

HOW WOULD A POSSIBLE U.N. SANCTION AFFECT THE IRANIAN ECONOMY?

Hamid Shahrestani, Ohio University-Chillicothe
Nahid Kalbasi Anaraki, Islamic Azad University-Tehran

ABSTRACT

Though Iran's economy has experienced various types of sanctions post revolution and during the war with Iraq, the latest series of economic sanctions by the U.N. Security Council, based on Resolutions 1737 and 1747, seems to have adversely affected the Iranian economy in a multi-faceted manner. These sanctions have led to higher inflation rate, rationing of gasoline, lower non-oil exports, and less foreign direct investment. A major difference between the current sanctions imposed by the U.N. Security Council and those imposed during the war is that recent series of sanctions are in some ways supported by the international community, which places greater pressure on the Iranian economy, effectively tying the hands of policymakers and encouraging them to react in a more accurate way. However, Iranian authorities believe that since economic sanctions have already been imposed on Iran and the country has weathered these hardships in the past, it is able to minimize the negative outcomes of new actions. For example, they argue that sanctions have increased the country's self-sufficiency, and have led to reallocation of resources into development projects. Nonetheless, certain opportunity costs are associated with these supposedly positive aspects. Indeed, the sanctions affect the Iranian economy through different transmission mechanism channels. The most important ones that we emphasize in this paper are inflationary expectations, exchange rate volatility, financing surcharges, real estate prices, foreign direct investment, total factor productivity and the economic growth.

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INTRODUCTION

The Iranian economy has been confronted with different sorts of sanctions post revolution era and during the eight years of war with Iraq, leading to rationing of essential goods and commodities. Before the 1979 Islamic revolution, the United States was Iran's number one commercial partner. The first formal U.S. sanction in 1980 banned all U.S. exports to Iran. After the revolution, the relations between two countries deteriorated as a group of students detained 52 American hostages in the US embassy in Tehran. This crisis led to a break-down of political relationship between two countries in April 1980. Subsequently the U.S. initiated a series of sanctions against Iran in order to release the American hostages.

After the end of the American embassy crisis in 1981, the sanctions were lifted; however, in 1984 the sanctions were reinstated. All exports of products with military applications and armaments to Iran were specifically banned. Nonetheless, U.S. oil companies continued to extract Iran's crude oil for import to the U.S. The imports of all Iranian goods and services to the United States were banned in 1987 and the U.S. oil companies were prohibited from importing Iranian oil for domestic consumption.

The U.S. expected its allies to support the sanctions by boycotting the purchase of Iranian oil, but none of them really did. Indeed, they had too much interest in Iran to follow the U.S. policy. Their trade volume with Iran was substantially higher compared to the U.S. In 1994, Germany exported four times more to Iran than the U.S. did, and Japan and Italy exported twice as much as the U.S. Moreover, they did not believe that the sanctions could persuade Iran to change its policy. As a result, in April 1995, President Clinton announced that the U.S. would cut off all trade and investment ties with Iran, including purchase

of Iranian oil. The new sanctions complemented the previously imposed ones and constituted a full embargo against Tehran.

These sanctions forced Tehran to seek new allies and suppliers in Europe. Trade relations with smaller Islamic and non-aligned nations grew significantly. The control over international trade was facilitated by a series of selective bilateral agreements. The government of Iran reduced its trade imbalance with some of OECD countries by restricting its imports to a predetermined proportion of exports. To deal with the sanctions imposed by the United States, Iran developed a closer relationship with Russia, China and India, among others.

Consequently, the US was induced to take more measures in order to impose more pressures on other countries to cooperate in the sanctions against Iran. Hence a bill (S.1228) was proposed in the US Senate to penalize foreign entities who exported petroleum products, natural gas or related technology to Iran. This bill was later signed into law by President Clinton in August 1996, and became known as the Iran-Libya Sanctions Act (ILSA). Under ILSA, companies that invest more than \$20 million in Iran's oil and gas sector are penalized. The penalty includes the denial of the U.S. government contracts, loans and export credits. Indeed, the U.S. sanctions aimed at halting the development of Iran's oil industry were amplified in 1997. The sanctions on Iran have deteriorated the US economic relations with Europe and Japan because Europe has extended its business with Iran and Japan has agreed to sign a contract for development of Iran's largest oil field Azadegan despite U.S. opposition. Indeed, as illustrated in Table 1, Iran has been successful to substitute other countries instead of the U.S. for its commercial needs. Iran's imports from other countries including China and Russia substantially rose from 17% pre-revolution (1975-78) to 48.6% in 2006.

Table 1: Iran's Trading Partners by Source

Time period	United States	Western Europe	Japan	Others
1975-1978 (Pre-revolution)	18.5	48.7	15.8	17.0
1979-1988 (Revolution & Iraq War)	1.8	47.8	13	37.4
1989-1992 (Postwar Reconstruction)	2.1	52.1	11.4	34.4
1993-1996 (Dual Containment)	3.3	45.8	8.3	42.6
1996-2006 (Iran-Libya Sanctions)	0.0	44.9	6.4	48.6

Source: Jeffrey J. Schott (2006), *Economic Sanctions, Oil and Iran*, Peterson Institute.

Indeed, the intensified trade and investment sanctions against Iran since the early 1990s have significantly affected the nature of international competition for Iranian business. However, according to the above table, the American companies have far more suffered the effects of sanctions than their non-American rivals.

The financial firestorm began in September 2006 when the United States took the unprecedented step of cutting off one of Iran's largest banks - Bank Saderat - from the American financial system. Over the next 13 months, the United States systematically froze the assets of Iran's four most significant banks and deprived them from any remaining access to New York, a financial nerve center of the global economy. Emboldened by the success of U.S. action, the international community has joined the combat. The Financial Action Task Force - a group of experts from the world's leading economies (including Russia, China and the Gulf Cooperation Council) - issued a striking statement in October 2007 telling member countries to advise their banks about Iran's worrisome financial practices. Though the recent U.N. sanctions based on Resolutions 1737 and 1747 imposed in February and March of 2007 were aimed to

prohibit financing activities for nuclear and related items, the sanctions put greater pressures on the international community to boycott the Iranian economy as a whole, imposing severe financial restrictions on Iran and specifically freezing the assets of its fifth-largest bank. This drumbeat of financial warnings has touched a nerve in the global banking community. Profoundly sensitive to reputational risk, several major global banks such as UBS and Deutsche Bank have reduced their dealings with Iran. This global coalition has put a measurable pressure on Iranian financial system. Indeed, due to U.N. Security Council Resolutions 1737 and 1747 and the support of the international community, Iran's access to western technology, supplies and particularly financial facilities has been considerably limited. As a result, the sanctions have contributed to the state of economic hardship as reflected in higher inflation rate, financing surcharges, real estate bubble and depreciation of Rial against major currencies.

Amazingly, despite benefiting from a great amount of trade with Iran, the European Union has imposed its own sanctions, limiting the alternative financial resources to Tehran to a few. In addition, many EU countries have avoided financing Iranian LCs since the passage of the UN resolutions. More importantly, some of the European government agencies have avoided issuing governmental insurance for their financing activities in Iran.

The threat seems to be so intense that the Iranian government has decided to resort a rationing system for some essential goods, including gasoline. However, this unpopular distribution policy, which the country experienced during the 1980s, is unlikely to respond to the current over-consumption of gasoline due to its intrinsic inefficiencies.

The rest of the paper is organized as follows. The First Section is allocated to literature review. In the Second Section we investigate the positive effects of the sanctions as proposed by the Iranian authorities. In the Third part we try to capture the quantitative effects of the sanctions on nominal and real macroeconomic variables. Finally, the last part draws up and concludes.

LITERATURE REVIEW

To address the abovementioned issues, we briefly review some of research studies that have investigated the effects of sanctions on Iran's economy. Many experts, as well as Iranian officials, say that decade-long U.S. sanctions—sharply limiting U.S. trade and investment in Iran and penalizing foreign companies that invest in Iran's energy sector—have not crippled Iran's economy but have had an impact. Hamid Reza Baradaran Shoraka, former head of Iran's Management and Planning Organization (MPO) has publicly stated that sanctions by Washington have hindered the economic progress. Takeyh and Pollack believe Iran's oil industry has particularly suffered from U.S. sanctions. Iran, whose oil fields are old and their installations are badly damaged, has done little exploration since the 1970s.

Many experts believe the effects of sanctions on the Iranian economy depend on the scope of sanctions as well as their type. Any sanction that doesn't include oil will not have serious effects says, Millani co-director of the Iran Democracy Project at Stanford University's Hoover Institution. But most experts believe such sanctions are highly unlikely so long as oil prices remain above \$70 per barrel. Further, sanctions could backfire and rally the Iranian population around its leadership. "Harsh sanctions would punish the Iranian people—not the regime, the army, or the police," write Gary Clyde Hufbauer and Jeffrey Schott of the Institute for International Economics.

Jahangir Amuzegar (1997a and 1997b) argues that the US sanctions have neither fulfilled the anticipated results nor have been effective enough to transform the Islamic regime. Among others, Clawson (1998) indicates that the sanctions have not persuaded Iran to change its policy. Preeg (1999) claims that the net assessment of the economic impact of U.S. sanctions on Iran is negative and believes the United States should unilaterally lift the sanctions. Alikhani (2000) has conducted a general study of the sanctions against Iran from a political and historical standpoint. He concludes that the sanctions have failed

politically to influence Iran's performance. Askari et al. (2001) examine the effects of economic sanctions on Iran. They believe despite significant costs to both countries, Iran has not changed its policies, and therefore, the United States should be more cautious. Torbat (2006) has measured the impact of U.S. sanctions on financing surcharges, non-oil exports, imports of intermediate goods and the welfare losses. According to his estimation, Iran suffers \$82.5 million, equivalent to 0.11% of its GDP, from not being able to import the necessary goods from the U.S. Financial sanctions may be more effective than unilateral trade sanctions, argues Torbat, because oil is a fungible commodity; that is, Iran can just find alternate customers namely China and Russia to replace the United States. Yet Torbat says Iran's economy is not faring poorly when compared to its Middle Eastern neighbors. After all, annual growth hovers around 5 to 6 percent, Iran has \$60 billion in foreign exchange reserves and it boasts a current accounts surplus. Unemployment figures officially around 10 percent are also on par with the region, Torbat says.

Rachel Loeffler (2007) believes Iran's financial appetite is a double-edged sword: The global banking network it has cultivated to facilitate trade and commerce is vulnerable to market skittishness when foreign banks pull the plug. No matter how high the price of oil climbs, Iran's petro-dollars, petro-euros or petro-yen must be invested in some lucrative fashion. If Iran cannot move its money around, it remains the equivalent of a rich man in a pauper's prison, Loeffler says.

Gordon P. (2007) believes that winning greater European support for isolating Iran is difficult but not impossible. For all the European reluctance to pursue sanctions, the combination of rising American pressure, EU3 leadership and Iranian behavior has led to an increase in the economic and political isolation of Iran. European banks – including Deutsche Bank, HSBC and BNP Paribas – have largely stopped doing business with Iran. However, the greater challenge is with China and Russia. Although both surprised Iran with their willingness to agree to Chapter VII UN Security Council resolutions making Iranian uranium enrichment illegal, they have resisted further economic pressure, despite Iran's continued lack of compliance, Gordon says.

Beehner L. (2007) believes that Iran's economy is reliant on foreign capital and investment to develop its untapped oil fields and fledgling nuclear energy sector. By denying Iran extensions of credit and other financial assistance, Iran's primary industry, oil and gas might be adversely affected by the sanctions. Iran may be forced to obtain loans with less favorable terms and at higher interest rates. And some western investors may decide doing business in Iran is not worth the risk.

In sharp contrast to above studies, Hossein Askari (2007) believes that the sanctions have not worked. The only discernible result of US sanctions on Iran has been to delay Iran's development of its energy resources. The U.S. has impeded the development of at least two known large oilfields in Iran (Azadegan and Yadavaran), which together could have proven reserves exceeding 35 billion barrels and produce more than a million barrels per day of crude at their expected peak; the sanctions have hindered oil and gas supply by playing the countries of the region against each other. Indeed, the sanctions have led to higher energy prices. Continued impediments to oil and gas development in Iran could reduce Iranian exports by the oil equivalent of more than 5 million barrels per day over the next decade. The U.S. policy is based on the premise that lowering Iranian oil and gas exports would hurt Iranian revenues. But the U.S. policy has in fact buoyed oil prices, which have increased Iranian revenues, albeit at lower export levels. Economic sanctions have come at a huge cost to the United States. The oil market is in essence a global market. Because of sanctions, the U.S. does not buy Iranian oil and gas, but if Iranian energy supplies come to the market this would, in turn, afford the U.S. more supplies from other countries and lower prices globally. The increased availability of Iranian energy supplies could make a big difference to energy prices and to the security of the region over the next decade. All sanctions, even the comprehensive ones, are notoriously porous. In addition, sanctions imposed by a "coalition of the willing" will only become an international embarrassment for the US, potentially placating a segmental

domestic constituency but succeeding in further alienating Iranians and the continuation of U.S. costly interventions in the region. Finally, and most importantly, it is almost certain that Iran would react to any UN or coalition-of-the-willing sanctions by cutting oil exports by at least 50%, driving oil prices above \$100 per barrel, with Americans paying close to \$5 a gallon (about \$1.30 per liter) for gasoline; presuming that a total stoppage of Iranian oil exports (3.2 million barrels per day) would drive oil prices well above \$150 per barrel.

A novel feature of our study compared to the above studies is that it tries to underpin the quantitative effects of sanctions on nominal and real variables. In fact, the economic sanctions induced some financial measures that prevented Iran from financing activities, export credits and loan guarantees. Since the sanctions have already limited the financing activities of many Iranian banks, including Sepah and Saderat, and may include other banks and entrepreneurs in the third stage, it is of great importance to investigate the transmission mechanism channels through which the sanctions affect the Iranian economy.

METHODOLOGY

Hypothesis

The hypothesis in this study is whether, and to what extent, the U.N. Security Council's economic sanctions affect the Iranian economy. In Section A, as emphasized by Iranian authorities, we shall consider the qualitative positive effects of the sanctions on the economy. In Section B, we try to measure the opportunity costs of the sanctions on nominal variables including inflation, exchange rate volatility, real estate prices, and financing surcharges. Finally, in Section C, we underpin the effects of sanctions on real variables including total factor productivity (TFP), foreign direct investment (FDI), and economic growth. Since the sanctions historically have excluded the oil sector, we do not investigate changes in the oil price on the economy.

Data

To capture the effects of sanctions on economic variables we have employed annual data for 1974 through 2006 published by the Central Bank of Iran as well as the International Financial Statistics (IFS). However, since nominal variables are affected in shorter intervals, quarterly data have been used for the years 1999 to 2007 to measure the effects of inflationary expectations on nominal variables.

The list of variables used in this study is as follows:

CPI, consumer price index, *M2* quasi money supply, *GDP* Gross Domestic Product, *E* market exchange rate, *M2** quasi money in the European Union, *Divid* dividend yield in the Tehran Stock Exchange, *Libor* London interbank offer rate, *Ph* housing prices in urban areas, *Loan* banking facilities to the housing sector, *EER* effective exchange rate, *i* effective interest rate on banking deposits, π inflation, *L*, labor force, *K* capital stock, $\frac{NX}{GDP}$ non-oil exports growth times the ratio of non-oil exports to GDP, *IMP* imports of intermediate goods, *Ind* industrialization index measured by the value added of the industry sector times the ratio of industry sector in GDP, *DUMY1* dummy variable for the periods the sanctions have been applied, *DUMY2* dummy variable for the period of war, *Openness* index of imports plus exports over GDP, *TOT* terms of trade, *Sch* schooling, *LE* life expectancy, *FDI* foreign direct investment, *HR* human capital measured by the secondary schooling population, *TFP* total factor productivity, *wage* wage index.

The methodology used in this paper is to test the relationship between the economic sanctions and nominal as well as real variables; including inflation rate, exchange rate volatility, real estate prices,

financing surcharges, foreign direct investment (FDI), total factor productivity (TFP), and economic growth.

A-Positive Effects of the Sanctions on the Iranian Economy

Many Iranian authorities assert that the sanctions have had positive effects on the economy. Indeed, as experienced during the war with Iraq and the reconstruction period, the sanctions have been ineffective in changing Iran's performance. Iran is in a special geopolitical location and is endowed with great amounts of natural resources and talented labor force that helps the country to confront the hardships of economic sanctions. Among the positive effects of sanctions Iranian authorities emphasize the followings:

- 1- The sanctions help the country to benefit from its comparative advantages, contributing to the improvement of sectors relying on domestic resources like textile and electronic industries, moving towards self-sufficiency.
- 2- With the increase in the oil revenues, the total import into the country has increased substantially, amounting to \$40 billion per year. Since a large portion of imports has been allocated for luxury goods, the sanctions incite the authorities to reallocate the resources to development and infrastructure projects, contributing to higher economic growth.
- 3- During the war with Iraq, Iran has recorded noticeably low oil revenue of \$8 per barrel without any major effect on its economy. This fact underlines the ability of the country to survive even under great economic pressure.
- 4- Despite the fact that Iran had to surmount many obstacles created by western world, it has been successful in inquiring new technologies including the nuclear program for its civilian projects. This achievement highlights the ability of Iranians to participate in innovative projects and be members of modern world society.
- 5- The sanctions shall induce the policy makers to focus more on the subsidies for the vulnerable groups and to carry out other essential financial and economic reforms that may have otherwise been ignored.
- 6- The benefits of the sanctions might far exceed their costs because the policy makers may resort to instruments like shadow budget, foreign exchange reserve cushioning, rationing and other policies that had been employed during the war.
- 7- As quoted in the *Economist* in July, Iran's risk ranking has not changed. Iran has succeeded in obtaining the 67th ranking in the list despite the imposed U.N. sanctions.

Though the country might enjoy these benefits, the sanctions are also costly because they influence the economy through different transmission channels. In the following sections, we measure the effects of sanctions on economic variables in two different parts. In Part B we measure the effects of sanctions on nominal variables, and in Part C we pay particular attention to real variables including FDI, productivity and economic growth.

RESULTS:

B-Monetary Sector

B-I: Inflationary Expectations and Inflation Rate- Iran's economy has experienced double-digit inflation rates in the postwar period as a result of a large budget deficit financed through high-powered money. Indeed, the Iranian economy suffers from the lack of monetary policy discipline. The loose monetary

stance has led to a record high inflation of 40% in 1995. Nonetheless, having not dropped below 15% since 2004, the inflation has relatively declined since the inception of the new millennium.

The Central Bank has tried to combat the inflation by containing the budget deficits through better management of Oil Stabilization Fund (OSF); however, it has not been very successful in doing so due to the lack of a well-defined stabilization policy. Indeed, the OSF has been substantially exploited due to higher financing premium charges and carrying out the projects through middlemen, consequently its balance-sheet has deteriorated dramatically. Moreover, the sanction has adversely affected the OSF balance-sheet, since a greater part of oil revenues shall be allocated to finance the higher than expected price of imports.

Indeed, not only have the sanctions limited the financing resources, but they have also led to higher financing surcharges. In addition, the imposed sanctions on the Iranian banks, including Sepah and Saderat, have intensified the inflationary expectations, leading to a wage-price spiral. In the past six months, the threat that these sanctions shall reduce the imports of essential goods has overheated the inflationary expectations, leading to 25% inflation in some sectors, including the real-estate. Though the government seems determined to contain inflation through the rationing system, the effectiveness of this system is ambiguous.

To measure the effects of sanctions on the inflation rate, we implement a monetary model with a dummy variable for the periods the sanctions have been applied. Using quarterly data for the years 1999-1 to 2007-1 enables us to estimate the following model:

$$CPI = + 2.43 + 0.72 M_2 + 0.31 CPI(-1) + 5.6 DUMMY_1$$

(2.70) (3.33) (1.67)

R-squared=0.98 Adjusted R-squared=0.98 D.W=2.8

The results indicate that imposing of sanctions by the U.S. leads to an inflation rate of 5.6% in the CPI.

B-II Foreign Exchange Rate Volatility- The foreign exchange reserves seem to decrease dramatically due to the reduction in non-oil export revenues and higher financing expenditures. Since the sanctions have made the foreign banks and intermediaries reluctant to interact with the Iranian banks, the effective interest rates for financing the LCs, as well as for project financing have substantially increased, leading to higher financing premium charges and lower foreign exchange reserves.

The current exchange rate regime in Iran is a crawling pegged, with frequent Central Bank's interventions in the market. The reduction in non-oil exports and inflationary expectations due to sanctions has led to depreciation of domestic currency, exploiting foreign exchange reserves.

To capture the effects of sanctions on the exchange rate, we apply the Hooper and Morton model. The model helps us to measure the effects of sanctions on depreciation through inflationary expectations. Using quarterly data for the years 1999-1 through 2007-1, the following model has been estimated.

$$E = 11.07 + 0.24(M_2 / M_2^*) + 0.23CPI(-1) + 0.03GDP - 0.46Divid - 0.08Libor$$

(18.67) (6.45) (1.63) (1.99) (-4.2) (-2.21)

R-Squared=0.98 Adjusted R-squared=0.97 D.W= 1.64

Since the interest rate has been controlled in the Iranian banking system during the mentioned period we dropped the domestic interest rate from the model. As it is seen, all the coefficients are significant and of

the expected signs. The coefficient on *CPI* is significant at 5% level of confidence with the expected positive sign. As we saw in the previous section the results suggest that economic sanctions leads to 5.6 percent increase in CPI leading to 1.3 percent depreciation of the exchange rate, which is negligible.

B-III: Real-Estate Prices- Among different monetary transmission mechanism channels emphasized in the finance literature, an important one is the housing prices. As postulated by Mishkin (2001) among others, housing prices may affect the economy through three main transmission channels, household wealth, housing expenditures and banks' balance sheets. The aim of this study is to explore to what extent and through which channels economic sanctions have affected real estate prices. Not only have the difficulties of import financing due to imposed sanctions on the Iranian banks led to reallocation of resources to the real-estate sector, but the inflationary expectations of the sanctions have led to irrational exuberance in this market. Indeed, the sanctions have increased the costs of import financing, leading to reallocation of resources from the foreign sector to the real-estate market, particularly given the stagnation in the Tehran stock market.

Indeed, the TSE has experienced a bubble burst since 2005, and the market has not yet recovered. The Money and Credit Council has recently approved the proposal of the president to limit the interest rate in the banking system with a ceiling of 17%. The foreign exchange market has also been manipulated through the central bank's intervention to stabilize the dollar, leading to overvaluation of the Rial against major currencies. In fact, the rate of returns in parallel markets, including banking system, TSE, and foreign exchange market, have dramatically been suppressed compared to the real estate market.

The following model has been estimated to capture the effects of sanctions on the real estate prices. The lower the rate of return in the banking system, the more resources shall be reallocated to the housing sector, leading to higher real-estate prices.

$$Ph = -18.9 + 0.33 Loan + 0.093 EER - 0.701 i + 0.336 \pi + 2.45 GDP$$

(-3.47)
(3.9)
(1.48)
(-2.06)
(3.57)
(4.99)

R-squared=0.99 Adjusted R-squared=0.99 D.W. =1.66

As it is seen in the above equation, the coefficient on inflation suggests that a one percent increase in inflation rate leads to a 0.33% increase in the housing prices. Since the sanctions lead to 5.6% increase in the real inflation, one may conclude that the inflationary expectations lead to a 1.8% increase in the real estate prices. In addition, 1.3% depreciation of the exchange rate, as a result of sanctions, leads to a 1.2% increase in the real estate prices. As a result, the total effect of the sanctions through inflation and exchange rate on the real estate prices amounts to 2.5%.

B-IV: Effects on Financial Activities- As it is observed in the past three months, the United States has used all its forces to attract its allies in order to limit the access of Iran to international banking facilities. The political and economic instability of the country has led to higher financing margins due to a higher risk after the sanctions. The foreign entrepreneurs face the risk of boycott if they trade with Iran. In the absence of sanctions Iran could have obtained much better terms and conditions on its loans and financing facilities.

One of the novel features of this study is that it attempts to capture the effects of sanctions on financial charges through estimation of financial interest rate as a function of foreign debt and the country risk rating. The following model has been estimated to measure the effects of sanctions on financing premium charges.

$$i = 2.3_{(1.45)} + 0.09 Debt_{(1.67)} + 0.15 Risk_{(2.1)}$$

R-squared=0.72 Adjusted R-squared=0.70 F=25.9 D.W=1.85

As the estimated results indicate a one percent increase in the country risk increases the interest rate premium by 0.15%.

C-Real Sector

C-I: Imports, Non-oil Exports, and Economic Growth- The Iranian economy is heavily dependent on the oil sector. Indeed, the non-oil export has not exceeded \$5 billion in the past three decades. However, the U.N. sanctions have adversely affected the willingness of foreign companies to interact with their Iranian counterparts. As a result, the non-oil export has decreased by 17% in the first three months of the Iranian year compared with the same period in the previous year. To capture the effects of non-oil exports reduction on economic growth we apply the Feder model.

$$GDP^0 = 6.83_{(2.57)} + 1.32 L^0_{(1.75)} + 0.92 K^0_{(2.84)} - 0.47 NX^0_{(2.75)} + 0.09 IMP^0_{(2.90)} + 1.69 IND_{(2.32)} - 5.10 DUM_{(2.46)} - 0.17 TREND_{(2.34)} + 0.29 MA_{(1.74)}$$

R-squared= 0.68 Adjusted R-squared=0.68 D.W=1.92

The estimated results help us to have a better understanding on the effects of non-oil exports reduction on GDP growth. Contrary to our expectations, the estimated coefficient on non-oil exports is negative. Indeed, the more resources reallocated to export sector, the lower the productivity growth in the internal sector will be, contributing to lower GDP growth.

In addition, since the U.N. sanctions reduce the imports of intermediate goods, it adversely affects the prospects for economic growth. The sanction imposed on the Iranian banks' financing activities, particularly opening LCs, not only has lengthened the import process but has increased the financing expenditure due to higher economic risk. Using an average sanction multiplier of 0.25% for the imports of intermediate goods as suggested by Torbat (2006) shall lead to 2.2% reduction in economic growth prospects, hindering Iran's economy.

Moreover, the reduction in imports of intermediate goods, as a result of sanctions, shall reduce the degree of openness in the country, leading to lower economic growth. To capture this effect, the following model has been estimated as proposed by Barro, among others.

$$GDP^0 = 16.7_{(1.19)} + 0.009 Openness_{(0.21)} + 0.85 Sch_{(1.15)} - 0.020 \pi_{(1.45)} - 1.3 LE_{(0.36)} + 1.3 E - 06 TOT_{(2.37)} - 0.034 DUM_{(0.88)} + 0.67 MA(1)_{(3.99)} + 0.77 AR(1)_{(5.9)}$$

R-squared=0.96 Adjusted R-squared= 0.95 D.W=1.89

The estimated results suggest that a one percent increase in inflation rate reduces the growth rate by 0.02%. Since the sanctions lead to a 5.6% increase in inflation, the GDP growth drops by 0.11%. In addition, a one percent decrease in the degree of openness reduces the GDP growth by 0.01%. Assuming

a 20% decrease in the degree of openness, as a result of sanctions, shall lead to 0.2% reduction in GDP according to our results.

C-II: Foreign Direct Investment (FDI) and Economic Growth- Compared to other developing countries, high political and economic risk in Iran has led to lower levels of Foreign Direct Investment (FDI), limiting it almost to \$7 billion annually. The new series of sanctions imposed by the U.N. Security Council has aggravated the current situation, resulting in lower levels of FDI. Not surprisingly, the FDI has decreased from \$1.5 billion to \$0.7 billion in the first three months of the Iranian year compared to the same period in the previous year.

The effects of FDI on economic growth is captured through the model developed by Alfaro et al. (2006), proposing a mechanism that emphasizes the role of local financial markets in enabling foreign direct investment (FDI) to promote growth through backward linkages. Indeed, replicating the Alfaro model for the Iranian economy enables us to capture the effects of FDI on economic growth. This model has the ability to capture the effects of openness of the economy besides the effects of FDI on economic growth prospects.

$$GDP = 7.8 + 0.21FDI + 0.018Opennes + 0.21HR + 0.003(M_2 / GDP) - 0.12DUM$$

(2.3) (6.4) (1.7) (1.7) (1.6)

R-squared=0.68 Adjusted R-squared=0.66 D.W=1.9

The estimated results suggest that a one percent decrease in FDI reduces economic growth by 0.2%. Assuming that FDI is expected to decrease by 10% as a result of sanctions, it shall affect the economic growth by 2.1%. In addition, since the sanctions affect the degree of openness they shall also reduce the economic growth indirectly. Assuming 20% decrease in the degree of openness shall reduce the economic growth by 0.4%. In sum, the total effect of sanctions through reducing the FDI and the degree of openness leads to a 2.5% reduction in GDP growth.

C-III: Total Factor Productivity (TFP)- The productivity growth in Iran stands at very low levels compared to the international standards. The U.N. sanction not only has adversely affected the productivity growth owing to reallocation of resources from R&D to other activities, but has led to a reduction in the productivity growth, through a drop in the foreign direct investment (FDI).

In this section, we try to measure the effects of reduction in FDI on TFP as conjectured by Haskel et al. (2002). Since it is expected that FDI in Iran drops substantially due to U.N. sanctions, it affects TFP in turn. The following model has been implemented to capture the effects of FDI on TFP. Needless to say that TFP data has been proxied through estimation of residuals of a Solow growth model.

$$TFP = 6.7 + 0.23FDI + 0.78wage - 0.36DUM$$

(1.7) (2.3) (1.3)

R-squared=0.67 Adjusted R-squared=0.65 D.W=1.8

The results indicate that a one percent decrease in FDI reduces the TFP by 0.23%. Assuming that FDI is expected to decrease by 10% due to U.N. sanctions, it shall in turn, reduce the total factor productivity by 2.3%.

CONCLUDING REMARKS

Iran's economy has experienced various sorts of sanctions during the post revolution era and in the recent war with Iraq, though with comprehensive support of international community, the new series of

economic sanctions imposed by the U.N. Security Council via Resolutions 1737 and 1747 seem to have adversely and multidimensionally affected the Iranian economy.

The novel feature of this paper is that it embraces the pros and cons of the sanctions on the Iranian economy. Many research studies, including those conducted by Clawson (1998) indicate that the sanctions have not persuaded Iran to change its policy. Preeg (1999) claims that the net assessment of the economic impact of U.S. sanctions on Iran is negative and asserts the United States should unilaterally lift the sanctions. Torbat (2006) has estimated the impact of U.S. sanctions on excess financing charges, non-oil exports, intermediate imports and welfare losses. Hossein Askari (2007) believes that the sanctions have not worked. The only discernible result of U.S. sanctions on Iran has been to delay Iran's development of its energy resources. The U.S. policy is based on the premise that lowering Iranian oil and gas exports would hurt Iranian revenues. But the U.S. policy has in fact buoyed oil prices, which have increased Iranian revenues, albeit at lower export levels. Economic sanctions have come at a huge cost to the United States.

As opposed to many western commentators, Iranian authorities assert that sanctions have had positive effects on the economy since the sanctions help the country to reallocate the resources to development of infrastructure projects, contributing to higher economic growth rates as has been the case in the past. In addition, the sanctions help the country to benefit from its comparative advantages. The benefits of the sanctions might far exceed its costs because they enable the policy makers to refurbish instruments like shadow budget, foreign exchange reserve cushioning, and other policies once adopted during the war. However, these benefits might be costly since the sanctions affect the economic variables through different transmission mechanism channels. To complement the findings of other studies, this paper has measured the effects of sanctions on nominal and real variables including inflation rate, exchange rate volatility, real estate prices, financing surcharges, total factor productivity, foreign direct investment, and economic growth.

The estimated results indicate that due to inflationary expectations aroused by the U.N. sanctions the CPI will increase by 5.6%, however, the exchange rate is expected to depreciate by 1.3%. The effects of sanctions on the real estate prices amount to 2.5%. In the real sector, the estimated results suggest that economic growth will drop by 2.2% as a result of the reduction of intermediate goods according to Feder model. In addition, a reduction of 10% in FDI, as a result of the sanctions, will reduce the economic growth by 2.2%, and in turn lowers the total factor productivity by 2.3%.

As seen through the results of this paper the impact of the sanctions on Iranian economy is not of considerable degree. Iran's economy is enjoying a \$36 billion of oil revenue and GDP of \$185 billion and will be able to survive these sanctions with minimal costs. As we will see in our future paper the total loss is not only on the shoulders of Iranians but on the western world, since there will be a substitution effect from the western world to China and Russia, making the European and American entrepreneurs more vulnerable. Indeed, the results suggest that the European and American authorities should avoid the escalation of the crisis by leaning towards peaceful negotiations to resolve this confusion between both sides. Not surprisingly, there is a viable alternative to imposing more stringent sanctions that is engaging in a true dialogue. Iran could be an appropriate intermediate in allowing the US to solve most of its problems in the Middle East, achieving peace and stability in the region, and enhancing the global energy market.

REFERENCES

- Alfaro, L., Chanda, A., Ozcan, S., Sayek, S. (2006) "*How does foreign direct investment promote economic growth? Exploring the effects of financial markets on linkages*," National Bureau of Economic Research, Working Paper 12522.
- Alikhani, H. (2001) "*Sanctioning Iran: Anatomy of a failed policy*," City: Tauris.
- Andersen, T. G., Bollerslev, T. & Diebold, F. X. (2005) "*Roughing it up: Including jump components in the Measurement, Modeling and Forecasting of Return Volatility*," National Bureau of Economic Research, Working Paper 11775.
- Askari, H. (2007) "Why sanctions on Iran will fail"?, Asia Times, 10/26/07.
- Askari, H. et al. (2002) "*U.S. economic sanctions: An empirical study*," Occasional Paper series, Center for the Study of Globalization.
- Askari, H. et al. (2003) "*Economic Sanctions: Examining their philosophy and efficacy*," George Washington University.
- Beehner L. (2007) "U.S. sanctions biting Iran," Council on Foreign Relations, Secretary of State.
- Bekaert, G., Engstrom, E. & Xing, Y. (2006) "*Risk uncertainty and asset prices*," National Bureau of Economic Research, Working Paper 12248.
- Bernanke, B. S., & Gertler M. (1995) "*Inside the black box: The credit channel of monetary policy transmission*," NBER, WP 5146.
- Brunnermeier, M., Gollier, C. & Parket, J. (2007) "*Optimal beliefs, asset prices, and the preference for skewed returns*," National Bureau of Economic Research, Working Paper 12940.
- Hufbauer Gary C. and Schott Jeffrey J. (2006) "Can sanctions stop the Iranian Bombs," Peterson Institute.
- Goldberg, L. S. & Klein, M. W. (1997) "*foreign direct investment, trade and real exchange rate linkages in developing countries*," National Bureau of Economic Research, Working Paper 6344.
- Gordon, Philip, H. (2007) "Iran sanctions and regional security", House Committee on foreign Affairs
- Haskel, J. E., Pereira, S. C. & Slaughter, M. J. (2002) "*Does inward foreign direct investment boost the productivity of domestic firms?*" National Bureau of Economic Research, Working Paper 8724.
- Kalbasi Anaraki, N. (2007) "*Meese and Rogoff puzzle revisited*," International Review of Business Research Papers, vol. 3(2), 278-304.
- Khazaie, M. (2004) "*The trend of foreign direct investment in Iran during the last decade*," Journal of Foreign Direct Investment, vol. 1.
- Loeffler Rachel, (2007) "Effective policy that keeps Iran in check", University of Virginia's Miller Center
- Mishkin, F. (2001) "*The transmission mechanism and the role of asset prices in monetary policy*," NBER, Working Paper 8617.
- Mishkin, F. (2007) "*Housing and the monetary transmission mechanism*," NBER, Working Paper 13518.

Patrick, C. (2006) "*Iran's motives and strategies: The role of the economy*," Statement for Senate Foreign Relations Committee.

Piazzesi, M., Schneider, M. & Tuzel, S. (2006) "*Housing consumption and asset pricing*," National Bureau of Economic Research, Working Paper 12036.

Preeg, E. (1999) "*Thinking ahead/commentary; economic sanctions: Story of failure*," International Herald Tribune.

Sadjadpour karim (2007) "New sanctions likely to worry Moscow and Beijing more than Tehran,"Carnegie Endowment for International Peace.

Schott, J.J. (2006) "*Economic sanctions, oil and Iran*," Peterson Institute for International Economics.

Shahrestani, H. & Mirzaeenejad, M. (2007) "*The relation between non-oil exports and economic growth*," The Economics and Management Journal vol. 2.

Torbat, A. E. (2005) "*Impacts of the U.S. trade and financial sanctions on Iran*," The World Economy, 28 (3), 407-434.

BIOGRAPHY

Hamid Shahrestani, a native of Tehran, Iran, is an Associate Professor of Economics at Ohio University-Chillicothe. He received his B.A. in Economics from Concordia University in Canada, M.A. and Ph.D. in Economics from Western Michigan University and University of Cincinnati, respectively. In the past 30 years, he has been an active consultant in the private sector as well as a teacher and academic researcher. He can be reached by email: Shahrest@ohio.edu

Nahid Kalbasi Anaraki is an Assistant Professor of Economics at Islamic Azad University, Science and Research Branch in Tehran, Iran. She holds a Ph.D. in Economics from George Mason University in Virginia. Dr. Kalbasi is also an economic consultant for various manufacturing companies in Tehran. Her fields of interest are in International Economics and Monetary Theory.