	0.17%	0.14%	0.15%	0.16%	0.18%	0.19%	0.20%	0.16%	0.17%	0.19%	0.20%	0.22%	0.24%	0.18%	0.20%	0.22%	0.23%	0.25%	0.27%	0.20%	0.22%	0.24%	0.26%	0.28%	0.30%
0.078%	0.09%	0.10%	0.11%	0.12%	0.13%	0.14%	0.12%	0.13%	0.14%	0.15%	0.16%	0.18%	0.14%	0.15%	0.17%	0.18%	0.20%	0.21%	0.16%	0.18%	0.20%	0.21%	0.23%	0.25%	0.19%	0.21%	0.22%	0.24%	0.26%	0.28%	0.21%	0.23%	0.25%	0.27%	0.29%	0.32%
0.081%	0.10%	0.11%	0.12%	0.13%	0.14%	0.15%	0.12%	0.13%	0.15%	0.16%	0.17%	0.18%	0.15%	0.16%	0.17%	0.19%	0.20%	0.22%	0.17%	0.19%	0.20%	0.22%	0.24%	0.25%	0.19%	0.21%	0.23%	0.25%	0.27%	0.29%	0.22%	0.24%	0.26%	0.28%	0.30%	0.33%
0.083%	0.10%	0.11%	0.12%	0.13%	0.14%	0.15%	0.13%	0.14%	0.15%	0.16%	0.18%	0.19%	0.15%	0.17%	0.18%	0.20%	0.21%	0.23%	0.18%	0.19%	0.21%	0.23%	0.25%	0.26%	0.20%	0.22%	0.24%	0.26%	0.28%	0.30%	0.23%	0.25%	0.27%	0.29%	0.32%	0.34%
0.086%	0.10%	0.11%	0.12%	0.13%	0.14%	0.16%	0.13%	0.14%	0.16%	0.17%	0.18%	0.19%	0.16%	0.17%	0.19%	0.20%	0.22%	0.23%	0.18%	0.20%	0.22%	0.24%	0.25%	0.27%	0.21%	0.23%	0.25%	0.27%	0.29%	0.31%	0.23%	0.26%	0.28%	0.30%	0.33%	0.35%
0.089%	0.11%	0.12%	0.13%	0.14%	0.15%	0.16%	0.13%	0.15%	0.16%	0.17%	0.19%	0.20%	0.16%	0.18%	0.19%	0.21%	0.22%	0.24%	0.19%	0.21%	0.22%	0.24%	0.26%	0.28%	0.21%	0.23%	0.26%	0.28%	0.30%	0.32%	0.24%	0.26%	0.29%	0.31%	0.34%	0.36%
0.092%	0.11%	0.12%	0.13%	0.14%	0.15%	0.17%	0.14%	0.15%	0.17%	0.18%	0.19%	0.21%	0.17%	0.18%	0.20%	0.21%	0.23%	0.25%	0.19%	0.21%	0.23%	0.25%	0.27%	0.29%	0.22%	0.24%	0.26%	0.29%	0.31%	0.33%	0.25%	0.27%	0.30%	0.32%	0.35%	0.37%
0.094%	0.11%	0.12%	0.14%	0.15%	0.16%	0.17%	0.14%	0.16%	0.17%	0.18%	0.20%	0.21%	0.17%	0.19%	0.20%	0.22%	0.24%	0.26%	0.20%	0.22%	0.24%	0.26%	0.28%	0.30%	0.23%	0.25%	0.27%	0.29%	0.32%	0.34%	0.26%	0.28%	0.31%	0.33%	0.36%	0.38%
0.097%	0.12%	0.13%	0.14%	0.15%	0.16%	0.18%	0.15%	0.16%	0.18%	0.19%	0.20%	0.22%	0.18%	0.19%	0.21%	0.23%	0.25%	0.26%	0.20%	0.22%	0.25%	0.27%	0.29%	0.31%	0.23%	0.26%	0.28%	0.30%	0.33%	0.35%	0.26%	0.29%	0.32%	0.34%	0.37%	0.39%
0.100%	0.12%	0.13%	0.14%	0.16%	0.17%	0.18%	0.15%	0.17%	0.18%	0.20%	0.21%	0.23%	0.18%	0.20%	0.22%	0.23%	0.25%	0.27%	0.21%	0.23%	0.25%	0.27%	0.29%	0.32%	0.24%	0.26%	0.29%	0.31%	0.34%	0.36%	0.27%	0.30%	0.32%	0.35%	0.38%	0.41%

Implied Loss in $US Billions Due to Net Oil Supply Disruption (Assuming 10% Increase in Oil Price Implies a Given Percentage Point Decrease in GDP Growth Rate)

GDP Growth % Decrease	1.20 mbpd						1.50 mbpd						1.80 mbpd						2.10 mbpd						2.40 mbpd						2.70 mbpd					
	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%
0.050%	$7.49	$8.24	$8.99	$9.74	$10.49	$11.23	$9.36	$10.30	$11.23	$12.17	$13.11	$14.04	$11.23	$12.36	$13.48	$14.60	$15.73	$16.85	$13.11	$14.42	$15.73	$17.04	$18.35	$19.66	$14.98	$16.48	$17.97	$19.47	$20.97	$22.47	$16.85	$18.54	$20.22	$21.91	$23.59	$25.28
0.053%	$7.91	$8.70	$9.49	$10.28	$11.07	$11.86	$9.88	$10.87	$11.86	$12.85	$13.83	$14.82	$11.86	$13.04	$14.23	$15.42	$16.60	$17.79	$13.83	$15.22	$16.60	$17.98	$19.37	$20.75	$15.81	$17.39	$18.97	$20.55	$22.14	$23.72	$17.79	$19.57	$21.34	$23.12	$24.90	$26.68
0.056%	$8.32	$9.15	$9.99	$10.82	$11.65	$12.48	$10.40	$11.44	$12.48	$13.52	$14.56	$15.60	$12.48	$13.73	$14.98	$16.23	$17.48	$18.72	$14.56	$16.02	$17.48	$18.93	$20.39	$21.84	$16.64	$18.31	$19.97	$21.64	$23.30	$24.96	$18.72	$20.60	$22.47	$24.34	$26.21	$28.09
0.058%	$8.74	$9.61	$10.49	$11.36	$12.23	$13.11	$10.92	$12.01	$13.11	$14.20	$15.29	$16.38	$13.11	$14.42	$15.73	$17.04	$18.35	$19.66	$15.29	$16.82	$18.35	$19.88	$21.41	$22.94	$17.48	$19.22	$20.97	$22.72	$24.47	$26.21	$19.66	$21.63	$23.59	$25.56	$27.52	$29.49
0.061%	$9.15	$10.07	$10.98	$11.90	$12.82	$13.73	$11.44	$12.59	$13.73	$14.87	$16.02	$17.16	$13.73	$15.10	$16.48	$17.85	$19.22	$20.60	$16.02	$17.62	$19.22	$20.82	$22.43	$24.03	$18.31	$20.14	$21.97	$23.80	$25.63	$27.46	$20.60	$22.66	$24.71	$26.77	$28.83	$30.89
0.064%	$9.57	$10.53	$11.48	$12.44	$13.40	$14.35	$11.96	$13.16	$14.35	$15.55	$16.75	$17.94	$14.35	$15.79	$17.23	$18.66	$20.10	$21.53	$16.75	$18.42	$20.10	$21.77	$23.45	$25.12	$19.14	$21.05	$22.97	$24.88	$26.80	$28.71	$21.53	$23.69	$25.84	$27.99	$30.14	$32.30
0.067%	$9.99	$10.98	$11.98	$12.98	$13.98	$14.98	$12.48	$13.73	$14.98	$16.23	$17.48	$18.72	$14.98	$16.48	$17.97	$19.47	$20.97	$22.47	$17.48	$19.22	$20.97	$22.72	$24.47	$26.21	$19.97	$21.97	$23.97	$25.96	$27.96	$29.96	$22.47	$24.71	$26.96	$29.21	$31.46	$33.70
0.069%	$10.40	$11.44	$12.48	$13.52	$14.56	$15.60	$13.00	$14.30	$15.60	$16.90	$18.20	$19.50	$15.60	$17.16	$18.72	$20.28	$21.84	$23.40	$18.20	$20.02	$21.84	$23.66	$25.48	$27.31	$20.80	$22.88	$24.96	$27.04	$29.13	$31.21	$23.40	$25.74	$28.09	$30.43	$32.77	$35.11
0.072%	$10.82	$11.90	$12.98	$14.06	$15.15	$16.23	$13.52	$14.87	$16.23	$17.58	$18.93	$20.28	$16.23	$17.85	$19.47	$21.10	$22.72	$24.34	$18.93	$20.82	$22.72	$24.61	$26.50	$28.40	$21.64	$23.80	$25.96	$28.13	$30.29	$32.45	$24.34	$26.77	$29.21	$31.64	$34.08	$36.51
0.075%	$11.23	$12.36	$13.48	$14.60	$15.73	$16.85	$14.04	$15.45	$16.85	$18.26	$19.66	$21.06	$16.85	$18.54	$20.22	$21.91	$23.59	$25.28	$19.66	$21.63	$23.59	$25.56	$27.52	$29.49	$22.47	$24.71	$26.96	$29.21	$31.46	$33.70	$25.28	$27.80	$30.33	$32.86	$35.39	$37.91
0.078%	$11.65	$12.82	$13.98	$15.15	$16.31	$17.48	$14.56	$16.02	$17.48	$18.93	$20.39	$21.84	$17.48	$19.22	$20.97	$22.72	$24.47	$26.21	$20.39	$22.43	$24.47	$26.50	$28.54	$30.58	$23.30	$25.63	$27.96	$30.29	$32.62	$34.95	$26.21	$28.83	$31.46	$34.08	$36.70	$39.32
0.081%	$12.07	$13.27	$14.48	$15.69	$16.89	$18.10	$15.08	$16.59	$18.10	$19.61	$21.12	$22.62	$18.10	$19.91	$21.72	$23.53	$25.34	$27.15	$21.12	$23.23	$25.34	$27.45	$29.56	$31.67	$24.13	$26.55	$28.96	$31.37	$33.79	$36.20	$27.15	$29.86	$32.58	$35.29	$38.01	$40.72
0.083%	$12.48	$13.73	$14.98	$16.23	$17.48	$18.72	$15.60	$17.16	$18.72	$20.28	$21.84	$23.40	$18.72	$20.60	$22.47	$24.34	$26.21	$28.09	$21.84	$24.03	$26.21	$28.40	$30.58	$32.77	$24.96	$27.46	$29.96	$32.45	$34.95	$37.45	$28.09	$30.89	$33.70	$36.51	$39.32	$42.13
0.086%	$12.90	$14.19	$15.48	$16.77	$18.06	$19.35	$16.12	$17.74	$19.35	$20.96	$22.57	$24.18	$19.35	$21.28	$23.22	$25.15	$27.09	$29.02	$22.57	$24.83	$27.09	$29.34	$31.60	$33.86	$25.80	$28.38	$30.96	$33.54	$36.12	$38.70	$29.02	$31.92	$34.83	$37.73	$40.63	$43.53
0.089%	$13.31	$14.65	$15.98	$17.31	$18.64	$19.97	$16.64	$18.31	$19.97	$21.64	$23.30	$24.96	$19.97	$21.97	$23.97	$25.96	$27.96	$29.96	$23.30	$25.63	$27.96	$30.29	$32.62	$34.95	$26.63	$29.29	$31.95	$34.62	$37.28	$39.94	$29.96	$32.95	$35.95	$38.94	$41.94	$44.94
0.092%	$13.73	$15.10	$16.48	$17.85	$19.22	$20.60	$17.16	$18.88	$20.60	$22.31	$24.03	$25.74	$20.60	$22.66	$24.71	$26.77	$28.83	$30.89	$24.03	$26.43	$28.83	$31.24	$33.64	$36.04	$27.46	$30.21	$32.95	$35.70	$38.45	$41.19	$30.89	$33.98	$37.07	$40.16	$43.25	$46.34
0.094%	$14.15	$15.56	$16.98	$18.39	$19.81	$21.22	$17.68	$19.45	$21.22	$22.99	$24.76	$26.52	$21.22	$23.34	$25.46	$27.59	$29.71	$31.83	$24.76	$27.23	$29.71	$32.18	$34.66	$37.13	$28.29	$31.12	$33.95	$36.78	$39.61	$42.44	$31.83	$35.01	$38.20	$41.38	$44.56	$47.74
0.097%	$14.56	$16.02	$17.48	$18.93	$20.39	$21.84	$18.20	$20.02	$21.84	$23.66	$25.48	$27.31	$21.84	$24.03	$26.21	$28.40	$30.58	$32.77	$25.48	$28.03	$30.58	$33.13	$35.68	$38.23	$29.13	$32.04	$34.95	$37.86	$40.78	$43.69	$32.77	$36.04	$39.32	$42.60	$45.87	$49.15
0.100%	$14.98	$16.48	$17.97	$19.47	$20.97	$22.47	$18.72	$20.60	$22.47	$24.34	$26.21	$28.09	$22.47	$24.71	$26.96	$29.21	$31.46	$33.70	$26.21	$28.83	$31.46	$34.08	$36.70	$39.32	$29.96	$32.95	$35.95	$38.94	$41.94	$44.94	$33.70	$37.07	$40.44	$43.81	$47.18	$50.55

Appendix F: US Economic Impact of Strait of Hormuz Oil Disruptions

Assumptions for Analysis of Net Oil Supply Disruptions in Strait of Hormuz

Daily Oil Supply in Millions of Barrels per Day (mbpd)

Minimum Gross Daily Oil Capacity of Strait of Hormuz	16.50 mbpd
Daily Oil Capacity Increment	0.10 mbpd
World Unaffected Exess Daily Capacity Max	1.50 mbpd
Unaffected Excess Daily Capacity Increment	0.30 mbpd
Current Oil Price per Barrel (4 Jan 2006)	$63.41
Oil Price Increment	$1.00
% Increase in Oil Price	10.00%
% Increase Increment	1.00%
Max % Point Decrease in GDP growth per 10% Oil price increase	0.10%
Min % Point Decrease in GDP growth per 10% Oil price increase	0.05%
% Point GDP Increment	0.0028%
US 2005 GDP (in billions - Estimate from the Economist Intelligence Unit)	$12,482.30
US Cost of Capital (Risk Free Rate)	4.50%

Implied Range of Net Oil Supply Disruptions in Strait of Hormuz

Daily Oil Supply in Millions of Barrels per Day (mbpd)

Gross Oil Disrupted in Hormuz Strait	16.50 mbpd	16.60 mbpd	16.70 mbpd	16.80 mbpd	16.90 mbpd	17.00 mbpd
Less Unaffected Exess Capacity	1.50 mbpd	1.20 mbpd	0.90 mbpd	0.60 mbpd	0.30 mbpd	0.00 mbpd
Less Petroline	5.00 mbpd	5.00 mbpd	5.00 mbpd	5.00 mbpd	5.00 mbpd	5.00 mbpd
Less Apqaiq-Yanbu	0.29 mbpd	0.29 mbpd	0.29 mbpd	0.29 mbpd	0.29 mbpd	0.29 mbpd
Less IPSA	1.65 mbpd	1.65 mbpd	1.65 mbpd	1.65 mbpd	1.65 mbpd	1.65 mbpd
Less Tapline	0.50 mbpd	0.50 mbpd	0.50 mbpd	0.50 mbpd	0.50 mbpd	0.50 mbpd
Net Oil Disrupted	**7.56 mbpd**	**7.96 mbpd**	**8.36 mbpd**	**8.76 mbpd**	**9.16 mbpd**	**9.56 mbpd**

Implied Increase in Oil Price per Barrel per 1 mbpd Net Supply Disruption

	% Increase in Price due to Disruption					
Initial Oil Price per Barrel	10%	11%	12%	13%	14%	15%
$54.41	$5.44	$5.99	$6.53	$7.07	$7.62	$8.16
$55.41	$5.54	$6.10	$6.65	$7.20	$7.76	$8.31
$56.41	$5.64	$6.21	$6.77	$7.33	$7.90	$8.46
$57.41	$5.74	$6.32	$6.89	$7.46	$8.04	$8.61
$58.41	$5.84	$6.43	$7.01	$7.59	$8.18	$8.76
$59.41	$5.94	$6.54	$7.13	$7.72	$8.32	$8.91
$60.41	$6.04	$6.65	$7.25	$7.85	$8.46	$9.06
$61.41	$6.14	$6.76	$7.37	$7.98	$8.60	$9.21
$62.41	$6.24	$6.87	$7.49	$8.11	$8.74	$9.36
$63.41	$6.34	$6.98	$7.61	$8.24	$8.88	$9.51
$64.41	$6.44	$7.09	$7.73	$8.37	$9.02	$9.66
$65.41	$6.54	$7.20	$7.85	$8.50	$9.16	$9.81
$66.41	$6.64	$7.31	$7.97	$8.63	$9.30	$9.96
$67.41	$6.74	$7.42	$8.09	$8.76	$9.44	$10.11
$68.41	$6.84	$7.53	$8.21	$8.89	$9.58	$10.26
$69.41	$6.94	$7.64	$8.33	$9.02	$9.72	$10.41
$70.41	$7.04	$7.75	$8.45	$9.15	$9.86	$10.56
$71.41	$7.14	$7.86	$8.57	$9.28	$10.00	$10.71
$72.41	$7.24	$7.97	$8.69	$9.41	$10.14	$10.86

Implied Increase in Oil Price per Barrel for Implied Ranges of Net Supply Disruption

Initial Oil Price per Barrel	7.56 mbpd						7.96 mbpd						8.36 mbpd						8.76 mbpd						9.16 mbpd						9.56 mbpd					
	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%
$54.41	$41.13	$45.25	$49.36	$53.47	$57.59	$61.70	$43.31	$47.64	$51.97	$56.30	$60.63	$64.97	$45.49	$50.04	$54.58	$59.13	$63.68	$68.23	$47.66	$52.43	$57.20	$61.96	$66.73	$71.49	$49.84	$54.82	$59.81	$64.79	$69.78	$74.76	$52.02	$57.22	$62.42	$67.62	$72.82	$78.02
$55.41	$41.89	$46.08	$50.27	$54.46	$58.65	$62.83	$44.11	$48.52	$52.93	$57.34	$61.75	$66.16	$46.32	$50.96	$55.59	$60.22	$64.85	$69.48	$48.54	$53.39	$58.25	$63.10	$67.95	$72.81	$50.76	$55.83	$60.91	$65.98	$71.06	$76.13	$52.97	$58.27	$63.57	$68.86	$74.16	$79.46
$56.41	$42.65	$46.91	$51.18	$55.44	$59.70	$63.97	$44.90	$49.39	$53.88	$58.37	$62.86	$67.35	$47.16	$51.87	$56.59	$61.31	$66.02	$70.74	$49.42	$54.36	$59.30	$64.24	$69.18	$74.12	$51.67	$56.84	$62.01	$67.17	$72.34	$77.51	$53.93	$59.32	$64.71	$70.11	$75.50	$80.89
$57.41	$43.40	$47.74	$52.08	$56.42	$60.76	$65.10	$45.70	$50.27	$54.84	$59.41	$63.98	$68.55	$47.99	$52.79	$57.59	$62.39	$67.19	$71.99	$50.29	$55.32	$60.35	$65.38	$70.41	$75.44	$52.59	$57.85	$63.11	$68.36	$73.62	$78.88	$54.88	$60.37	$65.86	$71.35	$76.84	$82.33
$58.41	$44.16	$48.57	$52.99	$57.41	$61.82	$66.24	$46.49	$51.14	$55.79	$60.44	$65.09	$69.74	$48.83	$53.71	$58.60	$63.48	$68.36	$73.25	$51.17	$56.28	$61.40	$66.52	$71.63	$76.75	$53.50	$58.85	$64.20	$69.55	$74.90	$80.26	$55.84	$61.42	$67.01	$72.59	$78.18	$83.76
$59.41	$44.91	$49.41	$53.90	$58.39	$62.88	$67.37	$47.29	$52.02	$56.75	$61.48	$66.21	$70.94	$49.67	$54.63	$59.60	$64.57	$69.53	$74.50	$52.04	$57.25	$62.45	$67.66	$72.86	$78.06	$54.42	$59.86	$65.30	$70.75	$76.19	$81.63	$56.80	$62.48	$68.16	$73.83	$79.51	$85.19
$60.41	$45.67	$50.24	$54.80	$59.37	$63.94	$68.50	$48.09	$52.89	$57.70	$62.51	$67.32	$72.13	$50.50	$55.55	$60.60	$65.65	$70.70	$75.75	$52.92	$58.21	$63.50	$68.79	$74.09	$79.38	$55.34	$60.87	$66.40	$71.94	$77.47	$83.00	$57.75	$63.53	$69.30	$75.08	$80.85	$86.63
$61.41	$46.43	$51.07	$55.71	$60.35	$65.00	$69.64	$48.88	$53.77	$58.66	$63.55	$68.44	$73.32	$51.34	$56.47	$61.61	$66.74	$71.87	$77.01	$53.80	$59.17	$64.55	$69.93	$75.31	$80.69	$56.25	$61.88	$67.50	$73.13	$78.75	$84.38	$58.71	$64.58	$70.45	$76.32	$82.19	$88.06
$62.41	$47.18	$51.90	$56.62	$61.34	$66.05	$70.77	$49.68	$54.65	$59.61	$64.58	$69.55	$74.52	$52.17	$57.39	$62.61	$67.83	$73.04	$78.26	$54.67	$60.14	$65.61	$71.07	$76.54	$82.01	$57.17	$62.88	$68.60	$74.32	$80.03	$85.75	$59.66	$65.63	$71.60	$77.56	$83.53	$89.50
$63.41	$47.94	$52.73	$57.53	$62.32	$67.11	$71.91	$50.47	$55.52	$60.57	$65.62	$70.66	$75.71	$53.01	$58.31	$63.61	$68.91	$74.22	$79.52	$55.55	$61.10	$66.66	$72.21	$77.77	$83.32	$58.08	$63.89	$69.70	$75.51	$81.32	$87.13	$60.62	$66.68	$72.74	$78.81	$84.87	$90.93
$64.41	$48.69	$53.56	$58.43	$63.30	$68.17	$73.04	$51.27	$56.40	$61.52	$66.65	$71.78	$76.91	$53.85	$59.23	$64.62	$70.00	$75.39	$80.77	$56.42	$62.07	$67.71	$73.35	$78.99	$84.63	$59.00	$64.90	$70.80	$76.70	$82.60	$88.50	$61.58	$67.73	$73.89	$80.05	$86.21	$92.36
$65.41	$49.45	$54.39	$59.34	$64.28	$69.23	$74.17	$52.07	$57.27	$62.48	$67.69	$72.89	$78.10	$54.68	$60.15	$65.62	$71.09	$76.56	$82.02	$57.30	$63.03	$68.76	$74.49	$80.22	$85.95	$59.92	$65.91	$71.90	$77.89	$83.88	$89.87	$62.53	$68.79	$75.04	$81.29	$87.54	$93.80
$66.41	$50.21	$55.23	$60.25	$65.27	$70.29	$75.31	$52.86	$58.15	$63.43	$68.72	$74.01	$79.29	$55.52	$61.07	$66.62	$72.17	$77.73	$83.28	$58.18	$63.99	$69.81	$75.63	$81.45	$87.26	$60.83	$66.91	$73.00	$79.08	$85.16	$91.25	$63.49	$69.84	$76.19	$82.53	$88.88	$95.23
$67.41	$50.96	$56.06	$61.15	$66.25	$71.35	$76.44	$53.66	$59.02	$64.39	$69.76	$75.12	$80.49	$56.35	$61.99	$67.63	$73.26	$78.90	$84.53	$59.05	$64.96	$70.86	$76.77	$82.67	$88.58	$61.75	$67.92	$74.10	$80.27	$86.45	$92.62	$64.44	$70.89	$77.33	$83.78	$90.22	$96.67
$68.41	$51.72	$56.89	$62.06	$67.23	$72.41	$77.58	$54.45	$59.90	$65.35	$70.79	$76.24	$81.68	$57.19	$62.91	$68.63	$74.35	$80.07	$85.79	$59.93	$65.92	$71.91	$77.91	$83.90	$89.89	$62.66	$68.93	$75.20	$81.46	$87.73	$94.00	$65.40	$71.94	$78.48	$85.02	$91.56	$98.10
$69.41	$52.47	$57.72	$62.97	$68.22	$73.46	$78.71	$55.25	$60.78	$66.30	$71.83	$77.35	$82.88	$58.03	$63.83	$69.63	$75.43	$81.24	$87.04	$60.80	$66.88	$72.96	$79.04	$85.12	$91.20	$63.58	$69.94	$76.30	$82.65	$89.01	$95.37	$66.36	$72.99	$79.63	$86.26	$92.90	$99.53
$70.41	$53.23	$58.55	$63.88	$69.20	$74.52	$79.84	$56.05	$61.65	$67.26	$72.86	$78.46	$84.07	$58.86	$64.75	$70.64	$76.52	$82.41	$88.29	$61.68	$67.85	$74.01	$80.18	$86.35	$92.52	$64.50	$70.95	$77.39	$83.84	$90.29	$96.74	$67.31	$74.04	$80.77	$87.51	$94.24	$100.97
$71.41	$53.99	$59.38	$64.78	$70.18	$75.58	$80.98	$56.84	$62.53	$68.21	$73.90	$79.58	$85.26	$59.70	$65.67	$71.64	$77.61	$83.58	$89.55	$62.56	$68.81	$75.07	$81.32	$87.58	$93.83	$65.41	$71.95	$78.49	$85.04	$91.58	$98.12	$68.27	$75.09	$81.92	$88.75	$95.58	$102.40
$72.41	$54.74	$60.22	$65.69	$71.16	$76.64	$82.11	$57.64	$63.40	$69.17	$74.93	$80.69	$86.46	$60.53	$66.59	$72.64	$78.70	$84.75	$90.80	$63.43	$69.77	$76.12	$82.46	$88.80	$95.15	$66.33	$72.96	$79.59	$86.23	$92.86	$99.49	$69.22	$76.15	$83.07	$89.99	$96.91	$103.84

Implied Decrease in GDP Growth Due to Net Oil Supply Disruption (Assuming 10% Increase in Oil Price Implies a Given Percentage Point Decrease in GDP Growth Rate)

GDP Growth % Decrease	7.56 mbpd						7.96 mbpd						8.36 mbpd						8.76 mbpd						9.16 mbpd						9.56 mbpd					
	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%
0.050%	0.38%	0.42%	0.45%	0.49%	0.53%	0.57%	0.40%	0.44%	0.48%	0.52%	0.56%	0.60%	0.42%	0.46%	0.50%	0.54%	0.59%	0.63%	0.44%	0.48%	0.53%	0.57%	0.61%	0.66%	0.46%	0.50%	0.55%	0.60%	0.64%	0.69%	0.48%	0.53%	0.57%	0.62%	0.67%	0.72%
0.053%	0.40%	0.44%	0.48%	0.52%	0.56%	0.60%	0.42%	0.46%	0.50%	0.55%	0.59%	0.63%	0.44%	0.49%	0.53%	0.57%	0.62%	0.66%	0.46%	0.51%	0.55%	0.60%	0.65%	0.69%	0.48%	0.53%	0.58%	0.63%	0.68%	0.73%	0.50%	0.56%	0.61%	0.66%	0.71%	0.76%
0.056%	0.42%	0.46%	0.50%	0.55%	0.59%	0.63%	0.44%	0.49%	0.53%	0.57%	0.62%	0.66%	0.46%	0.51%	0.56%	0.60%	0.65%	0.70%	0.49%	0.54%	0.58%	0.63%	0.68%	0.73%	0.51%	0.56%	0.61%	0.66%	0.71%	0.76%	0.53%	0.58%	0.64%	0.69%	0.74%	0.80%
0.058%	0.44%	0.49%	0.53%	0.57%	0.62%	0.66%	0.46%	0.51%	0.56%	0.60%	0.65%	0.70%	0.49%	0.54%	0.59%	0.63%	0.68%	0.73%	0.51%	0.56%	0.61%	0.66%	0.72%	0.77%	0.53%	0.59%	0.64%	0.69%	0.75%	0.80%	0.56%	0.61%	0.67%	0.72%	0.78%	0.84%
0.061%	0.46%	0.51%	0.55%	0.60%	0.65%	0.69%	0.49%	0.54%	0.58%	0.63%	0.68%	0.73%	0.51%	0.56%	0.61%	0.66%	0.72%	0.77%	0.54%	0.59%	0.64%	0.70%	0.75%	0.80%	0.56%	0.62%	0.67%	0.73%	0.78%	0.84%	0.58%	0.64%	0.70%	0.76%	0.82%	0.88%
0.064%	0.48%	0.53%	0.58%	0.63%	0.68%	0.72%	0.51%	0.56%	0.61%	0.66%	0.71%	0.76%	0.53%	0.59%	0.64%	0.69%	0.75%	0.80%	0.56%	0.62%	0.67%	0.73%	0.78%	0.84%	0.59%	0.64%	0.70%	0.76%	0.82%	0.88%	0.61%	0.67%	0.73%	0.79%	0.86%	0.92%
0.067%	0.50%	0.55%	0.60%	0.66%	0.71%	0.76%	0.53%	0.58%	0.64%	0.69%	0.74%	0.80%	0.56%	0.61%	0.67%	0.72%	0.78%	0.84%	0.58%	0.64%	0.70%	0.76%	0.82%	0.88%	0.61%	0.67%	0.73%	0.79%	0.85%	0.92%	0.64%	0.70%	0.76%	0.83%	0.89%	0.96%
0.069%	0.53%	0.58%	0.63%	0.68%	0.74%	0.79%	0.55%	0.61%	0.66%	0.72%	0.77%	0.83%	0.58%	0.64%	0.70%	0.75%	0.81%	0.87%	0.61%	0.67%	0.73%	0.79%	0.85%	0.91%	0.64%	0.70%	0.76%	0.83%	0.89%	0.95%	0.66%	0.73%	0.80%	0.86%	0.93%	1.00%
0.072%	0.55%	0.60%	0.66%	0.71%	0.76%	0.82%	0.57%	0.63%	0.69%	0.75%	0.80%	0.86%	0.60%	0.66%	0.72%	0.78%	0.85%	0.91%	0.63%	0.70%	0.76%	0.82%	0.89%	0.95%	0.66%	0.73%	0.79%	0.86%	0.93%	0.99%	0.69%	0.76%	0.83%	0.90%	0.97%	1.04%
0.075%	0.57%	0.62%	0.68%	0.74%	0.79%	0.85%	0.60%	0.66%	0.72%	0.78%	0.84%	0.90%	0.63%	0.69%	0.75%	0.82%	0.88%	0.94%	0.66%	0.72%	0.79%	0.85%	0.92%	0.99%	0.69%	0.76%	0.82%	0.89%	0.96%	1.03%	0.72%	0.79%	0.86%	0.93%	1.00%	1.08%
0.078%	0.59%	0.65%	0.71%	0.76%	0.82%	0.88%	0.62%	0.68%	0.74%	0.80%	0.87%	0.93%	0.65%	0.72%	0.78%	0.85%	0.91%	0.98%	0.68%	0.75%	0.82%	0.89%	0.95%	1.02%	0.71%	0.78%	0.85%	0.93%	1.00%	1.07%	0.74%	0.82%	0.89%	0.97%	1.04%	1.12%
0.081%	0.61%	0.67%	0.73%	0.79%	0.85%	0.91%	0.64%	0.71%	0.77%	0.83%	0.90%	0.96%	0.67%	0.74%	0.81%	0.88%	0.94%	1.01%	0.71%	0.78%	0.85%	0.92%	0.99%	1.06%	0.74%	0.81%	0.89%	0.96%	1.03%	1.11%	0.77%	0.85%	0.92%	1.00%	1.08%	1.16%
0.083%	0.63%	0.69%	0.76%	0.82%	0.88%	0.95%	0.66%	0.73%	0.80%	0.86%	0.93%	1.00%	0.70%	0.77%	0.84%	0.91%	0.98%	1.05%	0.73%	0.80%	0.88%	0.95%	1.02%	1.10%	0.76%	0.84%	0.92%	0.99%	1.07%	1.15%	0.80%	0.88%	0.96%	1.04%	1.12%	1.20%
0.086%	0.65%	0.72%	0.78%	0.85%	0.91%	0.98%	0.69%	0.75%	0.82%	0.89%	0.96%	1.03%	0.72%	0.79%	0.86%	0.94%	1.01%	1.08%	0.75%	0.83%	0.91%	0.98%	1.06%	1.13%	0.79%	0.87%	0.95%	1.03%	1.10%	1.18%	0.82%	0.91%	0.99%	1.07%	1.15%	1.23%
0.089%	0.67%	0.74%	0.81%	0.87%	0.94%	1.01%	0.71%	0.78%	0.85%	0.92%	0.99%	1.06%	0.74%	0.82%	0.89%	0.97%	1.04%	1.11%	0.78%	0.86%	0.93%	1.01%	1.09%	1.17%	0.81%	0.90%	0.98%	1.06%	1.14%	1.22%	0.85%	0.93%	1.02%	1.10%	1.19%	1.27%
0.092%	0.69%	0.76%	0.83%	0.90%	0.97%	1.04%	0.73%	0.80%	0.88%	0.95%	1.02%	1.09%	0.77%	0.84%	0.92%	1.00%	1.07%	1.15%	0.80%	0.88%	0.96%	1.04%	1.12%	1.20%	0.84%	0.92%	1.01%	1.09%	1.18%	1.26%	0.88%	0.96%	1.05%	1.14%	1.23%	1.31%
0.094%	0.71%	0.79%	0.86%	0.93%	1.00%	1.07%	0.75%	0.83%	0.90%	0.98%	1.05%	1.13%	0.79%	0.87%	0.95%	1.03%	1.11%	1.18%	0.83%	0.91%	0.99%	1.08%	1.16%	1.24%	0.87%	0.95%	1.04%	1.12%	1.21%	1.30%	0.90%	0.99%	1.08%	1.17%	1.26%	1.35%
0.097%	0.74%	0.81%	0.88%	0.96%	1.03%	1.10%	0.77%	0.85%	0.93%	1.01%	1.08%	1.16%	0.81%	0.89%	0.98%	1.06%	1.14%	1.22%	0.85%	0.94%	1.02%	1.11%	1.19%	1.28%	0.89%	0.98%	1.07%	1.16%	1.25%	1.34%	0.93%	1.02%	1.12%	1.21%	1.30%	1.39%
0.100%	0.76%	0.83%	0.91%	0.98%	1.06%	1.13%	0.80%	0.88%	0.96%	1.03%	1.11%	1.19%	0.84%	0.92%	1.00%	1.09%	1.17%	1.25%	0.88%	0.96%	1.05%	1.14%	1.23%	1.31%	0.92%	1.01%	1.10%	1.19%	1.28%	1.37%	0.96%	1.05%	1.15%	1.24%	1.34%	1.43%

Implied Loss in $US Billions Due to Net Oil Supply Disruption (Assuming 10% Increase in Oil Price Implies a Given Percentage Point Decrease in GDP Growth Rate)

GDP Growth % Decrease	7.56 mbpd						7.96 mbpd						8.36 mbpd						8.76 mbpd						9.16 mbpd						9.56 mbpd					
	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%
0.050%	$47.18	$51.90	$56.62	$61.34	$66.06	$70.77	$49.68	$54.65	$59.62	$64.58	$69.55	$74.52	$52.18	$57.39	$62.61	$67.83	$73.05	$78.26	$54.67	$60.14	$65.61	$71.07	$76.54	$82.01	$57.17	$62.89	$68.60	$74.32	$80.04	$85.75	$59.67	$65.63	$71.60	$77.57	$83.53	$89.50
0.053%	$49.80	$54.78	$59.77	$64.75	$69.73	$74.71	$52.44	$57.68	$62.93	$68.17	$73.42	$78.66	$55.07	$60.58	$66.09	$71.60	$77.10	$82.61	$57.71	$63.48	$69.25	$75.02	$80.79	$86.56	$60.34	$66.38	$72.41	$78.45	$84.48	$90.52	$62.98	$69.28	$75.58	$81.87	$88.17	$94.47
0.056%	$52.43	$57.67	$62.91	$68.15	$73.40	$78.64	$55.20	$60.72	$66.24	$71.76	$77.28	$82.80	$57.97	$63.77	$69.57	$75.37	$81.16	$86.96	$60.75	$66.82	$72.90	$78.97	$85.05	$91.12	$63.52	$69.87	$76.23	$82.58	$88.93	$95.28	$66.29	$72.92	$79.55	$86.18	$92.81	$99.44
0.058%	$55.05	$60.55	$66.06	$71.56	$77.07	$82.57	$57.96	$63.76	$69.55	$75.35	$81.14	$86.94	$60.87	$66.96	$73.05	$79.13	$85.22	$91.31	$63.78	$70.16	$76.54	$82.92	$89.30	$95.68	$66.70	$73.37	$80.04	$86.71	$93.38	$100.05	$69.61	$76.57	$83.53	$90.49	$97.45	$104.41
0.061%	$57.67	$63.44	$69.20	$74.97	$80.74	$86.50	$60.72	$66.79	$72.86	$78.94	$85.01	$91.08	$63.77	$70.15	$76.52	$82.90	$89.28	$95.66	$66.82	$73.50	$80.19	$86.87	$93.55	$100.23	$69.87	$76.86	$83.85	$90.84	$97.82	$104.81	$72.92	$80.22	$87.51	$94.80	$102.09	$109.39
0.064%	$60.29	$66.32	$72.35	$78.38	$84.41	$90.43	$63.48	$69.83	$76.18	$82.52	$88.87	$95.22	$66.67	$73.34	$80.00	$86.67	$93.34	$100.00	$69.86	$76.85	$83.83	$90.82	$97.80	$104.79	$73.05	$80.35	$87.66	$94.96	$102.27	$109.57	$76.24	$83.86	$91.49	$99.11	$106.73	$114.36
0.067%	$62.91	$69.20	$75.49	$81.78	$88.08	$94.37	$66.24	$72.86	$79.49	$86.11	$92.74	$99.36	$69.57	$76.52	$83.48	$90.44	$97.40	$104.35	$72.90	$80.19	$87.48	$94.77	$102.06	$109.34	$76.23	$83.85	$91.47	$99.09	$106.72	$114.34	$79.55	$87.51	$95.46	$103.42	$111.38	$119.33
0.069%	$65.53	$72.09	$78.64	$85.19	$91.74	$98.30	$69.00	$75.90	$82.80	$89.70	$96.60	$103.50	$72.47	$79.71	$86.96	$94.21	$101.45	$108.70	$75.93	$83.53	$91.12	$98.71	$106.31	$113.90	$79.40	$87.34	$95.28	$103.22	$111.16	$119.10	$82.87	$91.16	$99.44	$107.73	$116.02	$124.30
0.072%	$68.15	$74.97	$81.78	$88.60	$95.41	$102.23	$71.76	$78.94	$86.11	$93.29	$100.46	$107.64	$75.37	$82.90	$90.44	$97.97	$105.51	$113.05	$78.97	$86.87	$94.77	$102.66	$110.56	$118.46	$82.58	$90.84	$99.09	$107.35	$115.61	$123.87	$86.18	$94.80	$103.42	$112.04	$120.66	$129.28
0.075%	$70.77	$77.85	$84.93	$92.01	$99.08	$106.16	$74.52	$81.97	$89.42	$96.88	$104.33	$111.78	$78.26	$86.09	$93.92	$101.74	$109.57	$117.40	$82.01	$90.21	$98.41	$106.61	$114.81	$123.01	$85.75	$94.33	$102.90	$111.48	$120.05	$128.63	$89.50	$98.45	$107.40	$116.35	$125.30	$134.25
0.078%	$73.40	$80.74	$88.08	$95.41	$102.75	$110.09	$77.28	$85.01	$92.74	$100.46	$108.19	$115.92	$81.16	$89.28	$97.40	$105.51	$113.63	$121.74	$85.05	$93.55	$102.06	$110.56	$119.06	$127.57	$88.93	$97.82	$106.72	$115.61	$124.50	$133.39	$92.81	$102.09	$111.38	$120.66	$129.94	$139.22
0.081%	$76.02	$83.62	$91.22	$98.82	$106.42	$114.03	$80.04	$88.04	$96.05	$104.05	$112.05	$120.06	$84.06	$92.47	$100.87	$109.28	$117.69	$126.09	$88.08	$96.89	$105.70	$114.51	$123.32	$132.13	$92.11	$101.32	$110.53	$119.74	$128.95	$138.16	$96.13	$105.74	$115.35	$124.97	$134.58	$144.19
0.083%	$78.64	$86.50	$94.37	$102.23	$110.09	$117.96	$82.80	$91.08	$99.36	$107.64	$115.92	$124.20	$86.96	$95.66	$104.35	$113.05	$121.74	$130.44	$91.12	$100.23	$109.34	$118.46	$127.57	$136.68	$95.28	$104.81	$114.34	$123.87	$133.39	$142.92	$99.44	$109.39	$119.33	$129.28	$139.22	$149.16
0.086%	$81.26	$89.39	$97.51	$105.64	$113.76	$121.89	$85.56	$94.12	$102.67	$111.23	$119.78	$128.34	$89.86	$98.84	$107.83	$116.82	$125.80	$134.79	$94.16	$103.57	$112.99	$122.41	$131.82	$141.24	$98.46	$108.30	$118.15	$127.99	$137.84	$147.69	$102.76	$113.03	$123.31	$133.58	$143.86	$154.14
0.089%	$83.88	$92.27	$100.66	$109.05	$117.43	$125.82	$88.32	$97.15	$105.98	$114.81	$123.65	$132.48	$92.76	$102.03	$111.31	$120.58	$129.86	$139.14	$97.20	$106.92	$116.63	$126.35	$136.07	$145.79	$101.63	$111.80	$121.96	$132.12	$142.29	$152.45	$106.07	$116.68	$127.29	$137.89	$148.50	$159.11
0.092%	$86.50	$95.15	$103.80	$112.45	$121.10	$129.75	$91.08	$100.19	$109.30	$118.40	$127.51	$136.62	$95.66	$105.22	$114.79	$124.35	$133.92	$143.48	$100.23	$110.26	$120.28	$130.30	$140.33	$150.35	$104.81	$115.29	$125.77	$136.25	$146.73	$157.21	$109.39	$120.33	$131.26	$142.20	$153.14	$164.08
0.094%	$89.12	$98.04	$106.95	$115.86	$124.77	$133.69	$93.84	$103.22	$112.61	$121.99	$131.37	$140.76	$98.55	$108.41	$118.27	$128.12	$137.98	$147.83	$103.27	$113.60	$123.92	$134.25	$144.58	$154.91	$107.99	$118.78	$129.58	$140.38	$151.18	$161.98	$112.70	$123.97	$135.24	$146.51	$157.78	$169.05
0.097%	$91.74	$100.92	$110.09	$119.27	$128.44	$137.62	$96.60	$106.26	$115.92	$125.58	$135.24	$144.90	$101.45	$111.60	$121.74	$131.89	$142.03	$152.18	$106.31	$116.94	$127.57	$138.20	$148.83	$159.46	$111.16	$122.28	$133.39	$144.51	$155.63	$166.74	$116.02	$127.62	$139.22	$150.82	$162.42	$174.02
0.100%	$94.37	$103.80	$113.24	$122.68	$132.11	$141.55	$99.36	$109.30	$119.23	$129.17	$139.10	$149.04	$104.35	$114.79	$125.22	$135.66	$146.09	$156.53	$109.34	$120.28	$131.21	$142.15	$153.08	$164.02	$114.34	$125.77	$137.21	$148.64	$160.07	$171.51	$119.33	$131.26	$143.20	$155.13	$167.06	$179.00

Appendix G: Decision Analysis/Game Theoretic Calculations

Decision Analysis Assumptions for Coercive Case

US Assumptions		Iran Assumptions	
2005 US GDP ($US billions)	$12,482.30	2005 Iran GDP ($US billions)	$183
Wilshire 5000 Market Capitalization ($US billion)	$13,004.51	Iran Risk Free Rate	11.67%
US Risk Free Rate	4.50%	Annual Contribution to Hezbollah ($US billions)	$0.10
Event Day NYSE Cumulative Abnormal Returns	-4.79%	Total Value of 2005 Imports ($US billions)	$42.501
6 Day NYSE Cumulative Abnormal Returns	-6.69%	Total Oil Exports (mbpd)	2.7 mbpd
Days for NYSE to Rebound to Pre-Attack Levels	13	Total Oil Production (mbpd)	4.2 mbpd
Price of Oil per Barrel (January 4, 2006)	$63.41	Length of War (years)	5
Low Estimate of Sep 11th Physical & Human Capital Cost ($US billions)	$10.00	GDP Growth Rate	5.00%
High Estimate of Sep 11th Physical & Human Capital Cost ($US billions)	$60.00	Import Growth Rate	23.00%
Estimated Iraq War Cost	$1,500.00		
Average Market Growth Rate	12.00%		

United States-Iran Policy Assumptions Matrix for Coercive Case

	United States Policy Scenarios					
	Aggressive		Moderate		Conservative	
	Unilateral	Multilateral	Unilateral	Multilateral	Unilateral	Multilateral
Iran Aggressive Scenario Assumption						
Variables that Impact US Costs						
Number Catastrophic Terror Attacks against US Targets	5.00	3.50	2.00	1.00	7.50	5.00
Length of Strait of Hormuz Disruption (years)	5	5	3	3	2	2
Average Sept. 11 Max Damage Multiple	1.50x	1.50x	0.75x	0.75x	1.00x	1.00x
Iran War Multiple	5.0x	3.5x	3.0x	2.5x	4.0x	3.0x
Variables that Impact Iranian Costs						
Hezbollah Payment Multiple	10.0x	12.0x	10.0x	12.0x	10.0x	12.0x
Iranian Incremental Defense Budget Increase (% of GDP)	15.0%	20.0%	8.0%	10.0%	4.0%	5.0%
% Oil Exports Disrupted	10.0%	100.0%	25.0%	50.0%	10.0%	25.0%
% of Imports Disrupted	0.0%	40.0%	0.0%	20.0%	0.0%	10.0%
% of Oil Production Disrupted	80.0%	80.0%	0.0%	0.0%	0.0%	0.0%
Incremental Cost of Rebuilding Iranian Nuclear Program ($US billions)	$1.0	$1.0	$1.0	$1.0	$1.0	$1.0
Iran Moderate Scenario Assumption						
Variables that Impact US Costs						
Number Catastrophic Terror Attacks against US Targets	3.33	1.75	1.33	0.67	3.75	2.50
Length of Strait of Hormuz Disruption (years)	3	3	2	2	1	1
Average Sept. 11 Max Damage Multiple	0.80x	0.80x	0.60x	0.60x	0.50x	0.50x
Iran War Multiple	4.5x	3.2x	2.0x	1.0x	3.0x	2.5x
Variables that Impact Iranian Costs						
Hezbollah Payment Multiple	5.0x	5.0x	2.5x	2.5x	1.0x	1.0x
Iranian Incremental Defense Budget Increase (% of GDP)	10.0%	15.0%	4.0%	5.0%	0.0%	1.0%
% Oil Exports Disrupted	5.0%	75.0%	10.0%	30.0%	5.0%	10.0%
% of Imports Disrupted	0.0%	20.0%	0.0%	10.0%	0.0%	5.0%
% of Oil Production Disrupted	80.0%	80.0%	0.0%	0.0%	0.0%	0.0%
Incremental Cost of Rebuilding Iranian Nuclear Program ($US billions)	$1.0	$1.0	$1.0	$1.0	$1.0	$1.0
Iran Conservative Scenario Assumption						
Variables that Impact US Costs						
Number Catastrophic Terror Attacks against US Targets	2.67	1.40	1.60	0.80	0.00	0.00
Length of Strait of Hormuz Disruption (years)	2	2	1	1	0	0
Average Sept. 11 Max Damage Multiple	0.60x	0.60x	0.30x	0.30x	0.10x	0.10x
Iran War Multiple	4.0x	3.0x	0.5x	0.3x	0.6x	0.1x
Variables that Impact Iranian Costs						
Hezbollah Payment Multiple	1.5x	1.5x	1.0x	1.0x	0.5x	0.5x
Iranian Incremental Defense Budget Increase (% of GDP)	5.0%	10.0%	2.0%	2.5%	0.0%	0.0%
% Oil Exports Disrupted	2.5%	50.0%	1.0%	10.0%	0.0%	5.0%
% of Imports Disrupted	0.0%	10.0%	0.0%	5.0%	0.0%	2.5%
% of Oil Production Disrupted	80.0%	80.0%	0.0%	0.0%	0.0%	0.0%
Incremental Cost of Rebuilding Iranian Nuclear Program ($US billions)	$1.0	$1.0	$1.0	$1.0	$1.0	$1.0

United States Policies vs. Aggressive Iran Policy Discounted Cash Flow Model Matrix for Coercive Case

United States Policy Scenarios

	Aggressive										Moderate										Conservative									
	Unilateral					Multilateral					Unilateral					Multilateral					Unilateral					Multilateral				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Iran Aggressive Scenario Assumption																														
US Costs ($US billions)																														
Catastrophic Terror Costs to Human Capital and Infrastructure																														
Number Catastrophic Terror Attacks against US Targets	1.0	1.0	1.0	1.0	1.0	0.7	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	1.5	1.5	1.5	1.5	1.5	1.0	1.0	1.0	1.0	1.0
Average Sept. 11 Max Damage Multiple	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x
Sept. 11 Max Damage Cost	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00
Total Catastrophic Terror Costs	$90.00	$90.00	$90.00	$90.00	$90.00	$63.00	$63.00	$63.00	$63.00	$63.00	$18.00	$18.00	$18.00	$18.00	$18.00	$9.00	$9.00	$9.00	$9.00	$9.00	$90.00	$90.00	$90.00	$90.00	$90.00	$60.00	$60.00	$60.00	$60.00	$60.00
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$90.00	$86.12	$82.42	$78.87	$75.47	$63.00	$60.29	$57.69	$55.21	$52.83	$18.00	$17.22	$16.48	$15.77	$15.09	$9.00	$8.61	$8.24	$7.89	$7.55	$90.00	$86.12	$82.42	$78.87	$75.47	$60.00	$57.42	$54.94	$52.58	$50.31
Catastrophic Terror Cost Net Present Value	$412.89					$289.01					$82.58					$41.29					$412.89					$275.26				
Catastrophic Terror Costs to US Market Capitalization																														
Number Catastrophic Terror Attacks against US Targets	1.0	1.0	1.0	1.0	1.0	0.7	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	1.5	1.5	1.5	1.5	1.5	1.0	1.0	1.0	1.0	1.0
Average Cumulative Abnormal Return	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%
Days to Rebound to Pre-Attack Levels	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Average Annual Market Growth Rate	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Wilshire 5000 Market Capitalization	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85
Market Value Lost per Attack	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96
Total Market Value Lost	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$609.00	$682.08	$763.93	$855.60	$958.28	$348.00	$389.76	$436.53	$488.92	$547.59	$174.00	$194.88	$218.27	$244.46	$273.79	$1,305.00	$1,461.60	$1,637.00	$1,833.43	$2,053.45	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96
Risk Free Interest Lost Over Days to Rebound	$1.36	$1.53	$1.71	$1.92	$2.15	$0.96	$1.07	$1.20	$1.34	$1.50	$0.55	$0.61	$0.68	$0.77	$0.86	$0.27	$0.31	$0.34	$0.38	$0.43	$2.05	$2.29	$2.57	$2.88	$3.22	$1.36	$1.53	$1.71	$1.92	$2.15
Total Catastrophic Terror Costs to Interest Lost Over Rebound Period	$1.36	$1.53	$1.71	$1.92	$2.15	$0.96	$1.07	$1.20	$1.34	$1.50	$0.55	$0.61	$0.68	$0.77	$0.86	$0.27	$0.31	$0.34	$0.38	$0.43	$2.05	$2.29	$2.57	$2.88	$3.22	$1.36	$1.53	$1.71	$1.92	$2.15
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$1.36	$1.46	$1.57	$1.68	$1.80	$0.96	$1.02	$1.10	$1.18	$1.26	$0.55	$0.59	$0.63	$0.67	$0.72	$0.27	$0.29	$0.31	$0.34	$0.36	$2.05	$2.19	$2.35	$2.52	$2.70	$1.36	$1.46	$1.57	$1.68	$1.80
Catastrophic Terror Cost Net Present Value	$7.89					$5.51					$3.15					$1.58					$11.82					$7.89				
Iranian Costs ($US billions)																														
Hezbollah Payment Increase																														
Hezbollah Payment Multiple	10.0x	10.0x	10.0x	10.0x	10.0x	12.0x	12.0x	12.0x	12.0x	12.0x	10.0x	10.0x	10.0x	10.0x	10.0x	12.0x	12.0x	12.0x	12.0x	12.0x	10.0x	10.0x	10.0x	10.0x	10.0x	12.0x	12.0x	12.0x	12.0x	12.0x
Annual Contribution to Hezbollah	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10
Total Hezbollah Payment Increase	$1.00	$1.00	$1.00	$1.00	$1.00	$1.20	$1.20	$1.20	$1.20	$1.20	$1.00	$1.00	$1.00	$1.00	$1.00	$1.20	$1.20	$1.20	$1.20	$1.20	$1.00	$1.00	$1.00	$1.00	$1.00	$1.20	$1.20	$1.20	$1.20	$1.20
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$1.00	$0.90	$0.80	$0.72	$0.64	$1.20	$1.07	$0.96	$0.86	$0.77	$1.00	$0.90	$0.80	$0.72	$0.64	$1.20	$1.07	$0.96	$0.86	$0.77	$1.00	$0.90	$0.80	$0.72	$0.64	$1.20	$1.07	$0.96	$0.86	$0.77
Hezbollah Payment Increase Net Present Value	$4.00					$4.87					$4.06					$4.87					$4.06					$4.87				
Incremental Defense Budget Increase																														
Iranian GDP	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234
GDP Growth	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
% GDP Increase of Defense Budget	15.00%	15.00%	15.00%	15.00%	15.00%	20.00%	20.00%	20.00%	20.00%	20.00%	8.00%	8.00%	8.00%	8.00%	8.00%	10.00%	10.00%	10.00%	10.00%	10.00%	4.00%	4.00%	4.00%	4.00%	4.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Total Defense Budget Increase	$28.82	$30.26	$31.78	$33.37	$35.03	$38.43	$40.35	$42.37	$44.49	$46.71	$15.37	$16.14	$16.95	$17.80	$18.68	$19.22	$20.18	$21.18	$22.24	$23.36	$7.69	$8.07	$8.47	$8.90	$9.34	$9.61	$10.09	$10.59	$11.12	$11.68
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$28.82	$27.10	$25.48	$23.96	$22.53	$38.43	$36.13	$33.98	$31.95	$30.04	$15.37	$14.45	$13.59	$12.78	$12.02	$19.22	$18.07	$16.99	$15.97	$15.02	$7.69	$7.23	$6.80	$6.39	$6.01	$9.61	$9.03	$8.49	$7.99	$7.51
Total Defense Budget Increase Net Present Value	$6.25					$170.53					$68.21					$86.26					$34.11					$42.63				
Oil Exports Disrupted																														
Oil Exports per Year (mbpd x 365/1000) in billions of barrels	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Export Revenues	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49
% Oil Export Revenues Disrupted	10.00%	10.00%	10.00%	10.00%	10.00%	100.00%	100.00%	100.00%	100.00%	100.00%	25.00%	25.00%	25.00%	25.00%	25.00%	50.00%	50.00%	50.00%	50.00%	50.00%	10.00%	10.00%	10.00%	10.00%	10.00%	25.00%	25.00%	25.00%	25.00%	25.00%
Total Oil Exports Disrupted	$6.25	$6.25	$6.25	$6.25	$6.25	$62.49	$62.49	$62.49	$62.49	$62.49	$15.62	$15.62	$15.62	$15.62	$15.62	$31.25	$31.25	$31.25	$31.25	$31.25	$6.25	$6.25	$6.25	$6.25	$6.25	$15.62	$15.62	$15.62	$15.62	$15.62
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$6.25	$5.60	$5.01	$4.49	$4.02	$62.49	$55.96	$50.11	$44.88	$40.19	$15.62	$13.99	$12.53	$11.22	$10.05	$31.25	$27.98	$25.06	$22.44	$20.09	$6.25	$5.60	$5.01	$4.49	$4.02	$15.62	$13.99	$12.53	$11.22	$10.05
Total Oil Export Disruption Net Present Value	$25.36					$253.62					$63.41					$126.81					$25.36					$63.41				
Imports Disrupted																														
Value of Imports	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65
Import Trade Growth	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%
% Imports Disrupted	0.00%	0.00%	0.00%	0.00%	0.00%	40.00%	40.00%	40.00%	40.00%	40.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.00%	20.00%	20.00%	20.00%	20.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Total Imports Disrupted	$0.00	$0.00	$0.00	$0.00	$0.00	$20.91	$25.72	$31.64	$38.91	$47.86	$0.00	$0.00	$0.00	$0.00	$0.00	$10.46	$12.86	$15.82	$19.46	$23.93	$0.00	$0.00	$0.00	$0.00	$0.00	$5.23	$6.43	$7.91	$9.73	$11.97
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$20.91	$23.03	$25.37	$27.94	$30.78	$0.00	$0.00	$0.00	$0.00	$0.00	$10.46	$11.52	$12.68	$13.97	$15.39	$0.00	$0.00	$0.00	$0.00	$0.00	$5.23	$5.76	$6.34	$6.99	$7.69
Total Import Disruption Net Present Value	$0.00					$128.03					$0.00					$64.02					$0.00					$32.01				
Oil Production Disrupted																														
Oil Produced per Year (mbpd x 365/1000) in billions of barrels	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Revenues	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21
% Oil Production Revenues Disrupted	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total Oil Exports Disrupted	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Less Oil Exports Disrupted	($6.25)	($6.25)	($6.25)	($6.25)	($6.25)	($62.49)	($62.49)	($62.49)	($62.49)	($62.49)	($15.62)	($15.62)	($15.62)	($15.62)	($15.62)	($31.25)	($31.25)	($31.25)	($31.25)	($31.25)	($6.25)	($6.25)	($6.25)	($6.25)	($6.25)	($15.62)	($15.62)	($15.62)	($15.62)	($15.62)
Net Oil Production Disruption	$71.52	$71.52	$71.52	$71.52	$71.52	$15.28	$15.28	$15.28	$15.28	$15.28	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$71.52	$64.04	$57.35	$51.36	$45.99	$15.28	$13.68	$12.25	$10.97	$9.82	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Oil Production Disruption Net Present Value	$290.28					$62.00					$0.00					$0.00					$0.00					$0.00				

United States Policies vs. Moderate Iran Policy Discounted Cash Flow Model Matrix for Coercive Case

United States Policy Scenarios

	Aggressive										Moderate										Conservative									
	Unilateral					Multilateral					Unilateral					Multilateral					Unilateral					Multilateral				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Iran Moderate Scenario Assumption																														
US Costs ($US billions)																														
Catastrophic Terror Costs to Human Capital and Infrastructure																														
Number Catastrophic Terror Attacks against US Targets	0.7	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.8	0.8	0.8	0.8	0.8	0.5	0.5	0.5	0.5	0.5
Average Sept. 11 Max Damage Multiple	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.5x	0.5x	0.5x	0.5x	0.5x	0.5x	0.5x	0.5x	0.5x	0.5x
Sept. 11 Max Damage Cost	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00
Total Catastrophic Terror Costs	$32.00	$32.00	$32.00	$32.00	$32.00	$16.80	$16.80	$16.80	$16.80	$16.80	$9.60	$9.60	$9.60	$9.60	$9.60	$4.80	$4.80	$4.80	$4.80	$4.80	$22.50	$22.50	$22.50	$22.50	$22.50	$15.00	$15.00	$15.00	$15.00	$15.00
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$32.00	$30.62	$29.30	$28.04	$26.83	$16.80	$16.08	$15.38	$14.72	$14.09	$9.60	$9.19	$8.79	$8.41	$8.05	$4.80	$4.59	$4.40	$4.21	$4.03	$22.50	$21.53	$20.60	$19.72	$18.87	$15.00	$14.35	$13.74	$13.14	$12.58
Catastrophic Terror Cost Net Present Value	$146.80					$77.07					$44.04					$22.02					$103.22					$68.81				
Catastrophic Terror Costs to US Market Capitalization																														
Number Catastrophic Terror Attacks against US Targets	0.7	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.8	0.8	0.8	0.8	0.8	0.5	0.5	0.5	0.5	0.5
Average Cumulative Abnormal Return	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%
Days to Rebound to Pre-Attack Levels	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Average Annual Market Growth Rate	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Wilshire 5000 Market Capitalization	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85
Market Value Lost per Attack	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96
Total Market Value Lost	$580.00	$649.60	$727.55	$814.86	$912.64	$304.50	$341.04	$381.97	$427.80	$479.14	$232.00	$259.84	$291.02	$325.94	$365.06	$116.00	$129.92	$145.51	$162.97	$182.53	$652.50	$730.80	$818.50	$916.72	$1,026.72	$435.00	$487.20	$545.67	$611.14	$684.48
Risk Free Interest Lost Over Days to Rebound	$0.91	$1.02	$1.14	$1.28	$1.43	$0.48	$0.54	$0.60	$0.67	$0.75	$0.36	$0.41	$0.46	$0.51	$0.57	$0.18	$0.20	$0.23	$0.26	$0.29	$1.02	$1.15	$1.28	$1.44	$1.61	$0.68	$0.76	$0.86	$0.96	$1.07
Total Catastrophic Terror Costs to Interest Lost Over Rebound Period	$0.91	$1.02	$1.14	$1.28	$1.43	$0.48	$0.54	$0.60	$0.67	$0.75	$0.36	$0.41	$0.46	$0.51	$0.57	$0.18	$0.20	$0.23	$0.26	$0.29	$1.02	$1.15	$1.28	$1.44	$1.61	$0.68	$0.76	$0.86	$0.96	$1.07
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$0.91	$0.98	$1.05	$1.12	$1.20	$0.48	$0.51	$0.55	$0.59	$0.63	$0.36	$0.39	$0.42	$0.45	$0.48	$0.18	$0.20	$0.21	$0.22	$0.24	$1.02	$1.10	$1.18	$1.26	$1.35	$0.68	$0.73	$0.78	$0.84	$0.90
Catastrophic Terror Cost Net Present Value	$5.25					$2.76					$2.10					$1.05					$5.91					$3.94				
Iranian Costs ($US billions)																														
Hezbollah Payment Increase																														
Hezbollah Payment Multiple	5.0x	5.0x	5.0x	5.0x	5.0x	5.0x	5.0x	5.0x	5.0x	5.0x	2.5x	2.5x	2.5x	2.5x	2.5x	2.5x	2.5x	2.5x	2.5x	2.5x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x
Annual Contribution to Hezbollah	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10
Total Hezbollah Payment Increase	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.50	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.25	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.50	$0.45	$0.40	$0.36	$0.32	$0.50	$0.45	$0.40	$0.36	$0.32	$0.25	$0.22	$0.20	$0.18	$0.16	$0.25	$0.22	$0.20	$0.18	$0.16	$0.10	$0.09	$0.08	$0.07	$0.06	$0.10	$0.09	$0.08	$0.07	$0.06
Hezbollah Payment Increase Net Present Value	$2.03					$2.03					$1.01					$1.01					$0.41					$0.41				
Incremental Defense Budget Increase																														
Iranian GDP	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234
GDP Growth	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
% GDP Increase of Defense Budget	10.00%	10.00%	10.00%	10.00%	10.00%	15.00%	15.00%	15.00%	15.00%	15.00%	4.00%	4.00%	4.00%	4.00%	4.00%	5.00%	5.00%	5.00%	5.00%	5.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Total Defense Budget Increase	$19.22	$20.18	$21.18	$22.24	$23.36	$28.82	$30.26	$31.78	$33.37	$35.03	$7.69	$8.07	$8.47	$8.90	$9.34	$9.61	$10.09	$10.59	$11.12	$11.68	$0.00	$0.00	$0.00	$0.00	$0.00	$1.92	$2.02	$2.12	$2.22	$2.34
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$19.22	$18.07	$16.99	$15.97	$15.02	$28.82	$27.10	$25.48	$23.96	$22.53	$7.69	$7.23	$6.80	$6.39	$6.01	$9.61	$9.03	$8.49	$7.99	$7.51	$0.00	$0.00	$0.00	$0.00	$0.00	$1.92	$1.81	$1.70	$1.60	$1.50
Total Defense Budget Increase Net Present Value	$85.26					$127.69					$34.11					$42.63					$0.00					$8.53				
Oil Exports Disrupted																														
Oil Exports per Year (mbpd x 365/1000) in billions of barrels	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Export Revenues	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49
% Oil Export Revenues Disrupted	5.00%	5.00%	5.00%	5.00%	5.00%	75.00%	75.00%	75.00%	75.00%	75.00%	10.00%	10.00%	10.00%	10.00%	10.00%	30.00%	30.00%	30.00%	30.00%	30.00%	5.00%	5.00%	5.00%	5.00%	5.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Total Oil Exports Disrupted	$3.12	$3.12	$3.12	$3.12	$3.12	$46.87	$46.87	$46.87	$46.87	$46.87	$6.25	$6.25	$6.25	$6.25	$6.25	$18.75	$18.75	$18.75	$18.75	$18.75	$3.12	$3.12	$3.12	$3.12	$3.12	$6.25	$6.25	$6.25	$6.25	$6.25
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$3.12	$2.80	$2.51	$2.24	$2.01	$46.87	$41.97	$37.58	$33.66	$30.14	$6.25	$5.60	$5.01	$4.49	$4.02	$18.75	$16.79	$15.03	$13.46	$12.06	$3.12	$2.80	$2.51	$2.24	$2.01	$6.25	$5.60	$5.01	$4.49	$4.02
Total Oil Export Disruption Net Present Value	$12.68					$190.22					$25.36					$76.09					$12.68					$25.36				
Imports Disrupted																														
Value of Imports	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65
Import Trade Growth	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%
% Imports Disrupted	0.00%	0.00%	0.00%	0.00%	0.00%	20.00%	20.00%	20.00%	20.00%	20.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.00%	10.00%	10.00%	10.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Total Imports Disrupted	$0.00	$0.00	$0.00	$0.00	$0.00	$10.46	$12.86	$15.82	$19.46	$23.93	$0.00	$0.00	$0.00	$0.00	$0.00	$5.23	$6.43	$7.91	$9.73	$11.97	$0.00	$0.00	$0.00	$0.00	$0.00	$2.61	$3.22	$3.95	$4.86	$5.98
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$10.46	$11.52	$12.68	$13.97	$15.39	$0.00	$0.00	$0.00	$0.00	$0.00	$5.23	$5.76	$6.34	$6.99	$7.69	$0.00	$0.00	$0.00	$0.00	$0.00	$2.61	$2.88	$3.17	$3.49	$3.85
Total Import Disruption Net Present Value	$0.00					$64.02					$0.00					$32.01					$0.00					$16.00				
Oil Production Disrupted																														
Oil Produced per Year (mbpd x 365/1000) in billions of barrels	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Revenues	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21
% Oil Production Revenues Disrupted	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total Oil Exports Disrupted	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Less Oil Exports Disrupted	($3.12)	($3.12)	($3.12)	($3.12)	($3.12)	($46.87)	($46.87)	($46.87)	($46.87)	($46.87)	($6.25)	($6.25)	($6.25)	($6.25)	($6.25)	($18.75)	($18.75)	($18.75)	($18.75)	($18.75)	($3.12)	($3.12)	($3.12)	($3.12)	($3.12)	($6.25)	($6.25)	($6.25)	($6.25)	($6.25)
Net Oil Production Disruption	$74.64	$74.64	$74.64	$74.64	$74.64	$30.90	$30.90	$30.90	$30.90	$30.90	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$74.64	$66.84	$59.86	$53.60	$48.00	$30.90	$27.67	$24.78	$22.19	$19.87	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Oil Production Disruption Net Present Value	$302.94					$125.40					$0.00					$0.00					$0.00					$0.00				

United States Policies vs. Conservative Iran Policy Discounted Cash Flow Model Matrix for Coercive Case

United States Policy Scenarios

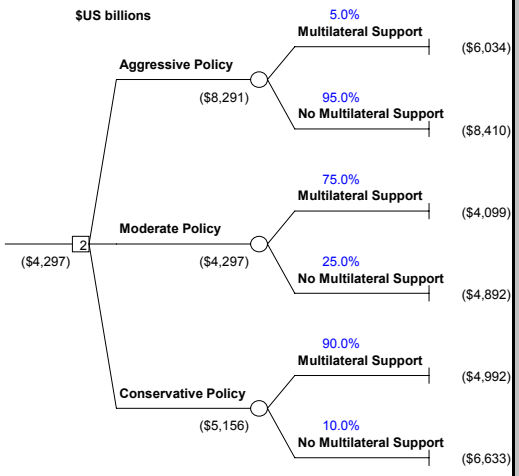
	Aggressive										Moderate										Conservative									
	Unilateral					Multilateral					Unilateral					Multilateral					Unilateral					Multilateral				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Iran Conservative Scenario Assumption																														
US Costs ($US billions)																														
Catastrophic Terror Costs to Human Capital and Infrastructure																														
Number Catastrophic Terror Attacks against US Targets	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Sept. 11 Max Damage Multiple	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.1x	0.1x	0.1x	0.1x	0.1x	0.1x	0.1x	0.1x	0.1x	0.1x
Sept. 11 Max Damage Cost	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$0.00	$0.00	$0.00	$0.00	$0.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00
Total Catastrophic Terror Costs	$19.20	$19.20	$19.20	$19.20	$19.20	$10.08	$10.08	$10.08	$10.08	$10.08	$0.00	$0.00	$0.00	$0.00	$0.00	$2.88	$2.88	$2.88	$2.88	$2.88	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$19.20	$18.37	$17.58	$16.82	$16.10	$10.08	$9.65	$9.23	$8.83	$8.45	$0.00	$0.00	$0.00	$0.00	$0.00	$2.88	$2.76	$2.64	$2.52	$2.42	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Catastrophic Terror Cost Net Present Value	$88.60					$46.29					$0.00					$13.21					$0.00					$0.00				
Catastrophic Terror Costs to US Market Capitalization																														
Number Catastrophic Terror Attacks against US Targets	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Cumulative Abnormal Return	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%
Days to Rebound to Pre-Attack Levels	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Average Annual Market Growth Rate	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Wilshire 5000 Market Capitalization	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85
Market Value Lost per Attack	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96
Total Market Value Lost	$464.00	$519.68	$582.04	$651.89	$730.11	$243.60	$272.83	$305.57	$342.24	$383.31	$278.40	$311.81	$349.23	$391.13	$438.07	$139.20	$155.90	$174.61	$195.57	$219.03	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Risk Free Interest Lost Over Days to Rebound	$0.73	$0.82	$0.91	$1.02	$1.15	$0.38	$0.43	$0.48	$0.54	$0.60	$0.44	$0.49	$0.55	$0.61	$0.69	$0.22	$0.24	$0.27	$0.31	$0.34	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Catastrophic Terror Costs to Interest Lost Over Rebound Period	$0.73	$0.82	$0.91	$1.02	$1.15	$0.38	$0.43	$0.48	$0.54	$0.60	$0.44	$0.49	$0.55	$0.61	$0.69	$0.22	$0.24	$0.27	$0.31	$0.34	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$0.73	$0.78	$0.84	$0.90	$0.96	$0.38	$0.41	$0.44	$0.47	$0.50	$0.44	$0.47	$0.50	$0.54	$0.58	$0.22	$0.23	$0.25	$0.27	$0.29	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Catastrophic Terror Cost Net Present Value	$4.20					$2.21					$2.53					$1.26					$0.00					$0.00				
Iranian Costs ($US billions)																														
Hezbollah Payment Increase																														
Hezbollah Payment Multiple	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	0.5x	0.5x	0.5x	0.5x	0.5x	0.5x	0.5x	0.5x	0.5x	0.5x
Annual Contribution to Hezbollah	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10
Total Hezbollah Payment Increase	$0.15	$0.15	$0.15	$0.15	$0.15	$0.15	$0.15	$0.15	$0.15	$0.15	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.05	$0.05	$0.05	$0.05	$0.05	$0.05	$0.05	$0.05	$0.05	$0.05
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.15	$0.13	$0.12	$0.11	$0.10	$0.15	$0.13	$0.12	$0.11	$0.10	$0.10	$0.09	$0.08	$0.07	$0.06	$0.10	$0.09	$0.08	$0.07	$0.06	$0.05	$0.04	$0.04	$0.04	$0.03	$0.05	$0.04	$0.04	$0.04	$0.03
Hezbollah Payment Increase Net Present Value	$0.61					$0.61					$0.41					$0.41					$0.20					$0.20				
Incremental Defense Budget Increase																														
Iranian GDP	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234
GDP Growth	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
% GDP Increase of Defense Budget	5.00%	5.00%	5.00%	5.00%	5.00%	10.00%	10.00%	10.00%	10.00%	10.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.50%	2.50%	2.50%	2.50%	2.50%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total Defense Budget Increase	$9.61	$10.09	$10.59	$11.12	$11.68	$19.22	$20.18	$21.18	$22.24	$23.36	$3.84	$4.04	$4.24	$4.45	$4.67	$4.80	$5.04	$5.30	$5.56	$5.84	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$9.61	$9.03	$8.49	$7.99	$7.51	$19.22	$18.07	$16.99	$15.97	$15.02	$3.84	$3.61	$3.40	$3.19	$3.00	$4.80	$4.52	$4.25	$3.99	$3.75	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Defense Budget Increase Net Present Value	$42.63					$85.28					$17.06					$21.32					$0.00					$0.00				
Oil Exports Disrupted																														
Oil Exports per Year (mbpd x 365/1000) in billions of barrels	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Export Revenues	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49
% Oil Export Revenues Disrupted	2.50%	2.50%	2.50%	2.50%	2.50%	50.00%	50.00%	50.00%	50.00%	50.00%	1.00%	1.00%	1.00%	1.00%	1.00%	10.00%	10.00%	10.00%	10.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Total Oil Exports Disrupted	$1.56	$1.56	$1.56	$1.56	$1.56	$31.25	$31.25	$31.25	$31.25	$31.25	$0.62	$0.62	$0.62	$0.62	$0.62	$6.25	$6.25	$6.25	$6.25	$6.25	$0.00	$0.00	$0.00	$0.00	$0.00	$3.12	$3.12	$3.12	$3.12	$3.12
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$1.56	$1.40	$1.25	$1.12	$1.00	$31.25	$27.98	$25.06	$22.44	$20.09	$0.62	$0.56	$0.50	$0.45	$0.40	$6.25	$5.60	$5.01	$4.49	$4.02	$0.00	$0.00	$0.00	$0.00	$0.00	$3.12	$2.80	$2.51	$2.24	$2.01
Total Oil Export Disruption Net Present Value	$6.34					$126.81					$2.54					$25.36					$0.00					$12.68				
Imports Disrupted																														
Value of Imports	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65
Import Trade Growth	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%
% Imports Disrupted	0.00%	0.00%	0.00%	0.00%	0.00%	10.00%	10.00%	10.00%	10.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%	5.00%	5.00%	5.00%	5.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.50%	2.50%	2.50%	2.50%	2.50%
Total Imports Disrupted	$0.00	$0.00	$0.00	$0.00	$0.00	$5.23	$6.43	$7.91	$9.73	$11.97	$0.00	$0.00	$0.00	$0.00	$0.00	$2.61	$3.22	$3.95	$4.86	$5.98	$0.00	$0.00	$0.00	$0.00	$0.00	$1.31	$1.61	$1.98	$2.43	$2.99
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$5.23	$5.76	$6.34	$6.99	$7.69	$0.00	$0.00	$0.00	$0.00	$0.00	$2.61	$2.88	$3.17	$3.49	$3.85	$0.00	$0.00	$0.00	$0.00	$0.00	$1.31	$1.44	$1.59	$1.75	$1.92
Total Import Disruption Net Present Value	$0.00					$32.61					$0.00					$16.00					$0.00					$8.00				
Oil Production Disrupted																														
Oil Produced per Year (mbpd x 365/1000) in billions of barrels	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Revenues	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21
% Oil Production Revenues Disrupted	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total Oil Exports Disrupted	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Less Oil Exports Disrupted	($1.56)	($1.56)	($1.56)	($1.56)	($1.56)	($31.25)	($31.25)	($31.25)	($31.25)	($31.25)	($0.62)	($0.62)	($0.62)	($0.62)	($0.62)	($6.25)	($6.25)	($6.25)	($6.25)	($6.25)	$0.00	$0.00	$0.00	$0.00	$0.00	($3.12)	($3.12)	($3.12)	($3.12)	($3.12)
Net Oil Production Disruption	$76.20	$76.20	$76.20	$76.20	$76.20	$46.52	$46.52	$46.52	$46.52	$46.52	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$76.20	$68.24	$61.11	$54.72	$49.00	$46.52	$41.66	$37.31	$33.41	$29.92	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Oil Production Disruption Net Present Value	$309.39					$188.81					$0.00					$0.00					$0.00					$0.00				

United States-Iran Policy Cost Matrix for Coercive Case

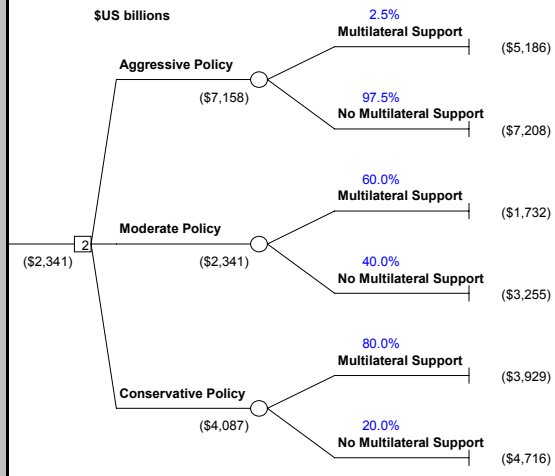
	United States Policy Scenarios					
	Aggressive		Moderate		Conservative	
	Unilateral	Multilateral	Unilateral	Multilateral	Unilateral	Multilateral
Iran Aggressive Scenario Assumption						
US Costs ($US billions)						
Catastrophic Terror Costs to Human Capital and Infrastructure	$412.9	$289.0	$82.6	$41.3	$412.9	$275.3
Strait of Hormuz Disruption Cost	$489.1	$489.1	$306.3	$306.3	$208.6	$208.6
Other Iran War Costs	$7,500.0	$5,250.0	$4,500.0	$3,750.0	$6,000.0	$4,500.0
Incremental Interest Lost to Market Effects of Terrorism	$7.9	$5.5	$3.2	$1.6	$11.8	$7.9
Total US Cost	$8,409.8	$6,033.6	$4,892.0	$4,099.1	$6,633.3	$4,991.8
Iranian Costs ($US billions)						
Hezbollah Payment Increase	$4.1	$4.9	$4.1	$4.9	$4.1	$4.9
Incremental Defense Budget Increase	$127.9	$170.5	$68.2	$85.3	$34.1	$42.6
Oil Exports Disrupted	$25.4	$253.6	$63.4	$126.8	$25.4	$63.4
Imports Disrupted	$0.0	$128.0	$0.0	$64.0	$0.0	$32.0
Oil Production Disrupted	$290.3	$62.0	$0.0	$0.0	$0.0	$0.0
Incremental Cost of Rebuilding Iranian Nuclear Program	$1.0	$1.0	$1.0	$1.0	$1.0	$1.0
Total Iran Cost	$448.6	$620.0	$136.7	$282.0	$64.5	$143.9
Iran Moderate Scenario Assumption						
US Costs ($US billions)						
Catastrophic Terror Costs to Human Capital and Infrastructure	$146.8	$77.1	$44.0	$22.0	$103.2	$68.8
Strait of Hormuz Disruption Cost	$306.3	$306.3	$208.6	$208.6	$106.6	$106.6
Other Iran War Costs	$6,750.0	$4,800.0	$3,000.0	$1,500.0	$4,500.0	$3,750.0
Incremental Interest Lost to Market Effects of Terrorism	$5.3	$2.8	$2.1	$1.1	$5.9	$3.9
Total US Cost	$7,208.3	$5,186.1	$3,254.8	$1,731.7	$4,715.7	$3,929.4
Iranian Costs ($US billions)						
Hezbollah Payment Increase	$2.0	$2.0	$1.0	$1.0	$0.4	$0.4
Incremental Defense Budget Increase	$85.3	$127.9	$34.1	$42.6	$0.0	$8.5
Oil Exports Disrupted	$12.7	$190.2	$25.4	$76.1	$25.4	$63.4
Imports Disrupted	$0.0	$128.0	$0.0	$64.0	$0.0	$32.0
Oil Production Disrupted	$290.3	$62.0	$0.0	$0.0	$0.0	$0.0
Incremental Cost of Rebuilding Iranian Nuclear Program	$1.0	$1.0	$1.0	$1.0	$1.0	$1.0
Total Iran Cost	$391.2	$511.2	$61.5	$184.7	$26.8	$105.3
Iran Conservative Scenario Assumption						
US Costs ($US billions)						
Catastrophic Terror Costs to Human Capital and Infrastructure	$88.1	$46.2	$0.0	$13.2	$0.0	$0.0
Strait of Hormuz Disruption Cost	$208.6	$208.6	$106.6	$106.6	$0.0	$0.0
Other Iran War Costs	$6,000.0	$4,500.0	$750.0	$450.0	$900.0	$150.0
Incremental Interest Lost to Market Effects of Terrorism	$4.2	$2.2	$2.5	$1.3	$0.0	$0.0
Total US Cost	$6,300.9	$4,757.1	$859.1	$571.1	$900.0	$150.0
Iranian Costs ($US billions)						
Hezbollah Payment Increase	$0.6	$0.6	$0.4	$0.4	$0.2	$0.2
Incremental Defense Budget Increase	$42.6	$85.3	$17.1	$21.3	$0.0	$0.0
Oil Exports Disrupted	$6.3	$126.8	$2.5	$25.4	$0.0	$12.7
Imports Disrupted	$0.0	$32.0	$0.0	$16.0	$0.0	$8.0
Oil Production Disrupted	$309.3	$188.8	$0.0	$0.0	$0.0	$0.0
Incremental Cost of Rebuilding Iranian Nuclear Program	$1.0	$1.0	$1.0	$1.0	$1.0	$1.0
Total Iran Cost	$359.9	$434.5	$21.0	$64.1	$1.2	$21.9

Decision Analysis for US Policy Options vs. Iranian Response Policy for Coercive Case

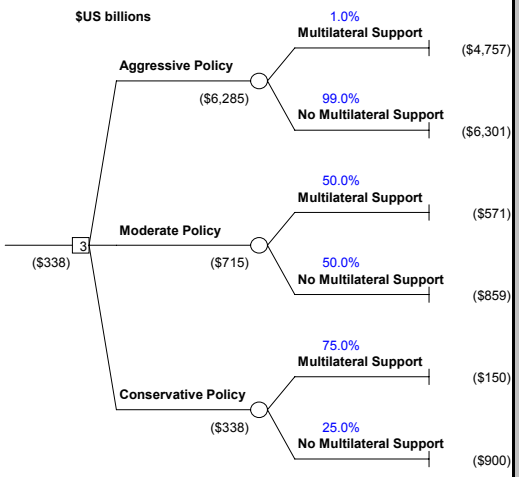
Aggressive Iranian Policy



Moderate Iranian Policy

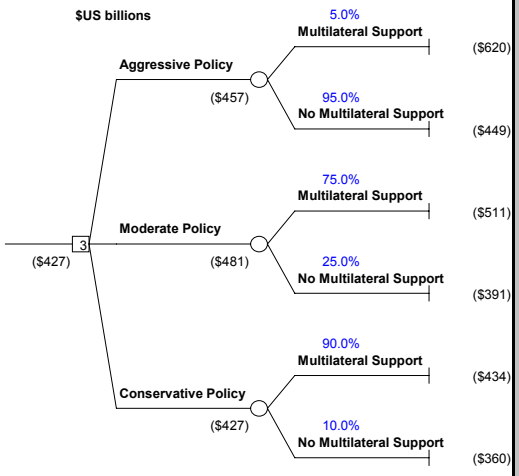


Conservative Iranian Policy

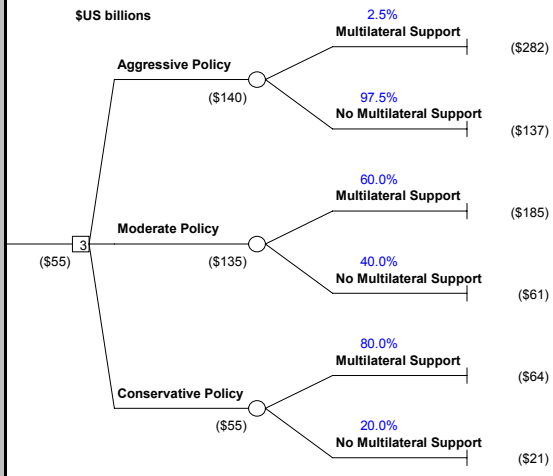


Decision Analysis for Iran Response Policy Options vs. US Policy for Coercive Case

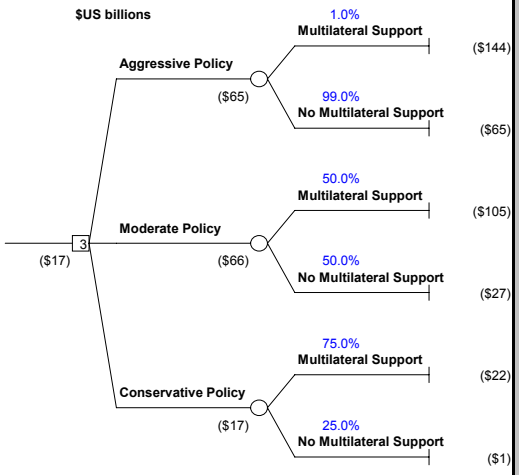
Aggressive US Policy



Moderate US Policy



Conservative US Policy



United States-Iran Policy Game Theoretic Strategic Matrix for Coercive Case
$US Billions

Iranian Strategy	United States Strategy: Aggressive	Moderate	Conservative
Aggressive	($8,291) ($457)	($4,297) ($140)	($5,156) ($65)
Moderate	($7,158) ($481)	($2,341) ($135)	($4,087) ($66)
Conservative	($6,285) ($427)	($715) ($55)	($338) ($17)

United States-Iran Policy Game Theoretic Strategic Matrix for Coercive Case
$US Billions

Iranian Strategy	United States Strategy: Aggressive	Moderate	Conservative
Aggressive	($8,291) ($457)	($4,297) ($140)	($5,156) ($65)
Moderate	($7,158) ($481)	($2,341) ($135)	($4,087) ($66)
Conservative	($6,285) ($427)	($715) ($55) *Dominant Iranian Strategy*	($338) ($17)

United States-Iran Policy Game Theoretic Strategic Matrix for Coercive Case
$US Billions

Iranian Strategy	United States Strategy: Aggressive	Moderate	Conservative
Aggressive	($8,291) ($457)	($4,297) ($140)	($5,156) ($65)
Moderate	($7,158) ($481)	($2,341) ($135)	($4,087) ($66)
Conservative	($6,285) ($427)	($715) ($55)	($338) ($17) *US Nash Equilibrium*

Decision Analysis Assumptions for Strategic Adjustment Case

US Assumptions		Iran Assumptions	
2005 US GDP ($US billions)	$12,482.30	2005 Iran GDP ($US billions)	$183
Wilshire 5000 Market Capitalization ($US billion)	$13,004.51	Iran Risk Free Rate	11.67%
US Risk Free Rate	4.50%	Annual Contribution to Hezbollah ($US billions)	$0.10
Event Day NYSE Cumulative Abnormal Returns	-4.79%	Total Value of 2005 Imports ($US billions)	$42.501
6 Day NYSE Cumulative Abnormal Returns	-6.69%	Total Oil Exports (mbpd)	2.7 mbpd
Days for NYSE to Rebound to Pre-Attack Levels	13	Total Oil Production (mbpd)	4.2 mbpd
Price of Oil per Barrel (January 4, 2006)	$63.41	Length of War (years)	5
Low Estimate of Sep 11th Physical & Human Capital Cost ($US billions)	$10.00	GDP Growth Rate	5.00%
High Estimate of Sep 11th Physical & Human Capital Cost ($US billions)	$60.00	Import Growth Rate	23.00%
Estimated Iraq War Cost	$1,500.00		
Average Market Growth Rate	12.00%		

United States-Iran Policy Assumptions Matrix for Strategic Adjustment Case

	United States Policy Scenarios					
	Aggressive		Moderate		Conservative	
	Unilateral	Multilateral	Unilateral	Multilateral	Unilateral	Multilateral
Iran Aggressive Scenario Assumption						
Variables that Impact US Costs						
Number Catastrophic Terror Attacks against US Targets	5.00	3.50	2.00	1.00	7.50	5.00
Length of Strait of Hormuz Disruption (years)	5	5	3	3	2	2
Average Sept. 11 Max Damage Multiple	2.00x	2.00x	1.00x	1.00x	1.50x	1.50x
Iran War Multiple	10.0x	7.0x	6.0x	5.0x	8.0x	6.0x
Variables that Impact Iranian Costs						
Hezbollah Payment Multiple	10.0x	12.0x	10.0x	12.0x	10.0x	12.0x
Iranian Incremental Defense Budget Increase (% of GDP)	20.0%	25.0%	13.0%	20.0%	9.0%	20.0%
% Oil Exports Disrupted	0.0%	50.0%	12.5%	25.0%	5.0%	12.5%
% of Imports Disrupted	0.0%	20.0%	0.0%	10.0%	0.0%	5.0%
% of Oil Production Disrupted	80.0%	80.0%	50.0%	50.0%	40.0%	40.0%
Incremental Cost of Rebuilding Iranian Nuclear Program ($US billions)	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Iran Moderate Scenario Assumption						
Variables that Impact US Costs						
Number Catastrophic Terror Attacks against US Targets	3.33	1.75	1.33	0.67	3.75	2.50
Length of Strait of Hormuz Disruption (years)	3	3	2	2	1	1
Average Sept. 11 Max Damage Multiple	0.80x	0.80x	0.70x	0.70x	0.60x	0.60x
Iran War Multiple	9.0x	6.0x	5.0x	4.0x	7.0x	5.0x
Variables that Impact Iranian Costs						
Hezbollah Payment Multiple	8.0x	9.0x	6.0x	7.0x	3.0x	5.0x
Iranian Incremental Defense Budget Increase (% of GDP)	10.0%	15.0%	4.0%	5.0%	2.0%	4.0%
% Oil Exports Disrupted	5.0%	75.0%	10.0%	30.0%	5.0%	10.0%
% of Imports Disrupted	0.0%	20.0%	0.0%	10.0%	0.0%	5.0%
% of Oil Production Disrupted	80.0%	80.0%	40.0%	40.0%	30.0%	30.0%
Incremental Cost of Rebuilding Iranian Nuclear Program ($US billions)	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Iran Conservative Scenario Assumption						
Variables that Impact US Costs						
Number Catastrophic Terror Attacks against US Targets	2.67	1.40	1.60	0.80	0.00	0.00
Length of Strait of Hormuz Disruption (years)	2	2	1	1	0	0
Average Sept. 11 Max Damage Multiple	0.60x	0.60x	0.30x	0.30x	0.10x	0.10x
Iran War Multiple	7.0x	5.0x	3.0x	2.0x	5.0x	4.0x
Variables that Impact Iranian Costs						
Hezbollah Payment Multiple	6.0x	8.0x	5.0x	6.0x	2.0x	3.0x
Iranian Incremental Defense Budget Increase (% of GDP)	5.0%	10.0%	2.0%	2.5%	1.0%	2.0%
% Oil Exports Disrupted	2.5%	50.0%	1.0%	10.0%	0.0%	5.0%
% of Imports Disrupted	0.0%	10.0%	0.0%	5.0%	0.0%	2.5%
% of Oil Production Disrupted	80.0%	80.0%	40.0%	40.0%	20.0%	20.0%
Incremental Cost of Rebuilding Iranian Nuclear Program ($US billions)	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0

United States Policies vs. Aggressive Iran Policy Discounted Cash Flow Model Matrix for Strategic Adjustment Case

United States Policy Scenarios

	Aggressive										Moderate										Conservative									
	Unilateral					Multilateral					Unilateral					Multilateral					Unilateral					Multilateral				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Iran Aggressive Scenario Assumption																														
US Costs ($US billions)																														
Catastrophic Terror Costs to Human Capital and Infrastructure																														
Number Catastrophic Terror Attacks against US Targets	1.0	1.0	1.0	1.0	1.0	0.7	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	1.5	1.5	1.5	1.5	1.5	1.0	1.0	1.0	1.0	1.0
Average Sept. 11 Max Damage Multiple	2.0x	2.0x	2.0x	2.0x	2.0x	2.0x	2.0x	2.0x	2.0x	2.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x	1.5x
Sept. 11 Max Damage Cost	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00
Total Catastrophic Terror Costs	$120.00	$120.00	$120.00	$120.00	$120.00	$84.00	$84.00	$84.00	$84.00	$84.00	$24.00	$24.00	$24.00	$24.00	$24.00	$12.00	$12.00	$12.00	$12.00	$12.00	$135.00	$135.00	$135.00	$135.00	$135.00	$90.00	$90.00	$90.00	$90.00	$90.00
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$120.00	$114.83	$109.89	$105.16	$100.63	$84.00	$80.38	$76.92	$73.61	$70.44	$24.00	$22.97	$21.98	$21.03	$20.13	$12.00	$11.48	$10.99	$10.52	$10.06	$135.00	$129.19	$123.62	$118.30	$113.21	$90.00	$86.12	$82.42	$78.87	$75.47
Catastrophic Terror Cost Net Present Value	$550.59					$385.39					$119.18					$55.68					$619.33					$412.89				
Catastrophic Terror Costs to US Market Capitalization																														
Number Catastrophic Terror Attacks against US Targets	1.0	1.0	1.0	1.0	1.0	0.7	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	1.5	1.5	1.5	1.5	1.5	1.0	1.0	1.0	1.0	1.0
Average Cumulative Abnormal Return	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%
Days to Rebound to Pre-Attack Levels	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Average Annual Market Growth Rate	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Wilshire 5000 Market Capitalization	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85
Market Value Lost per Attack	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96
Total Market Value Lost	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$609.00	$682.08	$763.93	$855.60	$958.28	$348.00	$389.76	$436.53	$488.92	$547.59	$174.00	$194.88	$218.27	$244.46	$273.79	$1,305.00	$1,461.60	$1,637.00	$1,833.43	$2,053.45	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96
Risk Free Interest Lost Over Days to Rebound	$1.36	$1.53	$1.71	$1.92	$2.15	$0.96	$1.07	$1.20	$1.34	$1.50	$0.55	$0.61	$0.68	$0.77	$0.86	$0.27	$0.31	$0.34	$0.38	$0.43	$2.05	$2.29	$2.57	$2.88	$3.22	$1.36	$1.53	$1.71	$1.92	$2.15
Total Catastrophic Terror Costs to Interest Lost Over Rebound Period	$1.36	$1.53	$1.71	$1.92	$2.15	$0.96	$1.07	$1.20	$1.34	$1.50	$0.55	$0.61	$0.68	$0.77	$0.86	$0.27	$0.31	$0.34	$0.38	$0.43	$2.05	$2.29	$2.57	$2.88	$3.22	$1.36	$1.53	$1.71	$1.92	$2.15
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$1.36	$1.46	$1.57	$1.68	$1.80	$0.96	$1.02	$1.10	$1.18	$1.26	$0.55	$0.59	$0.63	$0.67	$0.72	$0.27	$0.29	$0.31	$0.34	$0.36	$2.05	$2.19	$2.35	$2.52	$2.70	$1.36	$1.46	$1.57	$1.68	$1.80
Catastrophic Terror Cost Net Present Value	$7.85					$5.51					$3.15					$1.58					$11.82					$7.85				
Iranian Costs ($US billions)																														
Hezbollah Payment Increase																														
Hezbollah Payment Multiple	10.0x	10.0x	10.0x	10.0x	10.0x	12.0x	12.0x	12.0x	12.0x	12.0x	10.0x	10.0x	10.0x	10.0x	10.0x	12.0x	12.0x	12.0x	12.0x	12.0x	10.0x	10.0x	10.0x	10.0x	10.0x	12.0x	12.0x	12.0x	12.0x	12.0x
Annual Contribution to Hezbollah	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10
Total Hezbollah Payment Increase	$1.00	$1.00	$1.00	$1.00	$1.00	$1.20	$1.20	$1.20	$1.20	$1.20	$1.00	$1.00	$1.00	$1.00	$1.00	$1.20	$1.20	$1.20	$1.20	$1.20	$1.00	$1.00	$1.00	$1.00	$1.00	$1.20	$1.20	$1.20	$1.20	$1.20
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$1.00	$0.90	$0.80	$0.72	$0.64	$1.20	$1.07	$0.96	$0.86	$0.77	$1.00	$0.90	$0.80	$0.72	$0.64	$1.20	$1.07	$0.96	$0.86	$0.77	$1.00	$0.90	$0.80	$0.72	$0.64	$1.20	$1.07	$0.96	$0.86	$0.77
Hezbollah Payment Increase Net Present Value	$4.00					$4.87					$4.06					$4.87					$4.06					$4.87				
Incremental Defense Budget Increase																														
Iranian GDP	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234
GDP Growth	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
% GDP Increase of Defense Budget	20.00%	20.00%	20.00%	20.00%	20.00%	25.00%	25.00%	25.00%	25.00%	25.00%	13.00%	13.00%	13.00%	13.00%	13.00%	20.00%	20.00%	20.00%	20.00%	20.00%	9.00%	9.00%	9.00%	9.00%	9.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Total Defense Budget Increase	$38.43	$40.35	$42.37	$44.49	$46.71	$48.04	$50.44	$52.96	$55.61	$58.39	$24.98	$26.23	$27.54	$28.92	$30.36	$38.43	$40.35	$42.37	$44.49	$46.71	$17.29	$18.16	$19.07	$20.02	$21.02	$38.43	$40.35	$42.37	$44.49	$46.71
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$38.43	$36.13	$33.98	$31.95	$30.04	$48.04	$45.17	$42.47	$39.93	$37.55	$24.98	$23.49	$22.08	$20.77	$19.53	$38.43	$36.13	$33.98	$31.95	$30.04	$17.29	$16.26	$15.29	$14.38	$13.52	$38.43	$36.13	$33.98	$31.95	$30.04
Total Defense Budget Increase Net Present Value	$170.53					$213.16					$110.84					$170.53					$76.74					$170.53				
Oil Exports Disrupted																														
Oil Exports per Year (mbpd x 365/1000) in billions of barrels	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Export Revenues	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49
% Oil Export Revenues Disrupted	0.00%	0.00%	0.00%	0.00%	0.00%	50.00%	50.00%	50.00%	50.00%	50.00%	12.50%	12.50%	12.50%	12.50%	12.50%	25.00%	25.00%	25.00%	25.00%	25.00%	5.00%	5.00%	5.00%	5.00%	5.00%	12.50%	12.50%	12.50%	12.50%	12.50%
Total Oil Exports Disrupted	$0.00	$0.00	$0.00	$0.00	$0.00	$31.25	$31.25	$31.25	$31.25	$31.25	$7.81	$7.81	$7.81	$7.81	$7.81	$15.62	$15.62	$15.62	$15.62	$15.62	$3.12	$3.12	$3.12	$3.12	$3.12	$7.81	$7.81	$7.81	$7.81	$7.81
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$31.25	$27.98	$25.06	$22.44	$20.09	$7.81	$7.00	$6.26	$5.61	$5.02	$15.62	$13.99	$12.53	$11.22	$10.05	$3.12	$2.80	$2.51	$2.24	$2.01	$7.81	$7.00	$6.26	$5.61	$5.02
Total Oil Export Disruption Net Present Value	$0.00					$126.81					$31.76					$63.41					$12.68					$31.76				
Imports Disrupted																														
Value of Imports	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65
Import Trade Growth	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%
% Imports Disrupted	0.00%	0.00%	0.00%	0.00%	0.00%	20.00%	20.00%	20.00%	20.00%	20.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.00%	10.00%	10.00%	10.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Total Imports Disrupted	$0.00	$0.00	$0.00	$0.00	$0.00	$10.46	$12.86	$15.82	$19.46	$23.93	$0.00	$0.00	$0.00	$0.00	$0.00	$5.23	$6.43	$7.91	$9.73	$11.97	$0.00	$0.00	$0.00	$0.00	$0.00	$2.61	$3.22	$3.95	$4.86	$5.98
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$10.46	$11.52	$12.68	$13.97	$15.39	$0.00	$0.00	$0.00	$0.00	$0.00	$5.23	$5.76	$6.34	$6.99	$7.69	$0.00	$0.00	$0.00	$0.00	$0.00	$2.61	$2.88	$3.17	$3.49	$3.85
Total Import Disruption Net Present Value	$0.00					$64.02					$0.00					$33.91					$0.00					$16.00				
Oil Production Disrupted																														
Oil Produced per Year (mbpd x 365/1000) in billions of barrels	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Revenues	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21
% Oil Production Revenues Disrupted	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%
Total Oil Exports Disrupted	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$48.60	$48.60	$48.60	$48.60	$48.60	$48.60	$0.00	$38.88	$0.00	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88
Less Oil Exports Disrupted	$0.00	$0.00	$0.00	$0.00	$0.00	($31.25)	($31.25)	($31.25)	($31.25)	($31.25)	($7.81)	($7.81)	($7.81)	($7.81)	($7.81)	($15.62)	($15.62)	($15.62)	($15.62)	($15.62)	($3.12)	($3.12)	($3.12)	($3.12)	($3.12)	($7.81)	($7.81)	($7.81)	($7.81)	($7.81)
Net Oil Production Disruption	$77.77	$77.77	$77.77	$77.77	$77.77	$46.52	$46.52	$46.52	$46.52	$46.52	$40.79	$40.79	$40.79	$40.79	$40.79	$32.98	$0.00	$23.26	$0.00	$23.26	$35.76	$35.76	$35.76	$35.76	$35.76	$31.07	$31.07	$31.07	$31.07	$31.07
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$77.77	$69.64	$62.36	$55.84	$50.01	$46.52	$41.66	$37.31	$33.41	$29.92	$40.79	$36.53	$32.71	$29.29	$26.23	$32.98	$0.00	$18.65	$0.00	$14.96	$35.76	$32.02	$28.68	$25.68	$22.99	$31.07	$27.82	$24.92	$22.31	$19.98
Total Oil Production Disruption Net Present Value	$315.63					$188.81					$165.56					$66.59					$145.13					$126.11				

United States Policies vs. Moderate Iran Policy Discounted Cash Flow Model Matrix for Strategic Adjustment Case

United States Policy Scenarios

Aggressive

	Unilateral 2006	2007	2008	2009	2010	Multilateral 2006	2007	2008	2009	2010
Iran Moderate Scenario Assumption										
US Costs ($US billions)										
Catastrophic Terror Costs to Human Capital and Infrastructure										
Number Catastrophic Terror Attacks against US Targets	0.7	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.4	0.4
Average Sept. 11 Max Damage Multiple	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x	0.8x
Sept. 11 Max Damage Cost	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00
Total Catastrophic Terror Costs	$32.00	$32.00	$32.00	$32.00	$32.00	$16.80	$16.80	$16.80	$16.80	$16.80
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$32.00	$30.62	$29.30	$28.04	$26.83	$16.80	$16.08	$15.38	$14.72	$14.09
Catastrophic Terror Cost Net Present Value	**$146.85**					**$77.07**				
Catastrophic Terror Costs to US Market Capitalization										
Number Catastrophic Terror Attacks against US Targets	0.7	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.4	0.4
Average Cumulative Abnormal Return	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%
Days to Rebound to Pre-Attack Levels	13	13	13	13	13	13	13	13	13	13
Average Annual Market Growth Rate	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Wilshire 5000 Market Capitalization	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85
Market Value Lost per Attack	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96
Total Market Value Lost	$580.00	$649.60	$727.55	$814.86	$912.64	$304.50	$341.04	$381.97	$427.80	$479.14
Risk Free Interest Lost Over Days to Rebound	$0.91	$1.02	$1.14	$1.28	$1.43	$0.48	$0.54	$0.60	$0.67	$0.75
Total Catastrophic Terror Costs to Interest Lost Over Rebound Period	$0.91	$1.02	$1.14	$1.28	$1.43	$0.48	$0.54	$0.60	$0.67	$0.75
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$0.91	$0.98	$1.05	$1.12	$1.20	$0.48	$0.51	$0.55	$0.59	$0.63
Catastrophic Terror Cost Net Present Value	**$6.25**					**$2.76**				
Iranian Costs ($US billions)										
Hezbollah Payment Increase										
Hezbollah Payment Multiple	8.0x	8.0x	8.0x	8.0x	8.0x	9.0x	9.0x	9.0x	9.0x	9.0x
Annual Contribution to Hezbollah	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10
Total Hezbollah Payment Increase	$0.80	$0.80	$0.80	$0.80	$0.80	$0.90	$0.90	$0.90	$0.90	$0.90
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.80	$0.72	$0.64	$0.57	$0.51	$0.90	$0.81	$0.72	$0.65	$0.58
Hezbollah Payment Increase Net Present Value	**$3.25**					**$3.65**				
Incremental Defense Budget Increase										
Iranian GDP	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234
GDP Growth	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
% GDP Increase of Defense Budget	10.00%	10.00%	10.00%	10.00%	10.00%	15.00%	15.00%	15.00%	15.00%	15.00%
Total Defense Budget Increase	$19.22	$20.18	$21.18	$22.24	$23.36	$28.82	$30.26	$31.78	$33.37	$35.03
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$19.22	$18.07	$16.99	$15.97	$15.02	$28.82	$27.10	$25.48	$23.96	$22.53
Total Defense Budget Increase Net Present Value	**$85.26**					**$127.89**				
Oil Exports Disrupted										
Oil Exports per Year (mbpd x 365/1000) in billions of barrels	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Export Revenues	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49
% Oil Export Revenues Disrupted	5.00%	5.00%	5.00%	5.00%	5.00%	75.00%	75.00%	75.00%	75.00%	75.00%
Total Oil Exports Disrupted	$3.12	$3.12	$3.12	$3.12	$3.12	$46.87	$46.87	$46.87	$46.87	$46.87
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$3.12	$2.80	$2.51	$2.24	$2.01	$46.87	$41.97	$37.58	$33.66	$30.14
Total Oil Export Disruption Net Present Value	**$12.65**					**$190.22**				
Imports Disrupted										
Value of Imports	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65
Import Trade Growth	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%
% Imports Disrupted	0.00%	0.00%	0.00%	0.00%	0.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Total Imports Disrupted	$0.00	$0.00	$0.00	$0.00	$0.00	$10.46	$12.86	$15.82	$19.46	$23.93
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$10.46	$11.52	$12.68	$13.97	$15.39
Total Import Disruption Net Present Value	**$0.00**					**$64.02**				
Oil Production Disrupted										
Oil Produced per Year (mbpd x 365/1000) in billions of barrels	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Revenues	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21
% Oil Production Revenues Disrupted	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
Total Oil Exports Disrupted	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77
Less Oil Exports Disrupted	($3.12)	($3.12)	($3.12)	($3.12)	($3.12)	($46.87)	($46.87)	($46.87)	($46.87)	($46.87)
Net Oil Production Disruption	$74.64	$74.64	$74.64	$74.64	$74.64	$30.90	$30.90	$30.90	$30.90	$30.90
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$74.64	$66.84	$59.86	$53.60	$48.00	$30.90	$27.67	$24.78	$22.19	$19.87
Total Oil Production Disruption Net Present Value	**$302.94**					**$125.40**				

Moderate

	Unilateral 2006	2007	2008	2009	2010	Multilateral 2006	2007	2008	2009	2010
Iran Moderate Scenario Assumption										
US Costs ($US billions)										
Catastrophic Terror Costs to Human Capital and Infrastructure										
Number Catastrophic Terror Attacks against US Targets	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1
Average Sept. 11 Max Damage Multiple	0.7x	0.7x	0.7x	0.7x	0.7x	0.7x	0.7x	0.7x	0.7x	0.7x
Sept. 11 Max Damage Cost	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00
Total Catastrophic Terror Costs	$11.20	$11.20	$11.20	$11.20	$11.20	$5.60	$5.60	$5.60	$5.60	$5.60
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$11.20	$10.72	$10.26	$9.81	$9.39	$5.60	$5.36	$5.13	$4.91	$4.70
Catastrophic Terror Cost Net Present Value	**$51.38**					**$25.69**				
Catastrophic Terror Costs to US Market Capitalization										
Number Catastrophic Terror Attacks against US Targets	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1
Average Cumulative Abnormal Return	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%
Days to Rebound to Pre-Attack Levels	13	13	13	13	13	13	13	13	13	13
Average Annual Market Growth Rate	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Wilshire 5000 Market Capitalization	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85
Market Value Lost per Attack	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96
Total Market Value Lost	$232.00	$259.84	$291.02	$325.94	$365.06	$116.00	$129.92	$145.51	$162.97	$182.53
Risk Free Interest Lost Over Days to Rebound	$0.36	$0.41	$0.46	$0.51	$0.57	$0.18	$0.20	$0.23	$0.26	$0.29
Total Catastrophic Terror Costs to Interest Lost Over Rebound Period	$0.36	$0.41	$0.46	$0.51	$0.57	$0.18	$0.20	$0.23	$0.26	$0.29
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$0.36	$0.39	$0.42	$0.45	$0.48	$0.18	$0.20	$0.21	$0.22	$0.24
Catastrophic Terror Cost Net Present Value	**$2.10**					**$1.05**				
Iranian Costs ($US billions)										
Hezbollah Payment Increase										
Hezbollah Payment Multiple	6.0x	6.0x	6.0x	6.0x	6.0x	7.0x	7.0x	7.0x	7.0x	7.0x
Annual Contribution to Hezbollah	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10
Total Hezbollah Payment Increase	$0.60	$0.60	$0.60	$0.60	$0.60	$0.70	$0.70	$0.70	$0.70	$0.70
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.60	$0.54	$0.48	$0.43	$0.39	$0.70	$0.63	$0.56	$0.50	$0.45
Hezbollah Payment Increase Net Present Value	**$2.44**					**$2.84**				
Incremental Defense Budget Increase										
Iranian GDP	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234
GDP Growth	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
% GDP Increase of Defense Budget	4.00%	4.00%	4.00%	4.00%	4.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Total Defense Budget Increase	$7.69	$8.07	$8.47	$8.90	$9.34	$9.61	$10.09	$10.59	$11.12	$11.68
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$7.69	$7.23	$6.80	$6.39	$6.01	$9.61	$9.03	$8.49	$7.99	$7.51
Total Defense Budget Increase Net Present Value	**$34.11**					**$42.63**				
Oil Exports Disrupted										
Oil Exports per Year (mbpd x 365/1000) in billions of barrels	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Export Revenues	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49
% Oil Export Revenues Disrupted	10.00%	10.00%	10.00%	10.00%	10.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Total Oil Exports Disrupted	$6.25	$6.25	$6.25	$6.25	$6.25	$18.75	$18.75	$18.75	$18.75	$18.75
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$6.25	$5.60	$5.01	$4.49	$4.02	$18.75	$16.79	$15.03	$13.46	$12.06
Total Oil Export Disruption Net Present Value	**$25.36**					**$76.09**				
Imports Disrupted										
Value of Imports	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65
Import Trade Growth	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%
% Imports Disrupted	0.00%	0.00%	0.00%	0.00%	0.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Total Imports Disrupted	$0.00	$0.00	$0.00	$0.00	$0.00	$5.23	$6.43	$7.91	$9.73	$11.97
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$5.23	$5.76	$6.34	$6.99	$7.69
Total Import Disruption Net Present Value	**$0.00**					**$32.01**				
Oil Production Disrupted										
Oil Produced per Year (mbpd x 365/1000) in billions of barrels	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Revenues	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21
% Oil Production Revenues Disrupted	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%
Total Oil Exports Disrupted	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88
Less Oil Exports Disrupted	($6.25)	($6.25)	($6.25)	($6.25)	($6.25)	($18.75)	($18.75)	($18.75)	($18.75)	($18.75)
Net Oil Production Disruption	$32.63	$32.63	$32.63	$32.63	$32.63	$20.14	$20.14	$20.14	$20.14	$20.14
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$32.63	$29.22	$26.17	$23.43	$20.99	$20.14	$18.03	$16.15	$14.46	$12.95
Total Oil Production Disruption Net Present Value	**$132.48**					**$81.72**				

Conservative

	Unilateral 2006	2007	2008	2009	2010	Multilateral 2006	2007	2008	2009	2010
Iran Moderate Scenario Assumption										
US Costs ($US billions)										
Catastrophic Terror Costs to Human Capital and Infrastructure										
Number Catastrophic Terror Attacks against US Targets	0.8	0.8	0.8	0.8	0.8	0.5	0.5	0.5	0.5	0.5
Average Sept. 11 Max Damage Multiple	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x
Sept. 11 Max Damage Cost	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00
Total Catastrophic Terror Costs	$27.00	$27.00	$27.00	$27.00	$27.00	$18.00	$18.00	$18.00	$18.00	$18.00
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$27.00	$25.84	$24.72	$23.66	$22.64	$18.00	$17.22	$16.48	$15.77	$15.09
Catastrophic Terror Cost Net Present Value	**$123.88**					**$82.58**				
Catastrophic Terror Costs to US Market Capitalization										
Number Catastrophic Terror Attacks against US Targets	0.8	0.8	0.8	0.8	0.8	0.5	0.5	0.5	0.5	0.5
Average Cumulative Abnormal Return	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%
Days to Rebound to Pre-Attack Levels	13	13	13	13	13	13	13	13	13	13
Average Annual Market Growth Rate	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Wilshire 5000 Market Capitalization	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85
Market Value Lost per Attack	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96
Total Market Value Lost	$652.50	$730.80	$818.50	$916.72	$1,026.72	$435.00	$487.20	$545.67	$611.14	$684.48
Risk Free Interest Lost Over Days to Rebound	$1.02	$1.15	$1.28	$1.44	$1.61	$0.68	$0.76	$0.86	$0.96	$1.07
Total Catastrophic Terror Costs to Interest Lost Over Rebound Period	$1.02	$1.15	$1.28	$1.44	$1.61	$0.68	$0.76	$0.86	$0.96	$1.07
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$1.02	$1.10	$1.18	$1.26	$1.35	$0.68	$0.73	$0.78	$0.84	$0.90
Catastrophic Terror Cost Net Present Value	**$5.91**					**$3.94**				
Iranian Costs ($US billions)										
Hezbollah Payment Increase										
Hezbollah Payment Multiple	3.0x	3.0x	3.0x	3.0x	3.0x	5.0x	5.0x	5.0x	5.0x	5.0x
Annual Contribution to Hezbollah	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10
Total Hezbollah Payment Increase	$0.30	$0.30	$0.30	$0.30	$0.30	$0.50	$0.50	$0.50	$0.50	$0.50
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.30	$0.27	$0.24	$0.22	$0.19	$0.50	$0.45	$0.40	$0.36	$0.32
Hezbollah Payment Increase Net Present Value	**$1.22**					**$2.03**				
Incremental Defense Budget Increase										
Iranian GDP	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234
GDP Growth	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
% GDP Increase of Defense Budget	2.00%	2.00%	2.00%	2.00%	2.00%	4.00%	4.00%	4.00%	4.00%	4.00%
Total Defense Budget Increase	$3.84	$4.04	$4.24	$4.45	$4.67	$7.69	$8.07	$8.47	$8.90	$9.34
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$3.84	$3.61	$3.40	$3.19	$3.00	$7.69	$7.23	$6.80	$6.39	$6.01
Total Defense Budget Increase Net Present Value	**$17.05**					**$34.11**				
Oil Exports Disrupted										
Oil Exports per Year (mbpd x 365/1000) in billions of barrels	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Export Revenues	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49
% Oil Export Revenues Disrupted	5.00%	5.00%	5.00%	5.00%	5.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Total Oil Exports Disrupted	$3.12	$3.12	$3.12	$3.12	$3.12	$6.25	$6.25	$6.25	$6.25	$6.25
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$3.12	$2.80	$2.51	$2.24	$2.01	$6.25	$5.60	$5.01	$4.49	$4.02
Total Oil Export Disruption Net Present Value	**$12.68**					**$25.36**				
Imports Disrupted										
Value of Imports	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65
Import Trade Growth	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%
% Imports Disrupted	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Total Imports Disrupted	$0.00	$0.00	$0.00	$0.00	$0.00	$2.61	$3.22	$3.95	$4.86	$5.98
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$2.61	$2.88	$3.17	$3.49	$3.85
Total Import Disruption Net Present Value	**$0.00**					**$16.00**				
Oil Production Disrupted										
Oil Produced per Year (mbpd x 365/1000) in billions of barrels	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Revenues	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21
% Oil Production Revenues Disrupted	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Total Oil Exports Disrupted	$29.16	$29.16	$29.16	$29.16	$29.16	$29.16	$29.16	$29.16	$29.16	$29.16
Less Oil Exports Disrupted	($3.12)	($3.12)	($3.12)	($3.12)	($3.12)	($6.25)	($6.25)	($6.25)	($6.25)	($6.25)
Net Oil Production Disruption	$26.04	$26.04	$26.04	$26.04	$26.04	$22.91	$22.91	$22.91	$22.91	$22.91
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$26.04	$23.32	$20.88	$18.70	$16.74	$22.91	$20.52	$18.37	$16.45	$14.73
Total Oil Production Disruption Net Present Value	**$105.68**					**$93.00**				

United States Policies vs. Conservative Iran Policy Discounted Cash Flow Model Matrix for Strategic Adjustment Case

United States Policy Scenarios

	Aggressive									
	Unilateral					Multilateral				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Iran Conservative Scenario Assumption										
US Costs ($US billions)										
Catastrophic Terror Costs to Human Capital and Infrastructure										
Number Catastrophic Terror Attacks against US Targets	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3
Average Sept. 11 Max Damage Multiple	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x	0.6x
Sept. 11 Max Damage Cost	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00
Total Catastrophic Terror Costs	$19.20	$19.20	$19.20	$19.20	$19.20	$10.08	$10.08	$10.08	$10.08	$10.08
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$19.20	$18.37	$17.58	$16.82	$16.10	$10.08	$9.65	$9.23	$8.83	$8.45
Catastrophic Terror Cost Net Present Value	$88.60					$46.29				
Catastrophic Terror Costs to US Market Capitalization										
Number Catastrophic Terror Attacks against US Targets	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3
Average Cumulative Abnormal Return	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%
Days to Rebound to Pre-Attack Levels	13	13	13	13	13	13	13	13	13	13
Average Annual Market Growth Rate	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Wilshire 5000 Market Capitalization	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85
Market Value Lost per Attack	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96
Total Market Value Lost	$464.00	$519.68	$582.04	$651.89	$730.11	$243.60	$272.83	$305.57	$342.24	$383.31
Risk Free Interest Lost Over Days to Rebound	$0.73	$0.82	$0.91	$1.02	$1.15	$0.38	$0.43	$0.48	$0.54	$0.60
Total Catastrophic Terror Costs to Interest Lost Over Rebound Period	$0.73	$0.82	$0.91	$1.02	$1.15	$0.38	$0.43	$0.48	$0.54	$0.60
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$0.73	$0.78	$0.84	$0.90	$0.96	$0.38	$0.41	$0.44	$0.47	$0.50
Catastrophic Terror Cost Net Present Value	$4.20					$2.21				
Iranian Costs ($US billions)										
Hezbollah Payment Increase										
Hezbollah Payment Multiple	6.0x	6.0x	6.0x	6.0x	6.0x	8.0x	8.0x	8.0x	8.0x	8.0x
Annual Contribution to Hezbollah	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10
Total Hezbollah Payment Increase	$0.60	$0.60	$0.60	$0.60	$0.60	$0.80	$0.80	$0.80	$0.80	$0.80
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.60	$0.54	$0.48	$0.43	$0.39	$0.80	$0.72	$0.64	$0.57	$0.51
Hezbollah Payment Increase Net Present Value	$2.44					$3.29				
Incremental Defense Budget Increase										
Iranian GDP	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234
GDP Growth	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
% GDP Increase of Defense Budget	5.00%	5.00%	5.00%	5.00%	5.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Total Defense Budget Increase	$9.61	$10.09	$10.59	$11.12	$11.68	$19.22	$20.18	$21.18	$22.24	$23.36
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$9.61	$9.03	$8.49	$7.99	$7.51	$19.22	$18.07	$16.99	$15.97	$15.02
Total Defense Budget Increase Net Present Value	$42.63					$85.28				
Oil Exports Disrupted										
Oil Exports per Year (mbpd x 365/1000) in billions of barrels	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Export Revenues	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49
% Oil Export Revenues Disrupted	2.50%	2.50%	2.50%	2.50%	2.50%	50.00%	50.00%	50.00%	50.00%	50.00%
Total Oil Exports Disrupted	$1.56	$1.56	$1.56	$1.56	$1.56	$31.25	$31.25	$31.25	$31.25	$31.25
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$1.56	$1.40	$1.25	$1.12	$1.00	$31.25	$27.98	$25.06	$22.44	$20.09
Total Oil Export Disruption Net Present Value	$6.34					$126.81				
Imports Disrupted										
Value of Imports	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65
Import Trade Growth	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%
% Imports Disrupted	0.00%	0.00%	0.00%	0.00%	0.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Total Imports Disrupted	$0.00	$0.00	$0.00	$0.00	$0.00	$5.23	$6.43	$7.91	$9.73	$11.97
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$5.23	$5.76	$6.34	$6.99	$7.69
Total Import Disruption Net Present Value	$0.00					$32.01				
Oil Production Disrupted										
Oil Produced per Year (mbpd x 365/1000) in billions of barrels	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Revenues	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21
% Oil Production Revenues Disrupted	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
Total Oil Exports Disrupted	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77	$77.77
Less Oil Exports Disrupted	($1.56)	($1.56)	($1.56)	($1.56)	($1.56)	($31.25)	($31.25)	($31.25)	($31.25)	($31.25)
Net Oil Production Disruption	$76.20	$76.20	$76.20	$76.20	$76.20	$46.52	$46.52	$46.52	$46.52	$46.52
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$76.20	$68.24	$61.11	$54.72	$49.00	$46.52	$41.66	$37.31	$33.41	$29.92
Total Oil Production Disruption Net Present Value	$309.39					$188.81				

	Moderate									
	Unilateral					Multilateral				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Iran Conservative Scenario Assumption										
US Costs ($US billions)										
Catastrophic Terror Costs to Human Capital and Infrastructure										
Number Catastrophic Terror Attacks against US Targets	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
Average Sept. 11 Max Damage Multiple	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x
Sept. 11 Max Damage Cost	$0.00	$0.00	$0.00	$0.00	$0.00	$60.00	$60.00	$60.00	$60.00	$60.00
Total Catastrophic Terror Costs	$0.00	$0.00	$0.00	$0.00	$0.00	$2.88	$2.88	$2.88	$2.88	$2.88
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$2.88	$2.76	$2.64	$2.52	$2.42
Catastrophic Terror Cost Net Present Value	$0.00					$13.21				
Catastrophic Terror Costs to US Market Capitalization										
Number Catastrophic Terror Attacks against US Targets	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
Average Cumulative Abnormal Return	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%
Days to Rebound to Pre-Attack Levels	13	13	13	13	13	13	13	13	13	13
Average Annual Market Growth Rate	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Wilshire 5000 Market Capitalization	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85
Market Value Lost per Attack	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96
Total Market Value Lost	$278.40	$311.81	$349.23	$391.13	$438.07	$139.20	$155.90	$174.61	$195.57	$219.03
Risk Free Interest Lost Over Days to Rebound	$0.44	$0.49	$0.55	$0.61	$0.69	$0.22	$0.24	$0.27	$0.31	$0.34
Total Catastrophic Terror Costs to Interest Lost Over Rebound Period	$0.44	$0.49	$0.55	$0.61	$0.69	$0.22	$0.24	$0.27	$0.31	$0.34
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$0.44	$0.47	$0.50	$0.54	$0.58	$0.22	$0.23	$0.25	$0.27	$0.29
Catastrophic Terror Cost Net Present Value	$2.53					$1.26				
Iranian Costs ($US billions)										
Hezbollah Payment Increase										
Hezbollah Payment Multiple	5.0x	5.0x	5.0x	5.0x	5.0x	6.0x	6.0x	6.0x	6.0x	6.0x
Annual Contribution to Hezbollah	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10
Total Hezbollah Payment Increase	$0.50	$0.50	$0.50	$0.50	$0.50	$0.60	$0.60	$0.60	$0.60	$0.60
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.50	$0.45	$0.40	$0.36	$0.32	$0.60	$0.54	$0.48	$0.43	$0.39
Hezbollah Payment Increase Net Present Value	$2.03					$2.44				
Incremental Defense Budget Increase										
Iranian GDP	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234
GDP Growth	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
% GDP Increase of Defense Budget	2.00%	2.00%	2.00%	2.00%	2.00%	2.50%	2.50%	2.50%	2.50%	2.50%
Total Defense Budget Increase	$3.84	$4.04	$4.24	$4.45	$4.67	$4.80	$5.04	$5.30	$5.56	$5.84
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$3.84	$3.61	$3.40	$3.19	$3.00	$4.80	$4.52	$4.25	$3.99	$3.75
Total Defense Budget Increase Net Present Value	$17.05					$21.32				
Oil Exports Disrupted										
Oil Exports per Year (mbpd x 365/1000) in billions of barrels	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Export Revenues	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49
% Oil Export Revenues Disrupted	1.00%	1.00%	1.00%	1.00%	1.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Total Oil Exports Disrupted	$0.62	$0.62	$0.62	$0.62	$0.62	$6.25	$6.25	$6.25	$6.25	$6.25
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.62	$0.56	$0.50	$0.45	$0.40	$6.25	$5.60	$5.01	$4.49	$4.02
Total Oil Export Disruption Net Present Value	$2.54					$26.36				
Imports Disrupted										
Value of Imports	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65
Import Trade Growth	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%
% Imports Disrupted	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Total Imports Disrupted	$0.00	$0.00	$0.00	$0.00	$0.00	$2.61	$3.22	$3.95	$4.86	$5.98
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$2.61	$2.88	$3.17	$3.49	$3.85
Total Import Disruption Net Present Value	$0.00					$16.00				
Oil Production Disrupted										
Oil Produced per Year (mbpd x 365/1000) in billions of barrels	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Revenues	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21
% Oil Production Revenues Disrupted	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%	40.00%
Total Oil Exports Disrupted	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88	$38.88
Less Oil Exports Disrupted	($0.62)	($0.62)	($0.62)	($0.62)	($0.62)	($6.25)	($6.25)	($6.25)	($6.25)	($6.25)
Net Oil Production Disruption	$38.26	$38.26	$38.26	$38.26	$38.26	$32.63	$32.63	$32.63	$32.63	$32.63
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$38.26	$34.26	$30.68	$27.47	$24.60	$32.63	$29.22	$26.17	$23.43	$20.99
Total Oil Production Disruption Net Present Value	$155.27					$132.49				

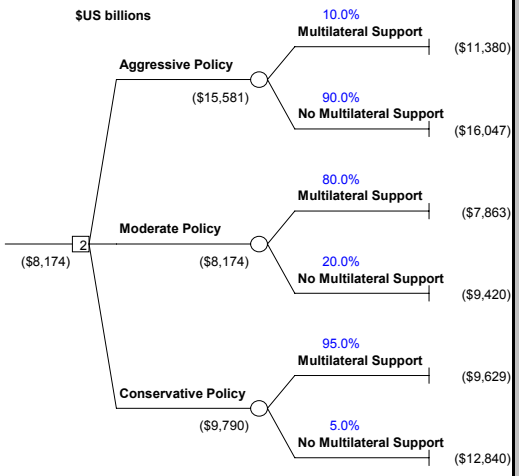
	Conservative									
	Unilateral					Multilateral				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Iran Conservative Scenario Assumption										
US Costs ($US billions)										
Catastrophic Terror Costs to Human Capital and Infrastructure										
Number Catastrophic Terror Attacks against US Targets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Sept. 11 Max Damage Multiple	0.1x	0.1x	0.1x	0.1x	0.1x	0.1x	0.1x	0.1x	0.1x	0.1x
Sept. 11 Max Damage Cost	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00
Total Catastrophic Terror Costs	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Catastrophic Terror Cost Net Present Value	$0.00					$0.00				
Catastrophic Terror Costs to US Market Capitalization										
Number Catastrophic Terror Attacks against US Targets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Cumulative Abnormal Return	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%	-6.69%
Days to Rebound to Pre-Attack Levels	13	13	13	13	13	13	13	13	13	13
Average Annual Market Growth Rate	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Wilshire 5000 Market Capitalization	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85	$13,004.51	$14,565.05	$16,312.86	$18,270.40	$20,462.85
Market Value Lost per Attack	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96	$870.00	$974.40	$1,091.33	$1,222.29	$1,368.96
Total Market Value Lost	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Risk Free Interest Lost Over Days to Rebound	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Catastrophic Terror Costs to Interest Lost Over Rebound Period	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Risk Free Discount Rate	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%	4.50%
Discount Factor	1.00	0.96	0.92	0.88	0.84	1.00	0.96	0.92	0.88	0.84
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Catastrophic Terror Cost Net Present Value	$0.00					$0.00				
Iranian Costs ($US billions)										
Hezbollah Payment Increase										
Hezbollah Payment Multiple	2.0x	2.0x	2.0x	2.0x	2.0x	3.0x	3.0x	3.0x	3.0x	3.0x
Annual Contribution to Hezbollah	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10
Total Hezbollah Payment Increase	$0.20	$0.20	$0.20	$0.20	$0.20	$0.30	$0.30	$0.30	$0.30	$0.30
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.20	$0.18	$0.16	$0.14	$0.13	$0.30	$0.27	$0.24	$0.22	$0.19
Hezbollah Payment Increase Net Present Value	$0.81					$1.22				
Incremental Defense Budget Increase										
Iranian GDP	$192	$202	$212	$222	$234	$192	$202	$212	$222	$234
GDP Growth	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
% GDP Increase of Defense Budget	1.00%	1.00%	1.00%	1.00%	1.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Total Defense Budget Increase	$1.92	$2.02	$2.12	$2.22	$2.34	$3.84	$4.04	$4.24	$4.45	$4.67
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$1.92	$1.81	$1.70	$1.60	$1.50	$3.84	$3.61	$3.40	$3.19	$3.00
Total Defense Budget Increase Net Present Value	$8.53					$17.05				
Oil Exports Disrupted										
Oil Exports per Year (mbpd x 365/1000) in billions of barrels	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855	0.9855
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Export Revenues	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49	$62.49
% Oil Export Revenues Disrupted	1.00%	1.00%	1.00%	1.00%	1.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Total Oil Exports Disrupted	$0.62	$0.62	$0.62	$0.62	$0.62	$3.12	$3.12	$3.12	$3.12	$3.12
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.62	$0.56	$0.50	$0.45	$0.40	$3.12	$2.80	$2.51	$2.24	$2.01
Total Oil Export Disruption Net Present Value	$2.54					$12.69				
Imports Disrupted										
Value of Imports	$52.28	$64.30	$79.09	$97.28	$119.65	$52.28	$64.30	$79.09	$97.28	$119.65
Import Trade Growth	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%
% Imports Disrupted	0.00%	0.00%	0.00%	0.00%	0.00%	2.50%	2.50%	2.50%	2.50%	2.50%
Total Imports Disrupted	$0.00	$0.00	$0.00	$0.00	$0.00	$1.31	$1.61	$1.98	$2.43	$2.99
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$0.00	$0.00	$0.00	$0.00	$0.00	$1.31	$1.44	$1.59	$1.75	$1.92
Total Import Disruption Net Present Value	$0.00					$8.00				
Oil Production Disrupted										
Oil Produced per Year (mbpd x 365/1000) in billions of barrels	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533	1.533
Price per Barrel (4 January 2006)	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41	$63.41
Total Revenues	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21	$97.21
% Oil Production Revenues Disrupted	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Total Oil Exports Disrupted	$19.44	$19.44	$19.44	$19.44	$19.44	$19.44	$19.44	$19.44	$19.44	$19.44
Less Oil Exports Disrupted	($0.62)	($0.62)	($0.62)	($0.62)	($0.62)	($3.12)	($3.12)	($3.12)	($3.12)	($3.12)
Net Oil Production Disruption	$18.82	$18.82	$18.82	$18.82	$18.82	$16.32	$16.32	$16.32	$16.32	$16.32
Risk Free Discount Rate	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%	11.67%
Discount Factor	1.00	0.90	0.80	0.72	0.64	1.00	0.90	0.80	0.72	0.64
Discounted Cash Flow	$18.82	$16.85	$15.09	$13.51	$12.10	$16.32	$14.61	$13.08	$11.72	$10.49
Total Oil Production Disruption Net Present Value	$76.37					$66.22				

United States-Iran Policy Cost Matrix for Strategic Adjustment Case

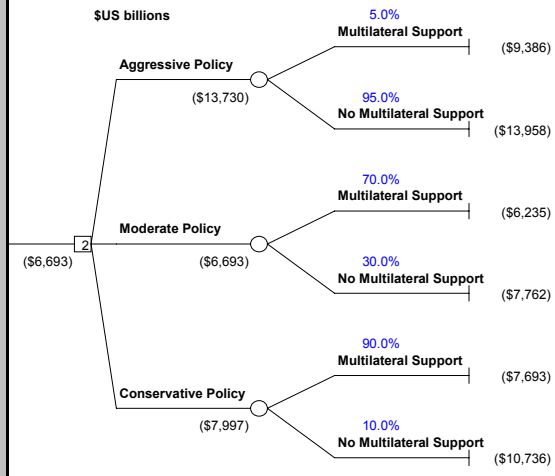
	United States Policy Scenarios					
	Aggressive		Moderate		Conservative	
	Unilateral	Multilateral	Unilateral	Multilateral	Unilateral	Multilateral
Iran Aggressive Scenario Assumption						
US Costs ($US billions)						
Catastrophic Terror Costs to Human Capital and Infrastructure	$550.5	$385.4	$110.1	$55.1	$619.3	$412.9
Strait of Hormuz Disruption Cost	$489.1	$489.1	$306.3	$306.3	$208.6	$208.6
Other Iran War Costs	$15,000.0	$10,500.0	$9,000.0	$7,500.0	$12,000.0	$9,000.0
Incremental Interest Lost to Market Effects of Terrorism	$7.9	$5.5	$3.2	$1.6	$11.8	$7.9
Total US Cost	$16,047.5	$11,379.9	$9,419.5	$7,862.9	$12,839.8	$9,629.4
Iranian Costs ($US billions)						
Hezbollah Payment Increase	$4.1	$4.9	$4.1	$4.9	$4.1	$4.9
Incremental Defense Budget Increase	$170.5	$213.2	$110.8	$170.5	$76.7	$170.5
Oil Exports Disrupted	$0.0	$126.8	$31.7	$63.4	$12.7	$31.7
Imports Disrupted	$0.0	$64.0	$0.0	$32.0	$0.0	$16.0
Oil Production Disrupted	$315.6	$188.8	$165.6	$66.6	$145.1	$126.1
Incremental Cost of Rebuilding Iranian Nuclear Program	$1.0	$1.0	$1.0	$1.0	$1.0	$1.0
Total Iran Cost	$491.2	$598.7	$313.2	$338.4	$239.6	$350.2
Iran Moderate Scenario Assumption						
US Costs ($US billions)						
Catastrophic Terror Costs to Human Capital and Infrastructure	$146.8	$77.1	$51.4	$25.7	$123.9	$82.6
Strait of Hormuz Disruption Cost	$306.3	$306.3	$208.6	$208.6	$106.6	$106.6
Other Iran War Costs	$13,500.0	$9,000.0	$7,500.0	$6,000.0	$10,500.0	$7,500.0
Incremental Interest Lost to Market Effects of Terrorism	$5.3	$2.8	$2.1	$1.1	$5.9	$3.9
Total US Cost	$13,958.3	$9,386.1	$7,762.1	$6,235.4	$10,736.4	$7,693.1
Iranian Costs ($US billions)						
Hezbollah Payment Increase	$3.2	$3.7	$2.4	$2.8	$1.2	$2.0
Incremental Defense Budget Increase	$85.3	$127.9	$34.1	$42.6	$17.1	$34.1
Oil Exports Disrupted	$12.7	$190.2	$25.4	$76.1	$12.7	$31.7
Imports Disrupted	$0.0	$64.0	$0.0	$32.0	$0.0	$16.0
Oil Production Disrupted	$315.6	$188.8	$165.6	$66.6	$145.1	$126.1
Incremental Cost of Rebuilding Iranian Nuclear Program	$1.0	$1.0	$1.0	$1.0	$1.0	$1.0
Total Iran Cost	$417.8	$575.6	$228.5	$221.2	$177.1	$210.9
Iran Conservative Scenario Assumption						
US Costs ($US billions)						
Catastrophic Terror Costs to Human Capital and Infrastructure	$88.1	$46.2	$0.0	$13.2	$0.0	$0.0
Strait of Hormuz Disruption Cost	$208.6	$208.6	$106.6	$106.6	$0.0	$0.0
Other Iran War Costs	$10,500.0	$7,500.0	$4,500.0	$3,000.0	$7,500.0	$6,000.0
Incremental Interest Lost to Market Effects of Terrorism	$4.2	$2.2	$2.5	$1.3	$0.0	$0.0
Total US Cost	$10,800.9	$7,757.1	$4,609.1	$3,121.1	$7,500.0	$6,000.0
Iranian Costs ($US billions)						
Hezbollah Payment Increase	$2.4	$3.2	$2.0	$2.4	$0.8	$1.2
Incremental Defense Budget Increase	$42.6	$85.3	$17.1	$21.3	$8.5	$17.1
Oil Exports Disrupted	$6.3	$126.8	$2.5	$25.4	$2.5	$12.7
Imports Disrupted	$0.0	$32.0	$0.0	$16.0	$0.0	$8.0
Oil Production Disrupted	$309.3	$188.8	$155.3	$132.4	$76.4	$66.2
Incremental Cost of Rebuilding Iranian Nuclear Program	$1.0	$1.0	$1.0	$1.0	$1.0	$1.0
Total Iran Cost	$361.7	$437.1	$177.9	$198.6	$89.2	$106.2

Decision Analysis for US Policy Options vs. Iranian Response for Strategic Adjustment

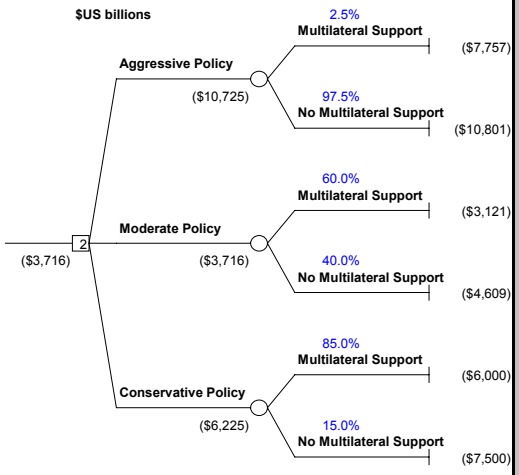
Aggressive Iranian Policy



Moderate Iranian Policy

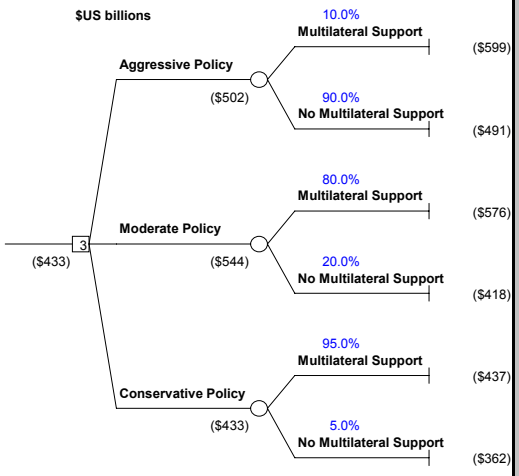


Conservative Iranian Policy

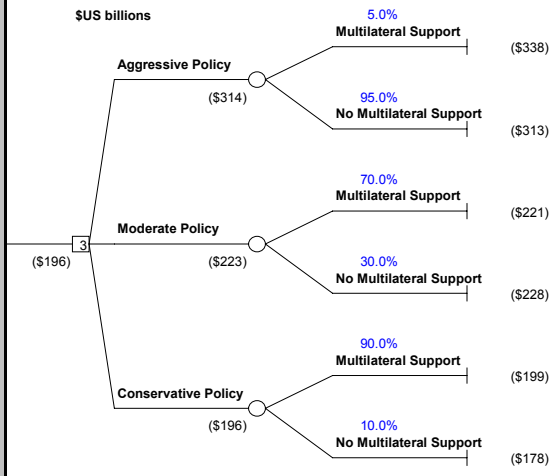


Decision Analysis for Iran Response Options vs. US Policy for Strategic Adjustment

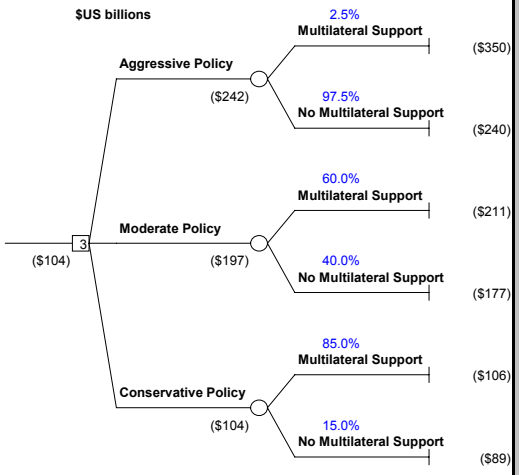
Aggressive US Policy



Moderate US Policy



Conservative US Policy



United States-Iran Policy Game Theoretic Strategic Matrix for Strategic Adjustment Case
$US Billions

		United States Strategy		
		Aggressive	Moderate	Conservative
Iranian Strategy	Aggressive	($15,581) ($502)	($8,174) ($314)	($9,790) ($242)
	Moderate	($13,730) ($544)	($6,693) ($223)	($7,997) ($197)
	Conservative	($10,725) ($433)	($3,716) ($196)	($6,225) ($104)

United States-Iran Policy Game Theoretic Strategic Matrix for Strategic Adjustment Case
$US Billions

		United States Strategy		
		Aggressive	Moderate	Conservative
Iranian Strategy	Aggressive	($15,581) ($502)	($8,174) ($314)	($9,790) ($242)
	Moderate	($13,730) ($544)	($6,693) ($223)	($7,997) ($197)
	Conservative	($10,725) ($433)	($3,716) ($196)	($6,225) ($104)

Dominant Iranian Strategy

United States-Iran Policy Game Theoretic Strategic Matrix for Strategic Adjustment Case
$US Billions

		United States Strategy		
		Aggressive	Moderate	Conservative
Iranian Strategy	Aggressive	($15,581) ($502)	($8,174) ($314)	($9,790) ($242)
	Moderate	($13,730) ($544)	($6,693) ($223)	($7,997) ($197)
	Conservative	($10,725) ($433)	($3,716) ($196)	($6,225) ($104)

US Dominant Strategy