“Do sanctions work? A look at Iran and Iranian oil production.”

By

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Abstract[1]

This paper intends to explore and quantify the effects of trade barriers. Specifically, the paper will focus on the sanctions that America has placed on Iran and their effects on oil prices and the Iranian economy. Our focus on Iran's oil sector is driven by the fact that it accounts for over 20% of Iran's GDP and 80% of its government revenue.[2] It is also driven by the increasing global need for further energy supplies, as prices have doubled since 2008.[3] Iran is currently producing roughly 1.54 billion barrels of oil a year (4,216MM bbl/day) and is OPEC's second-largest oil producer and the fourth-largest crude oil exporter in the world.[4] The United States is considering placing more restrictive sanctions on Iran; however, this paper shows that access to Iranian oil supplies would help decrease global oil prices. Furthermore, the analysis shows that if foreign oil companies are allowed to enter into Iran, their efficient oil-lifting technologies, coupled with Iran's access to modern oilfield equipment, could expand oil production revenue in Iran by more than 17% of GDP.

Research Questions

1. How have sanctions placed on Iran by America affected the energy sector of Iran, specifically with regard to oil production and refining capacity?
2. How has the overall Iranian economy been affected by the sanctions?

[1] I am extremely grateful to Professor Joseph Foudy for his insight, guidance and feedback throughout the year and to Professor Marti G. Subrahmanyam for his advice and investment into the Honors Program. Special thanks to Alexandra Lazar for helping me edit this paper. All errors herein are my own.
[2] Congressional Research Service: "Iran Sanctions", February 3, 2011 http://fpc.state.gov/documents/organization/156527.pdf
[3] Table 11 – "Spot Crude Oil Prices since 1978."
[4] Table 4 – "2009 Snapshot"

3. Can the sanctions be considered successful?

Hypothesis

1. The energy sector of Iran has been negatively affected by the sanctions—the lower production output and refining capacity has led to higher global oil prices.
2. The sanctions have negatively affected the Iranian economy, by contributing to the current Iranian government's mismanagement of the country.
3. The sanctions have not been successful, since they have not induced any policy changes within the current Iranian government.

This paper will first provide background information on American-Iranian relations as well as on sanctions. Then, it will quantify the effects of the sanctions placed on Iran by examining the loss in foreign direct investment (FDI) and its subsequent effect on Iran's oil output. This will be demonstrated by examining shifts in oil production, refining capacity and oil exports. Furthermore, this paper will conduct a comparable analysis on other oil producing countries to quantify where Iran's oil output should be. This will then be used to quantify the costs to the Iranian energy sector.

This paper will also discuss the effects of the trade embargo on Iran as a whole and where Iran is today. This will be done by comparing the GDP growth since 1979 of comparable countries to quantify where Iran's economy should be. This paper will then explore the role of the Iranian Revolutionary Guard, its mismanagement of the economy and the inefficiencies that have resulted. This paper will conclude by exploring whether or not the sanctions are successful.

Iran Background Information

The breakdown in economic relations between Iran and the United States is rooted as far back as the post-World War II era. In 1953, the U.S. helped overthrow the democratically elected Iranian Prime Minister Mohammed Mossadeq for political reasons stemming from the fear of communism.[5] Following the coup, the United States backed the Shah politically and financially.[6] The Shah's rapid Westernization of Iran and the support he received from America angered the radical Islamic population.

The 1979 Iranian Revolution led to the overthrow and exile of the Shah, who was pro-American. He was replaced by Ayatollah Khomeini, a radical Muslim leader who espoused anti-American sentiments. The Shah's exile led to the 1979 Iran hostage crisis as Islamic revolutionaries wished to extradite and execute him.

On November 4, 1979, Iranian students attacked the American embassy and took 52 U.S. diplomats hostage in violation of international law.[7] The hostages were held for 444 days.[8] This greatly angered the American public since historically, diplomats had immunity from arrest and any diplomatic compounds were considered sovereign regardless of the country in which they existed.

[5] Congressional Research Service: "Iran Sanctions", February 3, 2011 http://fpc.state.gov/documents/organization/156527.pdf
[6] Ibid
[7] Ibid
[8] Ibid

The crisis led to lasting economic and diplomatic damage. On April 7, 1980, the United States broke diplomatic relations with Iran, a rift which has yet to be restored.[9] Commercial relations between Iran and the United States are heavily restricted by sanctions—commerce between the two countries consists only of Iranian purchases of food, spare parts and medical products and U.S. purchases of rugs and food. These sanctions have been ongoing for more than thirty years on the basis that Iran poses an "unusual and extraordinary threat" to U.S. national security.[10]

In 1996, the Iran and Libya Sanctions Act (ILSA) was passed by the U.S. Congress. The act prohibits U.S. companies and their foreign subsidiaries from conducting business with Iran, in addition to banning any "contract for the financing of the development of petroleum resources located in Iran."[11] In addition, the U.S. imposes mandatory and discretionary sanctions on non-U.S. companies (entities, persons) investing more than $20 million annually in the Iranian oil and natural gas sectors.[12] The sanctions are effective until December 31, 2011.[13]

The act requires the President to enforce at least two out of seven sanctions on foreign companies that do not comply:[14]

1. "Denial of Export-Import Bank loans, credits, or credit guarantees for U.S. exports to the sanctioned entity.
2. Denial of licenses for the U.S. export of military or militarily-useful technology to the entity.

[9] Ibid
[10] Congressional Research Service: "Iran Sanctions", February 3, 2011 http://fpc.state.gov/documents/organization/156527.pdf
[11] Ibid
[12] Ibid
[13] Ibid
[14] Ibid

3. Denial of U.S. bank loans exceeding $10 million in one year to the entity.
4. If the entity is a financial institution, a prohibition on its service as a primary dealer in U.S. government bonds; and/or a prohibition on its serving as a repository for U.S. government funds (each counts as one sanction).
5. Prohibition on U.S. government procurement from the entity.
6. Restriction on imports from the entity, in accordance with the International Emergency Economic."

As the sanctions have become more stringent against Iran, they have spread to other Organisation for Economic Co-operation and Development (OECD) countries and Asian countries who wish to comply with U.S. Policy.[15] On the financing side, in December of 2010, Intesa Sanpaolo stopped its dealings with Iran.[16] It was the last Italian bank to provide financing to Iran. Furthermore, India's central bank recently stopped all payments to Iran through its clearinghouse system, which was used by Iran's energy sector.[17] Sanctions such as these have caused banking transactions to becoming extremely difficult for Iran, as fewer options are available to the country to finance its trade.

As for exports, Tupras (Turkey's largest industrial enterprise) cancelled all of its gasoline export contracts in October 2010 following pressure from the U.S.[18] Even other OPEC countries like the United Arab Emirates (UAE) have begun imposing sanctions, freezing bank accounts and

[15] Congressional Research Service: "Iran Sanctions", February 3, 2011 http://fpc.state.gov/documents/organization/156527.pdf
[16] Ibid
[17] Ibid
[18] Ibid

blacklisting Iranian entities.[19] South Korea also suspended transactions with Iranian banks for two months and restricted foreign exchange deals with Iran.[20]

Below is the chronology of sanctions on Iran[21]:

	United States Sanctions
1979	Ban on US-Iran trade after Iranian students stormed the US embassy and took diplomats hostage. No Imports of goods and services from Iran, either directly or through third countries, with minimal exceptions.
1995	President Bill Clinton issues executive orders to prevent US Companies from investing in Iranian oil & gas companies. The US government imposes sanctions on foreign firms investing more than US$20MM/year in Iran.
Sept. 2006	Congress extends sanctions on foreign firms for five years. Many foreign firms curtail their operations in Iran.
Oct. 2007	Sanctions imposed on Bank Melli, Bank Mellat & Bank Saderat. Iranian Revolutionary Guards (IRG) branded as proliferators of Weapons of Mass Destruction.
Oct. 2009	US Treasury enforces sanctions on Bank Mellat in Malaysia and its Chairman.
2010	US Treasury attempts to cut of Post Bank of Iran (16th Iranian Bank) from the international financial system by branding it as a proliferator US Treasury identifies 20 petroleum & petrochemical companies that are under Iranian government control that go of limits to US businesses under a general trade embargo. New unilateral sanctions aimed at Iran's energy & banking sectors, aimed at hurting companies from other countries going into business with Iran. Legalization passed to sanction companies from supplying Iran with refined petroleum products (with a fair market value of greater than $1MM or the aggregate fair market value over 12 months > $5M). Companies failing to abide may be banned from the US financial system or denied US contracts. The legislation also imposes sanctions on international banking institutions involved with Iran's IRG - foreign banks doing business with Iranian banks/IRG will be deprived access to the US financial system.
Aug. 2010	US sanctions prevent delivery of five passenger jets to Iran from Russia.
Nov.2010	The US announces new sanctions on Iran's shipping lines.
Dec. 2010	Obama administration talks about introducing new sanctions to increase pressure on Tehran.
	United Nations Sanctions
Dec. 2006	*Sensitive nuclear materials* - Assets of Iranian individuals/companies linked to its nuclear program are frozen and Iran given 60 days to suspend uranium enrichment.
Mar. 2007	*New arms and financial sanctions* - Assets of 28 more groups/companies/individuals engaged in nuclear work are frozen, including Bank Sepah & firms controlled by the IRG.
Mar. 2008	*Travel and financial curbs* - Travel curbs on all previous individuals/companies Partial ban on trade in items sold (including technology) to Iran. 13 individuals and 12 companies added to sanctions
Sep. 2008	The UN Security Council adopts a resolution ordering Iran to halt enrichment. The UN arms embargo extended against Tehran. The firms controlled by the Islamic Republic of Iran Shipping Lines and 15 IRGs blacklisted. Introduced talks over cargo inspection regime similar to that of North Korea.
Jun. 2010	40 new companies added to the existing UN blacklist of firms, including shopping entities (introduced inspection of cargo on ships). More financial restrctions between Iranian banks and the international community.
	European Union Sanctions
Oct. 2009	Visa bans on senior officials from Revolutionary Guards and top nuclear and ballistic experts. UK freezes business ties with Bank Mellat and Islamic Republic of Iran Shipping Lines.
Jul. 2010	New sanctions by EU on trade, transport sector and key sectors of oil & gas industry. Energy sector sanctions prohibit new investments, technical assistance and transfer of technologies, equipment and services, in refining, liquefactions and LNG technology. Extra sanctions approved focused on oil & gas investments and halting dealings with Iranian banks and insurance companies.
Oct. 2010	Turkey cancels all gasoline contracts with Iran.
Dec. 2010	The UK shut down its North Sea Rhum gas field due to sanctions Iran.
	Australia Sanctions
Jul-10	The Australian government announces new sanctions against Iran.
	Asia Sanctions
Aug. 2010	Following UN lead, Japan imposes sanctions against Iran, and further enforces new ones in September 2010 targeting banks & investments.
Sep. 2010	South Korea blacklists 102 companies and 24 individuals, including Iran's Bank Mellat, as part of its sanctions.
Dec. 2010	India stops all payments via clearinghouse for oil trade with Iran, and looks for alternatives.

[19] Ibid
[20] Ibid
[21] Nomura Equity Research – Michael Lo CFA and Cheng Khoo

Sanctions Background Information

There are two types of sanctions that are employed by governments: trade and economic. Trade sanctions remove what the United States calls "preference programs," which are basic privileges, such as the Most Favored Nation trade status given to all friendly countries.[22] For example, the United States has imposed trade sanctions on nations that close their markets to U.S. goods (China), sell arms to hostile regimes (Pakistan), and violate human rights (Myanmar).[23] Trade sanctions are reprimands, tailored to reform a sanctioned country's behavior without completely alienating it.

If trade sanctions fail, the government can adopt economic sanctions, which do aim to alienate. Economic sanctions can comprise of trade barriers or embargoes, bans on both cash transfers and loans from American financial institutions, and measures that prohibit access to American assets. Economic sanctions can essentially strangle an economy.[24]

Political Effectiveness of Sanctions

Gary Hufbauer, Jeffrey Schott, Kimberly Elliott and Barbara Oegg believe that a sanction "works" if it accomplishes the goals set by United States policy-makers at the onset of its implementation, such as ending apartheid in South Africa or undermining Libya's support of

[22] Economic Sanctions Reconsidered: Gary Haufbauer, Jeffery Schott, Kimberly Elliot Barbara Oegg - http://bookstore.piie.com/book-store/4082.html
[23] Ibid
[24] Ibid

terrorism. By examining 204 sanction programs by policy goals, their study estimates sanctions have succeeded 34 percent of the time.[25]

Policy Goal	Success Cases	Failure Cases	Total	Success Ratio (percent of total)
Modest policy changes	22	21	43	51%
Regime change and democratization	25	55	80	31%
Disruption of military adventures	4	15	19	21%
Military impairment	9	20	29	31%
Other major policy changes	10	23	33	30%
All cases	**70**	**134**	**204**	**34%**

They believe there are several reasons that account for why sanctions often do not work. First, they believe that sanctions rarely achieve foreign policy goals that depend on persuading the target country to take actions it firmly opposes. Furthermore, in some cases, the target country's costs associated with obeying are higher than the negative effects of the sanction. Second, they classify sanctions that were used mainly for political or other rhetorical purposes, and therefore lacked a primary policy goal, as failures. Third, they believe that sanctions can have conflicting goals with regard to relations with the target country. Using the basis of their findings, it is clear that sanctions against Iran have failed—they have not impeded the determination of Iran's revolutionary government to pursue a nuclear weapons program.

Traditional Economic Analysis of Sanctions

Sanctions are used to impose economic penalties in order to pressure the sanctioned country to alter its policies. The costs have to be great enough or else they will fail to bring about any change. Essentially, the economic penalties or costs (actual or threatened) determine the success

[25] Ibid

or failure of sanctions. There are many elaborate theoretical models created by economists to analyze the costs and predict its effect on the sanctioned country's subsequent actions. Hufbauer and his colleagues believe in using a simple model.

To calculate the cost of sanctions, they estimate the initial deprivation of markets, supplies or finance expressed on an annualized basis in current U.S. dollars.[26] To calculate the welfare loss to a sanctioned country's economy, they estimate a "sanctions coefficient" that is different for every sanction program, since some countries are affected more than others due to the varying availability of other markets or substituted goods.[27]

Quantifying the Economic Effects of the Sanctions

By looking at the data, we see that per capita GDP in the region has not grown much since 1978, due to external factors. Therefore, foreign direct investment (FDI) is a better indicator of the direct economic effects of the sanctions placed on Iran, which in turn has led to a stagnant per capita GDP in the past 30 years.[28] Foreign direct investment (FDI) in Iran is only 7% of GDP; such limited foreign direct investment is well below the average for developing countries today, as the average for OPEC countries is 23%.[29] Looking at tables 3 and 4, we see that Iran is the only OPEC country that has less oil production in 2009 than in 1979. This can be contributed to the FDI drought that Iran has been facing for over 30 years due to the U.S. sanctions as well as subsequent insular and self-reliant policies. For example, looking at Saudi Arabia, its average daily production of oil grew by 7.2% since 1979, and in 2009, it had FDI that equaled 40% of

[26] Economic Sanctions Reconsidered: Gary Haufbauer, Jeffery Schott, Kimberly Elliot Barbara Oegg - http://bookstore.piie.com/book-store/4082.html
[27] Ibid
[28] Table 1 & 2 – "1978 & 2009 Snapshots"
[29] Table 5 & 6 - "1978 & 2009 Snapshots"

GDP. At the same time, Iran's average daily production declined by 20.5% with 2009's FDI equaling 7% of GDP.

Iran has encouraged international oil companies to participate in oil exploration and development projects by extending buyback contracts to foreign firms in order to stimulate further exploration of its untapped reserves and upgrading of mature oil fields.[30] Because foreign ownership is prohibited, these contracts reward participating foreign firms with production based compensation fees over a certain period of time. Essentially, these contracts allow foreign firms to provide assets, such as plants, machinery, and technology, in exchange for the production based fees. There are several reasons, such as Iran's FDI climate and risky geopolitical situation, which have made these arrangements unsuccessful, especially in attracting U.S. and E.U. oil companies. Furthermore, the Heritage Foundation and Wall Street Journal's *2011 Index of Economic Freedom* gave Iran a foreign investment freedom rating of 0 percent.[31] This falls far below the world average of 50 percent.[32]

The non-existent foreign investment freedom is also evidenced by Iran's actions in current oil dealings (an example of economic mismanagement). For example, in 2006 they forcibly seized a Romanian-owned oil rig that was operating in the Persian Gulf after there was a contractual dispute.[33] Very few companies have taken the major risks of investing in Iran, which has left the oil industry in demise. According to the U.S. Energy Information Administration, Iran has been unable to match its production in 1974 (6 million barrels per day of crude oil) because of the

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[31] 2011 Economic Index of Freedom: Iran - http://www.heritage.org/Index/Country/Iran

[32] Ibid

[33] Financial Times: "Iranian military seizes Romanian oil rig in Persian Gulf in murky incident" - http://www.ft.com/cms/s/529a366a-321d-11db-ab06-0000779e2340.html

high decline rate in its mature oil fields, the result of limited investment associated with U.S. economic sanctions.[34] Furthermore, the Administration reports:

> "Iran produced over 5 million bbl/d of oil in 1978, but since the 1979 revolution a combination of war, limited investment, sanctions, and a high rate of natural decline in Iran's mature oil fields have prevented a return to such production levels. Iran's fields have a natural annual decline rate estimated at 8 percent onshore and 11 percent offshore, with recovery rates at 20-25 percent. An estimated 400,000-700,000 bbl/d of crude production is lost annually due to declines in the mature oil fields. To offset natural decline rates, Iran's oil fields require structural upgrades including enhanced oil recovery efforts such as natural gas injection."[35]

Furthermore, according to Kenneth Katzman, a specialist in Middle Eastern Affairs at the Congressional Research Service, Iran's onshore oil fields and oil industry infrastructure are aging and need substantial investment.[36] It has 940 trillion cubic feet of natural gas resources (second only to Russia), but they have remained largely undeveloped since the sanctions have been enacted.[37]

[34] U.S. Energy Information Administration (EIA): Iran - http://www.eia.doe.gov/countries/cab.cfm?fips=IR
[35] U.S. Energy Information Administration (EIA): Iran - http://www.eia.doe.gov/countries/cab.cfm?fips=IR
[36] Congressional Research Service: "Iran Sanctions", February 3, 2011 http://fpc.state.gov/documents/organization/156527.pdf
[37] Ibid

Examining and Estimating the Costs

- Estimated Loss in oil revenue for Iran
  - Upper Bound: $36.5BN
  - Lower Bound: $9.13BN
- Estimated Loss in natural gas revenue for Iran
  - Upper Bound: $21.9BN
  - Lower Bound: $5.48BN

The upper and lower bounds are estimating an added 500k or 2MM bbl/d, which would achieve a similar growth rate in production to Iran's comparable oil-producing countries[38]. For oil revenue, we estimated a spot price of $100, and for natural gas revenue, we estimated a spot price of $4. After taking into consideration production and refining costs, as well as price fluctuations due to added supply, we used a conservative estimate of $50 for oil profit per bbl and $3 for natural gas profit per bbl. Together, the added revenue for oil and natural gas make up 4.2% to 17.3% of Iran's GDP.

Moreover, Wall Street analysts believe that recent sanctions will lower exports and further impact oil output in Iran. They estimate that U.S. sanctions have cost Iran as much as $50 to $60BN (15% of GDP) in lost energy investments.[39] The losses will continue to increase as countries, such as Japan and India, have recently followed the U.S. and have placed sanctions on

[38] Table 7 – "1978 to 2009 OPEC average daily oil production (Thousands BBL/Day)"
[39] Nomura Equity Research – Michael Lo CFA and Cheng Khoo

Iran.[40] Thus, they believe that the average daily production will continue to fall to 3.34 million barrels a day (bbl/d) by 2015.[41] This will further increase the loss of oil and gas revenue for Iran.

Iran's refining capacity is low, especially in comparison to its oil production.[42] This is evidenced by the fact that it must import refined oil from other countries. This becomes a further added cost to Iran, as it would cost Iran less if it had the refining capacity to match its production. The sanctions amplify this cost as there is now a limit on how much refined oil any country can sell to Iran (fair market value of $1MM per year).[43]

Furthermore, oil revenue from exports in Iran has been shrinking since 1979. The more stringent U.S. sanctions have caused other countries to stop buying refined Iranian oil. For example, in 2008 Switzerland's EGL Group, a utility company, was criticized by the United Sates for planning to buy 194 trillion cubic feet per year of Iranian gas for 25 years.[44] Switzerland's EGL was not violating any of the U.S. sanctions, as this was a purchase of Iranian gas and not for exploration and development. Nevertheless, the U.S. criticized the deal as sending the "wrong message" to Iran.[45] Because Switzerland feared what the U.S. might do, it cancelled its contract with Iran.[46]

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[40] Ibid
[41] Nomura Equity Research – Michael Lo CFA and Cheng Khoo
[42] Table 10 - Iran Avg. Daily Oil Production vs. Oil Refining Capacity since 1978
[43] Congressional Research Service: "Iran Sanctions", February 3, 2011 http://fpc.state.gov/documents/organization/156527.pdf
[44] Ibid
[45] Ibid
[46] Ibid

Effect of Sanctions on Iran's Economy Today

As a result of the sanctions, Iran's Revolutionary Guard (IRG) has taken an even larger role in its economy, which has played a significant role in discouraging domestic investment. According to the Heritage Foundation and Wall Street Journal's *2011 Index of Economic Freedom,* the incident in 2006 during which Iran seized the Romanian oil rig over contractual disputes was not unexpected. The Index reports on the IRG's foreign investment policies:

> "Foreign investment is restricted or banned in many industries, including banking, telecommunications, transport, oil, and gas. Foreign investments require approval, and the process is not straightforward. The method of calculating the maximum share that foreign-owned entities are allowed can be non-transparent. The parliament can veto projects in which foreign investors have a majority stake. Political unrest and uncertainty over international sanctions further deter investment. Most payments, transfers, credit operations, and capital transactions are subject to restrictions or approval requirements. Only legal permanent residents of Iran may purchase land. Foreign companies may own property only if they are registered both in Iran and in their respective countries and make the purchase using their Iranian business identity."[47]

Furthermore, the Iranian government subsidizes oil prices domestically, which encourages over-consumption and eats into potential revenue from exports. Natural gas sells for just $.10/litre for the first 60 litres every month, which equates to roughly a $100BN subsidy (30% of GDP) in

[47] 2011 Economic Index of Freedom: Iran - http://www.heritage.org/Index/Country/Iran

Iran.[48] The has led to a surge in over-consumption—for example, domestic Iranian oil consumption in 2009 was 1.7MM bbl/d; whereas, Algeria, which has a similar per capita GDP, had domestic oil consumption of 299K bbl/d.[49] In fact, Iran is the third largest consumer of natural gas (after the U.S. and Russia).[50]

The Iranian government is also ineffective in preventing oil from being smuggled out of Iran. Each year, more than five billion litres of fuel and oil products are smuggled out of the country, costing Iran over $1BN every year.[51] This essentially creates a "subsidy" for other countries at the expense of the Iranian economy.

Despite Iran's vast wealth of proven reserves of both crude oil and natural gas, Iran is one of the least prosperous OPEC countries. With a per capita income of $4,565, it is way below the OPEC average of $17,595.[52] These are some of the main reasons that this is so.

Executive Summary

The U.S. sanctions placed on Iran have led to a global restriction on FDI within Iran. The evidence greatly suggests that this has prevented Iran's energy sector from upgrading and maintaining its maturing oil fields, exploring new oil fields and matching its refining capacity to its oil production. The sanctions have restricted global trade with Iran, specifically, supplying Iran with oil or financing Iran. Furthermore, the analysis shows that if foreign oil companies are allowed to enter into Iran, their efficient oil-lifting technologies, coupled with Iran's access to

[48] Nomura Equity Research – Michael Lo CFA and Cheng Khoo
[49] U.S. Energy Information Administration (EIA): Algeria & Iran - http://www.eia.doe.gov/countries/
[50] CIA – The World Factbook - https://www.cia.gov/library/publications/the-world-factbook/geos/ir.html
[51] The Dawn: "$1bn oil smuggled out annually: Iran" - http://archives.dawn.com/2005/01/25/ebr8.htm
[52] Table 2 - 2009 Snapshot

modern oilfield equipment, could expand oil production revenue in Iran by more than 17% of GDP. This has not only hurt Iran but the United States as well. The removal of the U.S. sanctions would expand Iran's oil production and lead to lower oil spot prices.

Furthermore, the sanctions have led to a greater surge of power to the Iranian government in domestic matters. There has been great economic mismanagement, as evidenced in this paper, which has led to further discouragement of foreign investment, decreasing oil output and revenue. Furthermore, the IRG's policies encourage massive domestic overconsumption of oil, and they are inefficient in preventing oil from being smuggled out to other countries, decreasing the government's profits from oil exports.

By following Hufbauer's definition of a successful sanction, the paper shows that these sanctions are not successful because the costs incurred by Iran have not altered its policies. One reason could be that the costs are exaggerated. For example, when looking at the cost of importing refined oil, Gary Hufbauer believes that smugglers will continue to keep Iran supplied with refined gasoline—"Short of blockading the Persian Gulf, the Straits of Hormuz, it will come through."[53] This is one reason that the sanctions have failed in altering Iran's policies because the costs are not high enough for Iran to force Iran to alter its policies. However, Iran only spends approximately $7BN a year on defense—that is only 1.8% of GDP.[54] The costs illustrated above incurred by Iran naturally limit what Iran can spend on defense, slowing down Iran's nuclear program.

[53] Marketplace: "Will House sanctions work on Iran?" - http://marketplace.publicradio.org/display/web/2009/12/16/am-iranian-oil/
[54] Payvand Iran News: "Iran's defense spending 'a fraction of Persian Gulf neighbors," http://www.payvand.com/news/06/jun/1011.html

Going forward, the Iran Sanctions Act is only effective till the end of this year (December 31, 2011). The United States is considering placing more restrictive sanctions on Iran; however, this paper shows that access to Iranian oil supplies would help decrease global oil prices. The renewed sanctions will need to incur greater costs to Iran in order to create any policy changes. If this is not done, the United States, as well as the rest of the world, will continue to pay higher oil prices due to the decline of Iran's energy sector.

Tables

Table 1 - 1978 Snapshot[55]

	Population (000s)	National Output (GDP) Total GDP (MM)	Per Capita ($)	Per Capita Growth 1970-1980 %
OPEC		**362,640**	**6,522.2**	**8.6**
Algeria	17,625	26,433	1,500	6.8
Angola	7,383	3,643	493	(0.3)
Ecuador	7,530	8,056	1,070	9.1
Iran	**36,587**	**72,722**	**1,988**	**3.7**
Iraq	13,205	8,492	643	11.7
Kuwait	1,224	15,502	12,664	(2.4)
Libya	2,798	21,438	7,661	9.1
Nigeria	70,138	60,593	864	3.7
Qatar	200	3,932	19,656	5.5
Saudi Arabia	8,544	80,089	9,374	13.1
UAE	821	15,672	19,097	38.1
Venezuela	14,150	46,068	3,256	5.0
Russian Federation	N/A	N/A	N/A	N/A
Major OECD Countries		**6,166,242**	**8,350.1**	**3.6**
EU	457,087	2,908,941	6,607	3.1
Japan	114,913	967,651	8,421	4.3
US	228,449	2,289,650	10,023	3.3
World	**4,285,046**	**9,256,065**	**2,169**	**3.8**

Table 2 - 2009 Snapshot[56]

	Population (000s)	National Output (GDP) Total GDP (MM)	Per Capita ($)	Per Capita Growth 2000-2009 %
OPEC		**1,985,707**	**17,595.8**	**3.9**
Algeria	34,895	140,787	4,035	2.5
Angola	18,498	28,716	1,552	10.0
Ecuador	13,625	55,089	4,043	3.5
Iran	**74,196**	**338,739**	**4,565**	**4.3**
Iraq	30,747	18,040	587	1.4
Kuwait	2,985	110,955	37,170	3.9
Libya	6,420	61,577	9,592	4.1
Nigeria	154,729	182,989	1,183	8.0
Qatar	1,409	95,256	67,585	1.2
Saudi Arabia	25,721	363,358	14,127	1.5
UAE	4,599	252,434	54,894	3.3
Venezuela	28,583	337,768	11,817	3.2
Russian Federation	140,874	1,241,511	8,813	6.3
Major OECD Countries		**36,209,919**	**39,076.9**	**1.2**
EU	511,250	17,316,624	33,884	1.3
Japan	127,156	5,092,663	40,050	1.2
US	318,749	13,800,632	43,296	1.1
World	**6,829,360**	**57,193,708**	**8,460**	**1.7**

[55] United Nations Conference On Trade and Development Statistics Overview - http://www.unctad.org/Templates/Page.asp?intItemID=1584&lang=1

[56] Ibid

Table 3 - 1978 Snapshot[57]

	Oil and Gas Production		
	Production		
	Crude Oil (000s bbl/d)	Refinery Capacity (000s bbl/d)	Natural Gas (BN cf/d)
OPEC	**28,677**	**4,079**	**6.3**
Algeria	1,270	N/A	1.2
Angola	131	N/A	N/A
Ecuador	204	N/A	N/A
Iran	**5,302**	**1,080**	**1.6**
Iraq	2,574	209	N/A
Kuwait	2,182	572	0.5
Libya	2,023	N/A	0.5
Nigeria	1,897	N/A	0.1
Qatar	484	N/A	0.1
Saudi Arabia	8,554	758	0.5
UAE	1,829	15	0.6
Venezuela	2,227	1,445	1.2
Russian Federation	N/A	6,862	N/A
Major OECD Countries	**12,081**	**42,163**	**71.8**
EU	1,807	19,080	19.4
Japan	-	5,643	-
US	10,274	17,440	52.4
World	**63,332**	**76,852**	**129.5**

Table 4 - 2009 Snapshot[58]

	Oil and Gas Production				
	Production			Proven Reserves	
	Crude Oil (000s bbl/d)	Refinery Capacity (000s bbl/d)	Natural Gas (BN cf/d)	Crude Oil (BN bbl)	Natural Gas (TN cm)
OPEC	**33,076**	**8,180**	**49.2**	**1,029**	**91**
Algeria	1,811	462	7.9	12	5
Angola	1,784	39	N/A	14	N/A
Ecuador	495	N/A	N/A	7	N/A
Iran	**4,216**	**1,860**	**12.7**	**138**	**30**
Iraq	2,482	804	N/A	115	3
Kuwait	2,481	931	1.2	102	2
Libya	1,652	N/A	1.5	44	2
Nigeria	2,061	N/A	2.4	37	5
Qatar	1,345	N/A	8.6	27	25
Saudi Arabia	9,713	2,100	7.5	265	8
UAE	2,599	673	4.7	98	6
Venezuela	2,437	1,311	2.7	172	6
Russian Federation	10,032	5,616	51.0	74	44
Major OECD Countries	**11,438**	**35,923**	**79.5**	**41**	**12**
EU	4,242	13,614	22.1	13	5
Japan	-	4,621	-	-	-
US	7,196	17,688	57.4	28	7
World	**79,948**	**90,662**	**289.0**	**1,333**	**187**

[57] BP Statistical Review of World Energy 2010 - http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622

[58] Ibid

Table 5 - 1978 Snapshot[59]

	Trade and Foreign Investment				
	Goods & Services. (1980)				
	Export (MM $USD)	Import	Total Trade (%GDP)	FDI Inward Stock (MM $USD)	FDI Inward Stock (%GDP)
OPEC	**229,568**	**149,638**	**105%**	**13,064**	**4%**
Algeria	14,347	13,040	104%	1,525	4%
Angola	2,430	1,991	121%	61	1%
Ecuador	2,848	2,901	71%	719	6%
Iran	**13,059**	**18,232**	**43%**	**2,962**	**3%**
Iraq	N/A	N/A	N/A	N/A	N/A
Kuwait	21,067	9,355	196%	30	0%
Libya	22,074	8,896	144%	1,855	5%
Nigeria	27,061	21,506	80%	2,457	3%
Qatar	N/A	N/A	N/A	83	1%
Saudi Arabia	106,768	57,977	206%	1,359	1%
UAE	N/A	N/A	N/A	409	1%
Venezuela	19,914	15,740	77%	1,604	2%
Russian Federation	N/A	N/A	N/A	N/A	N/A
Major OECD Countries	**1,547,698**	**1,649,677**	**52%**	**317,165**	**10%**
EU	1,123,901	1,183,933	79%	230,849	6%
Japan	150,681	171,067	33%	3,270	0%
US	273,116	294,677	25%	83,046	3%
World	**2,424,340**	**2,486,153**	**53%**	**700,277**	**7%**

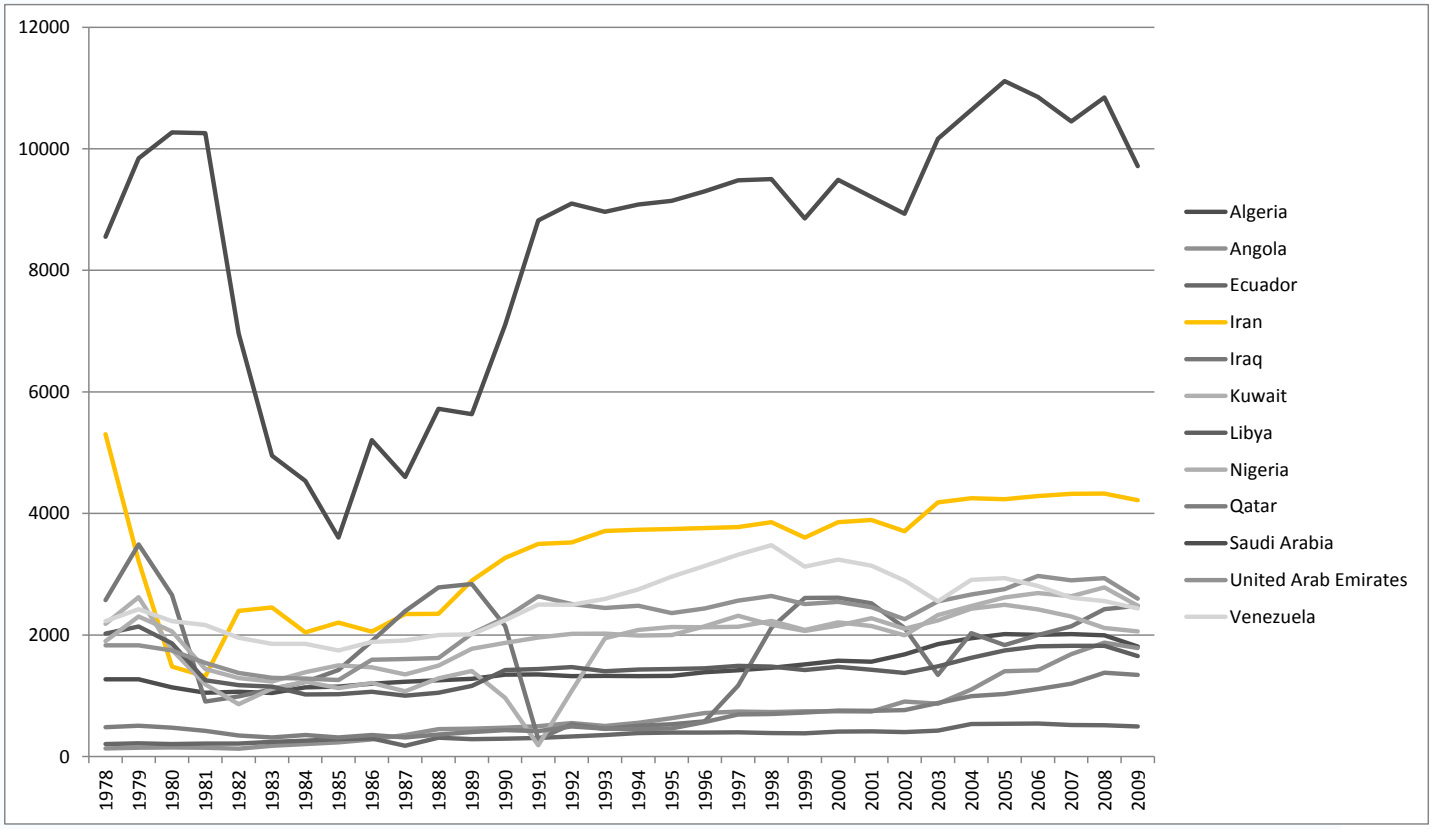
Table 6 - 2009 Snapshot[60]

	Trade and Foreign Investment				
	Goods & Services. (2008)				
	Export (MM $USD)	Import	Total Trade (%GDP)	FDI Inward Stock (MM $USD)	FDI Inward Stock (%GDP)
OPEC	**1,290,514**	**771,759**	**104%**	**450,400**	**23%**
Algeria	88,223	50,752	99%	17,344	12%
Angola	27,503	14,759	147%	16,515	58%
Ecuador	20,048	19,867	72%	11,948	22%
Iran	**97,964**	**81,264**	**53%**	**23,984**	**7%**
Iraq	16,228	10,982	151%	5,060	28%
Kuwait	99,057	38,205	124%	986	1%
Libya	66,616	25,733	150%	15,508	25%
Nigeria	97,836	68,996	91%	69,089	38%
Qatar	79,678	41,787	128%	28,184	30%
Saudi Arabia	327,003	162,648	135%	147,145	40%
UAE	268,685	193,939	183%	73,422	29%
Venezuela	101,672	62,826	49%	41,214	12%
Russian Federation	520,129	367,585	72%	252,456	20%
Major OECD Countries	**10,831,301**	**11,329,788**	**61%**	**11,358,537**	**73%**
EU	8,058,848	7,879,824	92%	8,037,813	46%
Japan	856,174	849,057	33%	200,141	4%
US	1,916,279	2,600,907	33%	3,120,583	23%
World	**19,820,798**	**19,545,239**	**69%**	**17,743,408**	**30%**

[59] United Nations Conference On Trade and Development Statistics Overview - http://www.unctad.org/Templates/Page.asp?intItemID=1584&lang=1

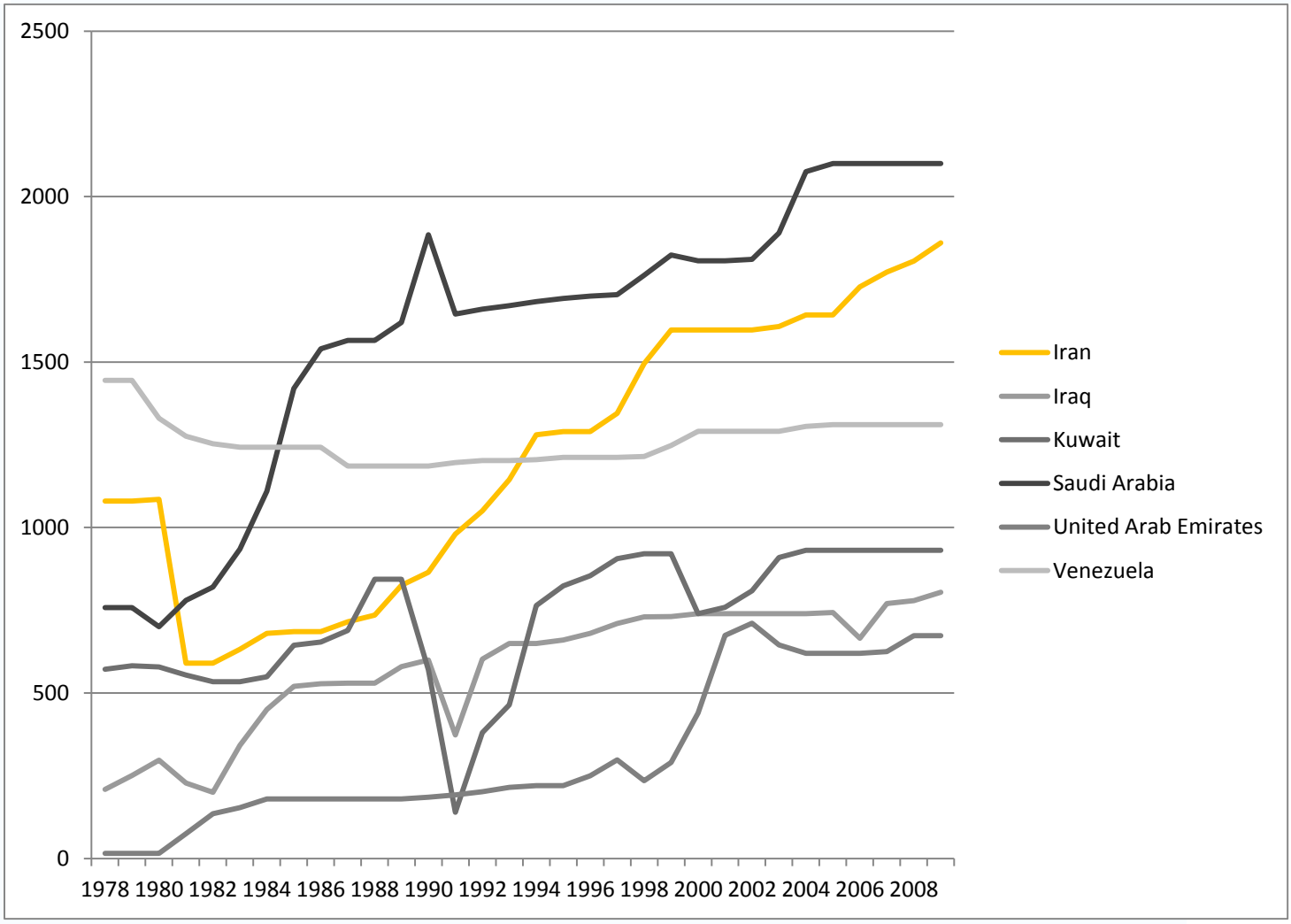
[60] Ibid

Table 7 - 1978 to 2009 OPEC average daily oil production (Thousands BBL/Day)[61]



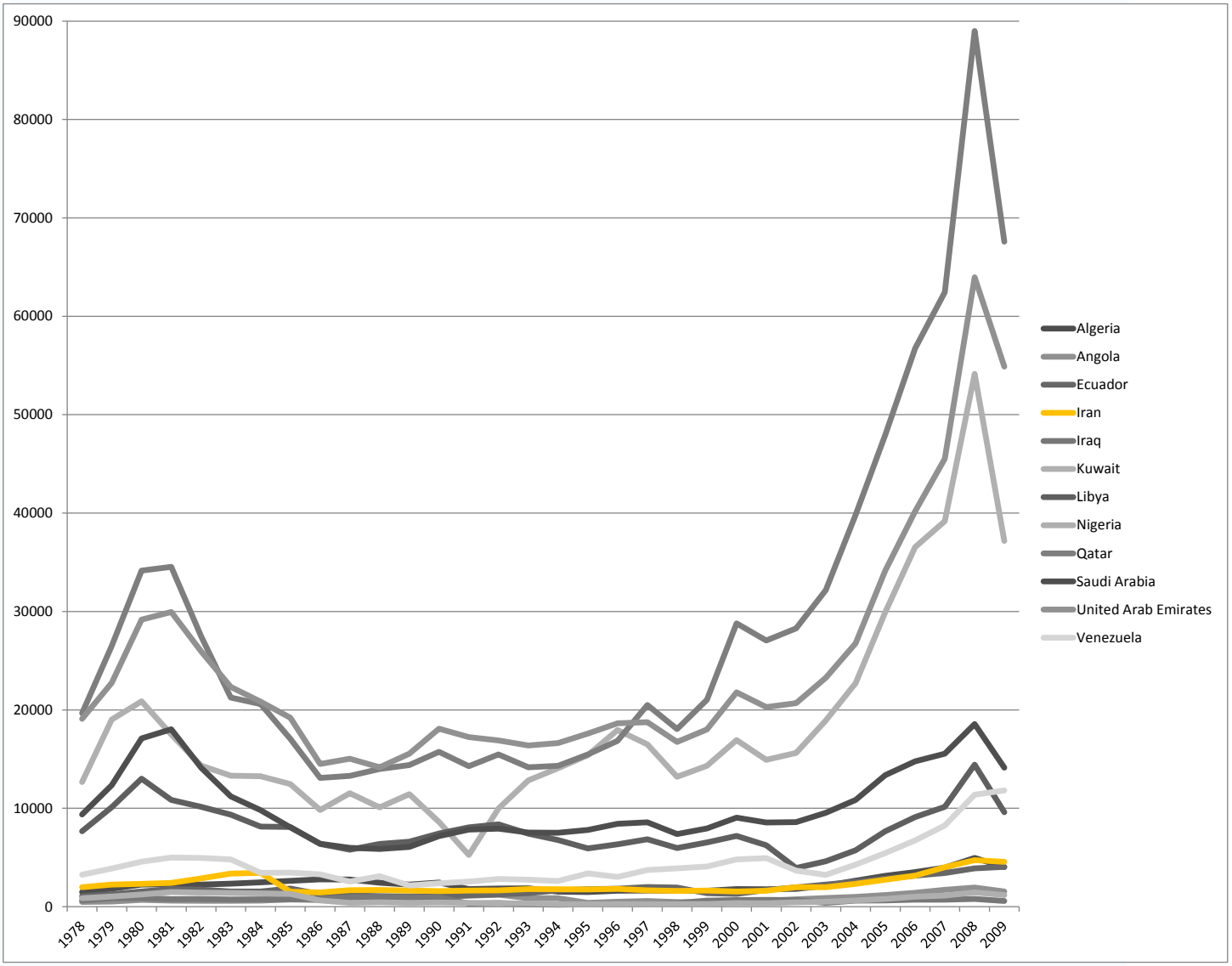
[61] BP Statistical Review of World Energy 2010 - http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622

Table 8 - 1978 to 2009 OPEC average daily oil refinery capacity (Thousands BBL/Day)[62]



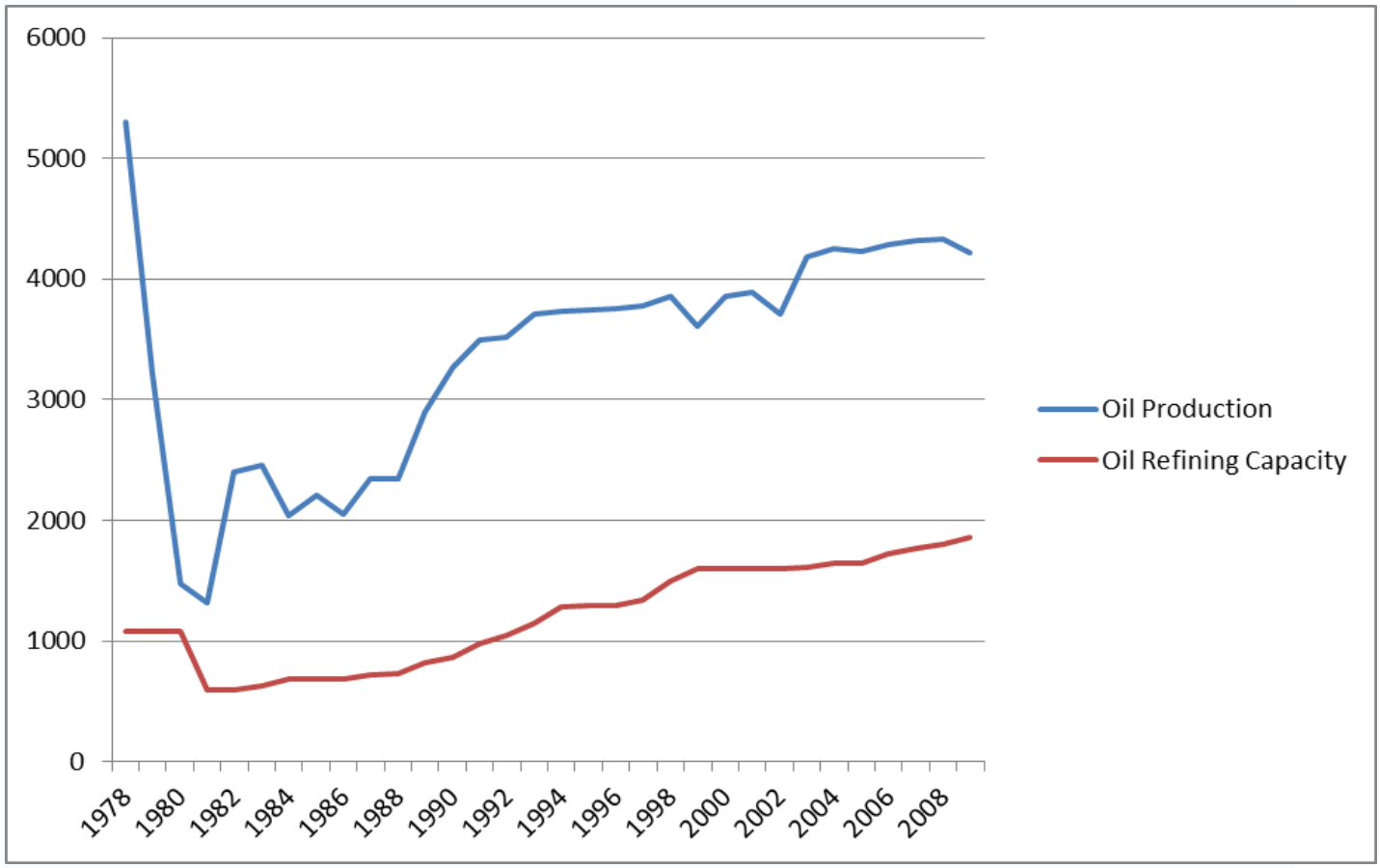
[62] BP Statistical Review of World Energy 2010 - http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622

Table 9 - 1978 to 2009 OPEC per capita GDP[63]



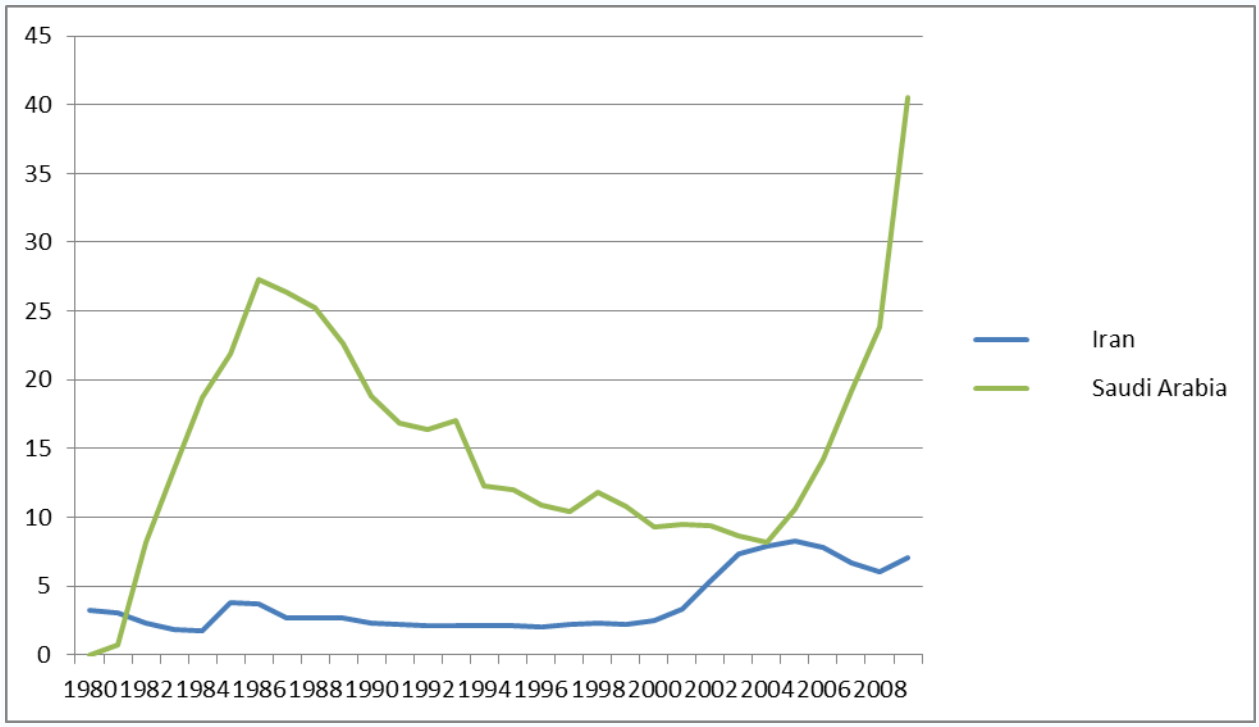
[63] United Nations Conference On Trade and Development Statistics Overview - http://www.unctad.org/Templates/Page.asp?intItemID=1584&lang=1

Table 10 - Iran Avg. Daily Oil Production vs Oil Refining Capacity since 1978[64]



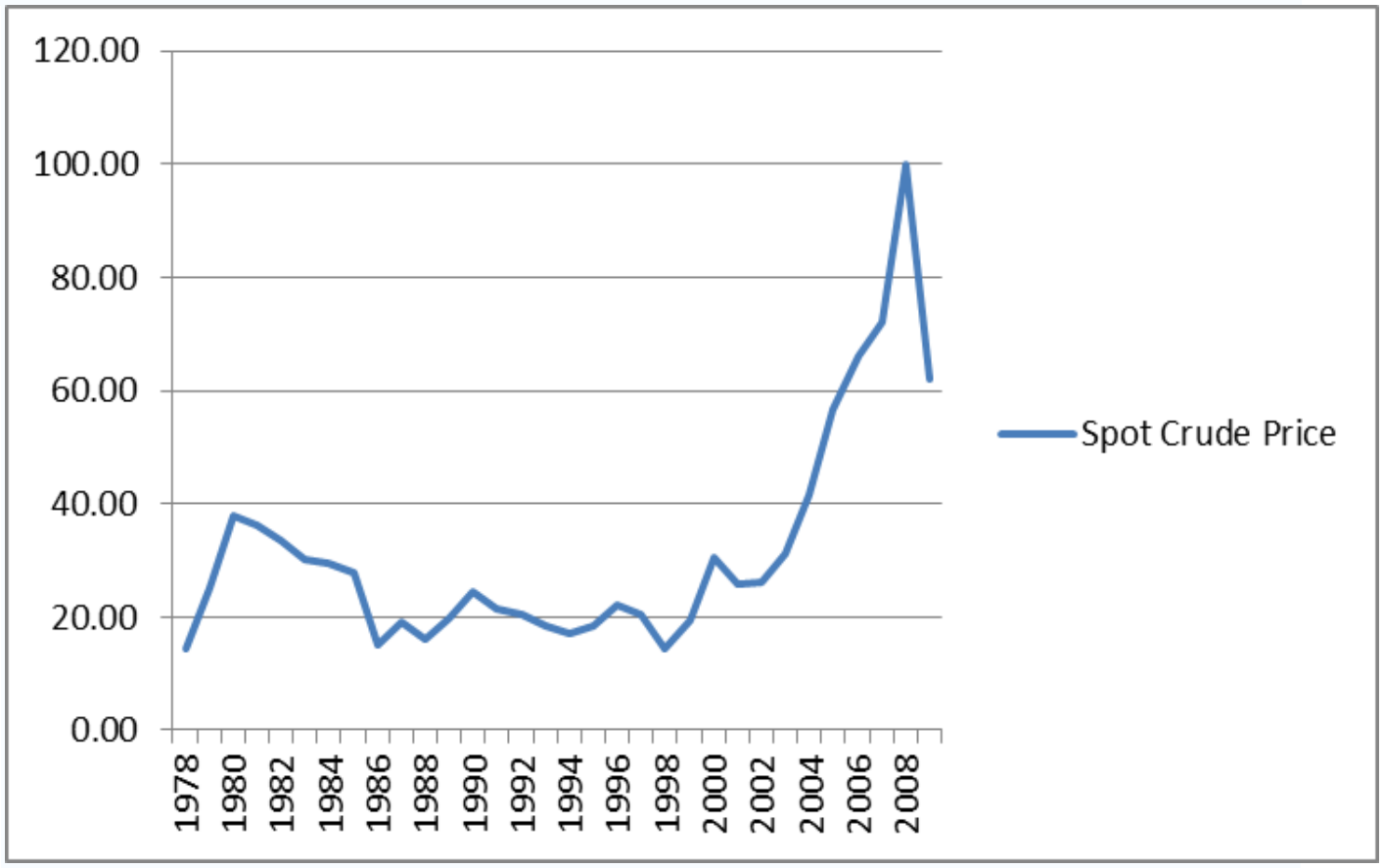
[64] BP Statistical Review of World Energy 2010 - http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622

Table 11 –FDI stock as a percentage of GDP since 1980[65]



[65] United Nations Conference On Trade and Development Statistics Overview - http://www.unctad.org/Templates/Page.asp?intItemID=1584&lang=1

Table 11 – Spot Crude Oil Prices since 1978[66]



[66]BP Statistical Review of World Energy 2010 - http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622 ;Crude oil prices in 2011 have surpassed $100

Table 12 – Energy Exports from Iran by country in 2009[67]

Major Energy Buyers from Iran (2009) (Amts in MM USD$)	
China	10,529
France	1,340
Germany	401
Greece	310
Hong Kong	373
India	9,541
Indonesia	183
Italy	2,363
Japan	9,192
Malaysia	964
Netherlands	2,765
Portugal	215
Singapore	21,793
South Africa	5,420
South Korea	2,624
Spain	844
Sri Lanka	1,788
Taiwan	127
Thailand	3,047
Turkey	174
United Kingdom	
Total	**73,993**

[67] Congressional Research Service: "Iran Sanctions", February 3, 2011
http://fpc.state.gov/documents/organization/156527.pdf