

# The Impact of Export Earning Falls on the Growth of Other Sectors in Iranian Economy

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## Abstract

The purpose of this paper has been to estimate the impact of export earning falls on other sectors of Iranian economy. We have aggregated input-output table of Iran into 37 sectors and separating imports from domestic production to estimate the impact of fall in export earnings on other sectors of Iranian economy. We have also disaggregated imports to show the impact of falls in exports on intermediate imports, the result shows that a unit change in exports would have the highest negative impact on the output of mines other than oil and natural gas production followed by service sector, rubber and plastic, agriculture sector, construction, construction materials and chemicals products and tobacco and food product industries and Manufacture of basic Iron and Steel products, fabricated metals and manufacture of other transport equipments respectively, indicating probably, the sensitivity of these industries to fluctuation in oil export earnings. While industries such as textiles, office machinery and accounting, wood and wood products, Manufacture of medical and optical instruments, household appliances and recycling and other likewise industries are least affected. The decline in intermediate imports paid by oil exports, however is relatively high in products related to mines other than oil and natural gas, followed by service sector, rubber and plastics, construction materials and chemicals products, agriculture, water, gas and electricity, manufacture of transport equipments, manufacture of glass, Iron and steel and Fabricated metal products. This finding shows that in addition to high import intensive industries such just mentioned, other important sectors such as agriculture and service sector are also highly adversely affected. Taking into account the fact that these are the main economic activities of Iran it is Plausible that the economy of Iran on its entirety would be adversely affected by decline in export earnings.

**Key Words:** Export Earning Falls, Intermediate Imports, Iranian Economy, Input-output Technique.

**JEL Classification:** O21, Q32, Q38

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## **1-Introduction**

While export plays a very important role in economic development<sup>1</sup>, its impact varies among countries depending on countries sectoral composition, their institutional structures and the level of development<sup>2</sup>. Oil has been the main source of Iran exchange earnings, thus any fluctuation in its export would have adverse impact on the entire economy. While positive oil price shock increases the real effective exchange rate and appreciate domestic currency in medium terms which is one of the syndromes of a “Dutch diseases”. This reduces the price of imports and increases the price of exports. With increase in oil price and its exchange earnings real government expenditure also increases leading to inflationary tendencies.<sup>3</sup>

However, the Iranian economy is much more vulnerable to the negative shocks of oil prices, the real effective exchange rate falls significantly as the domestic currency depreciates. This leads to increase in price of imports while being ineffective in raising non-oil exports. Thus while positive and negative oil price shocks translate into demand side inflationary effects, the supply side is highly vulnerable to negative oil revenue shocks .Given this negative supply shocks of fall in oil exchange earnings ,the real output which depend heavily on imported Machinery, raw and intermediary material will decline. The question is which sector is more vulnerable to the fall in oil exports? In this Paper we use input-output technique to evaluate the impact of falls in oil export earnings of Iran .The following section would discuss the impact of oil Industry on the economy of Iran. Section three, presents’ methodology and data sources. In section four we analyses the findings and finally, in section fifth and the last we conclude the paper.

## **2- The Impact of Oil Industry**

Iran being an oil exporter ever since the discovery of the first oil well in Masjed Soleiman in 1908.It is the second largest producer and exporter of crude oil after Saudi Arabia. Oil is the major source of exchange earning and the main source of government revenue and an important component of GDP (see table-1). Thus the

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<sup>1</sup>- Keesing(1979),Little(1970, 1982),Haberler(1958)and Samuelson(1938),Balassa(1978)Heller and Porter(1978),Krueger(1978),Taylor(1981)

<sup>2</sup>- Cunado and Carcia de(2005)

<sup>3</sup>- Mohammad Reza Farzanegan and Gunther Markwardt(2009)PP.134-152

entire development program of Iran economy is financed by the revenue earned from oil exports<sup>1</sup>.

**Table 1: Importance of Oil sector in Iranian economy(Percent )**

Year	Share of Oil Sector in Export	Share of Oil Sector in Government Revenues	Share of Oil Sector in GDP
1991	85.80%	51.19%	6.80%
1992	84.96%	52.06%	7.84%
1993	79.28%	72.51%	15.65%
1994	75.14%	73.45%	16.22%
1995	82.26%	70.79%	15.29%
1996	86.07%	66.79%	14.20%
1997	84.17%	58.43%	11.56%
1998	75.72%	42.01%	6.12%
1999	81.26%	47.85%	10.20%
2000	85.31%	56.81%	17.58%
2001	80.90%	57.35%	15.20%
2002	81.33%	62.14%	17.20%
2003	80.48%	61.65%	17.45%
2004	82.81%	58.99%	19.52%
2005	83.62%	48.07%	21.57%
2006	81.54%	43.94%	20.70%
2007	83.51%	36.69%	21.35%

**Source: Statistical Center of Iran, Statistical Yearbook Various Issues and Central Bank of Iran Reports and Balanced Sheets(2012)**

Theoretically, it may be expected that the oil industry influences the economy of oil producers directly and indirectly<sup>2</sup>.The direct impact of oil industry maybe studied in terms of the flow of resources between oil industry and non oil sectors on the one hand ,oil industry may be expected to generate demand for various output of indigenous sector ,capital equipment, labor supply and requirement of industrial goods and services, on the other hand there is the demand of domestic economy for its cheap sources of energy and raw materials for such energy intensive industries like petrochemicals and oil refineries .Indirectly the influence of oil industry may be studied in terms of its revenue and expenditure in the economy of oil producing nations. In the course of development it is noticed that

<sup>1</sup>- Yousefi(1996 )

<sup>2</sup>- Amuzegar and Fekrat( 1971 )

demand for imports tend to exceed the export capacity to import and the poor countries then confront a conflict between accelerating their internal development and external balance<sup>1</sup>.Iran , however, managed through its oil revenue to bridge the balance of payments gap which otherwise would have been very large. Oil industry no doubt helped Iran to surmount the investment and foreign exchange barrier which has been such a serious obstacle for the majority of developing countries. It has no doubt succeed in raising the standard of living of their population, though despite this it continue to remain underdeveloped and share most of the problems and characteristics of other underdeveloped countries. It still continues to depend on oil for its exports with no sign of diversification of its export base. As a result the country is highly vulnerable to fluctuations in oil prices or its export revenue.

In fact inflationary effects are much more pronounced during negative shocks. This is mainly because of increased import prices and the mechanisms of financing budget deficit in Iran .In fact oil price fluctuations have marginal impact on real government expenditures. The dominant position of Iranian government in the economy leading to over employment in public sector and consequently a large and growing wage bill and various kinds of implicit and explicit subsidies such as free or blow cost provision of government services such as utilities, education, health, transport and input for specific sectors ,etc ,making public expenditure highly rigid<sup>2</sup>.

### **3-Methodology and Data Sources**

The basic data is input-output table of the Iranian economy for the year 2001 prepared by the Statistical Centre of Iran .

The basic equation in IO is used:

$$X=Z+F \quad (1)$$

Relationship (1) shows that, Total output(X) of an economy is divided into intermediate demand (Z) and final demand (F). In the standard model of input-output is assumed that there is a constant ratio between intermediate exchange and total product of each sector, by considering that the IO coefficients can be calculated.

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<sup>1</sup> - Gerald ,M,Meir(1963)P.74

<sup>2</sup> - Farzanegan,M.R,and Markwardt (2009)P.138-146

$$A_{ij} = \frac{Z_{ij}}{X_j} \quad (2)$$

And,

$$Z=AX \quad (3)$$

By substituting equation (3) in (1): (4)

$$X = (I - A)^{-1} \cdot F = L \cdot F \quad (4)$$

Where “L” is Leontief Inverse Matrix which shows the impact of Final demand sectors on output level. Thus the impact of fall in exchange earnings of crude oil and Natural gas on other sectors can be estimated through the following equations

$$\partial X = L \cdot \partial F \quad (5)$$

That is crude oil sector and natural gas column in Leontief Inverse Matrix

Shows the impact of a unit change in export sector on the other sectors .In other words how other sectors output would change when oil export changes(declined in our case) by one unit.

To estimate the impact of decline in export on import at first we have calculated the import ratio. i.e. we have divided the imports to output for every sectors to obtain import requirement of domestic output. To estimate the decline in imports resulting from fall in oil exports, we have multiplied this ratio by oil export: Thus,

$$\text{Reduction of import of any sector resulting from a reduction in oil export} = \frac{m_i}{x_i} \times l_{ij} \quad (6)$$

However, to be realistic we have to use input-output table based on domestic output. Thus, at first we have to estimate domestic input-output table, for which imports have to be separated .For this purpose following procedures are adopted:

$$x = Ze + fh + Ex - m$$

$$f = fh + Ex \quad (7)$$

$$x - Ex = Ze + fh - m$$

$$fh = c + g + cf$$

$$x = Ze + fh + e - m$$

$$d = \frac{x-Ex}{Ze+fh} = 1 - \frac{m}{Ze+fh} \quad (8)$$

In the above equation "d" has domestic content ,by multiplying it to any variable we shall obtain domestic content of that variable .Value of "d" varies from zero to unity ,thus we can write the following equation:

$$x - Ex = dZe + dfh \quad (9)$$

Where "c", "g", and "cf", are vectors of household consumption, government consumption and capital formation including imports respectively ."mc", "mg", "mcf" are vectors of import consumption of households, governments ,and imports of capital goods respectively. Differences of each of the vectors give us domestic consumption of households, governments and domestic investment respectively.

Thus we can write domestic output balance sheets as follows:

$$x = (\bar{D}e + \bar{M}e) + [(ch + mc) + (gh + mg) + (cfh + mcf)] + Ex - m \quad (10)$$

In this method also row sum of matrix is equal to import row matrix in final demand. That means sector wise and economy wise "mc", "mg", "mcf" is equal to "m" cancelling each others. Row sum of matrix and column sum of vectors "mc", "mg", "and" mcf" are in value added area and in region IV of the table. Thus

$$x = \bar{D}e + (ch + gh + cfh) + Ex \quad (11)$$

$$x = (I - A^d)^{-1}[(ch + gh + cfh) + Ex] \quad (12)$$

$$x = (I - A^d)^{-1}FD \quad (13)$$

The above relation shows Leontief output balance sheet based on domestic intermediate transactions. This output balance sheets are used in the present paper.

#### **4- Analysis of Findings**

Table 2, presents the findings of input-output technique as described above. The first column shows the fall in output resulting from a unit change (decline) in exports. The second column of the table shows the fall in imports resulting from decline in oil exports. As can be seen from the table , a unit change in exports would have the highest negative impact on the output of mines other than oil and natural gas production followed by service sector, rubber and plastic , agriculture sector, construction, construction materials and chemicals products and tobacco and food product industries and Manufacture of basic Iron and Steel products, fabricated metals and manufacture of other transport equipments respectively .Indicating probably, the sensitivity of these industries to fluctuation in oil

exports. On the other hand the result show that industries such as textiles, office machinery and accounting, wood and wood products, Manufacture of medical and optical instruments, household applicants and recycling and other likewise industries are least affected. The decline in intermediate imports paid by oil exports is largest in mines other than oil and natural gas , ,followed by service sector, rubber and plastics, construction materials and chemicals products, agriculture, water, gas and electricity , manufacture of transport equipments , manufacture of glass , Iron and still and Fabricated metal products. This finding shows that in addition to high import intensive industries such as machinery and transport equipments, rubber and plastics, construction machinery, Iron and still and fabricated metal products, other important sectors such as agriculture and service sector are also highly adversely affected. In other words taking into account the fact that these are the main economic activities of Iran it is Plausible that the economy of Iran on its entirety would be adversely affected by decline in oil exchange earnings.

**Table 2: Production loss and Decline in Intermediate imports due to a unit Fall in oil exports(Million Rials)**

No.	Sectors	Production Loss	Rank	Fall in Intermediate Imports	Rank
1	Agriculture	0.00161	5	0.0000624	5
2	Crude oil and natural gas	0.00023	15	0.0000004	35
3	Other mines	1.00083	1	0.0399065	1
4	Manufacture of food products and beverages	0.00003	28	0.0000046	19
5	Manufacture of tobacco products	0.00060	8	0.0000376	8
6	Manufacture of textiles	0.00000	37	0.0000000	37
7	Manufacture apparel, processed and colored furs	0.00012	18	0.0000129	15
8	Tanning of leather, manufacture of luggage, handbag, saddle, shoes	0.00004	27	0.0000017	30
9	Manufacture of wood and wood products	0.00001	35	0.0000007	33
10	Making paper and paper products	0.00004	26	0.0000025	26
11	Publishing, printing and recorded media	0.00012	17	0.0000118	16
12	Manufacture of refined petroleum products and coal, coke and nuclear fuel processing	0.00007	20	0.0000068	18
13	Construction materials and chemical products	0.00090	7	0.0000182	14
14	Manufacture of rubber and plastic products	0.00186	4	0.0001543	3
15	Manufacture of glass and glass products	0.00024	13	0.0000322	9
16	Non-metallic mineral products not elsewhere classified	0.00003	32	0.0000018	29
17	Manufacture of food products and beverages	0.00038	10	0.0000223	12
18	Manufacture of basic iron and steel products	0.00041	9	0.0000313	10
19	Manufacture of copper products	0.00007	19	0.0000039	21
20	Manufacture of aluminum products	0.00005	22	0.0000038	22
21	Manufacture of basic metals and metal casting	0.00005	23	0.0000036	24
22	Fabricated Metal Products except Machinery and Equipment Manufacturing	0.00035	11	0.0000274	11
23	Construction machinery with general application	0.00005	21	0.0000022	28
24	Construction machinery, with particular application	0.00020	16	0.0000094	17
25	Manufacture of household appliances	0.00003	29	0.0000037	23
26	Manufacture of office machinery, accounting and computing	0.00000	36	0.0000001	36
27	Manufacture of electrical machinery and apparatus not elsewhere classified	0.00023	14	0.0000212	13
28	Manufacture of radio, television and communication equipment	0.00003	31	0.0000032	25
29	Manufacture of medical and optical instruments	0.00001	34	0.0000005	34
30	Manufacture of motor vehicles, trailers and semi-trailer	0.00004	25	0.0000008	32
31	Manufacture of other transport equipment	0.00034	12	0.0000436	7
32	Furniture Manufacture	0.00004	24	0.0000041	20
33	Manufacturing products not classified elsewhere and Recycling	0.00001	33	0.0000011	31
34	Fabricated Metal Products except Machinery and Equipment Manufacturing	0.00003	30	0.0000023	27
35	water,elec & gas	0.00342	3	0.0000517	6
36	Construction	0.00102	6	0.0000697	4
37	Service	0.02093	2	0.0004991	2
Total		1.03443		0.0411	

Source: Research results



The literature on the impact of oil revenue on the economy of oil exporters show that with increase in oil export earnings both tradable and non tradable sectors are expanded, the decline on the oil exchange earnings however, would not counteract these trends, leading to inefficiency and high cost and to what is called cost diseases<sup>1</sup>. This finding support the conclusion reached by scholars such as Eltony and Al-awadi(2001),Raguindin and Reyes(2005),Elanahasy(2006) and Berunent and Ceylon(1989) and Yousefi(1995) who studied the impact of oil revenues on the economy of oil producers, though they differ in their methodologies.

## **Conclusion**

The purpose of this paper has been to estimate the impact of export earning falls on other sectors of Iranian economy. Iran is an oil producer and exporter. Oil is the major source of exchange earning and the main source of government revenue and an important component of GDP. Thus the entire development program of Iran economy is financed by the revenue earned from oil exports<sup>2</sup>. a unit change in exports would have the highest negative impact on crude oil and natural gas production followed by service sector, water ,electricity, and gas connections, Rubber and plastic industries, agriculture sector ,construction materials and chemicals products and tobacco industries and Manufacture of basic Iron and Steel products, fabricated metals and manufacture of other transport equipments respectively .Indicating probably the sensitivity of these industries to fluctuation in exports. On the other hand the result show that industries such as textiles, office machinery and accounting, wood and wood products, Manufacture of medical and optical instruments, household applicants and recycling and other likewise industries are least affected. The decline in output resulting from decline in imports paid by oil exports is largest in manufacture of rubber and plastics ,followed by service sector construction materials and chemicals products, crude oil and natural gas, construction machinery with particular application ,agriculture sector and the manufacture of electrical machinery, Iron and still and Fabricated metal products and machinery and transport equipments. The least sensitive industries are construction, textiles, household applicants, recycling, fabricated metal products, office machinery and accounting. In both cases in addition to high import intensive

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<sup>1</sup>- Baumol(1967) and Baumol.et.al(1985)

<sup>2</sup>- Yousefi(1996 )

industries such as machinery and transport equipments, rubber and plastics, construction machinery, Iron and steel and fabricated metal products that are adversely affected, our finding also shows that agriculture and service sector are highly affected. The literature on the impact of oil revenue on the economy of oil exporters show that with increase in oil export earnings both tradable and non tradable sectors are expanded, the decline on the oil exchange earnings, however would not counteract these trends. In other words the economy of Iran on its entirety would be adversely affected by decline in oil exchange earnings

## References

- Amuzegar, J., and Fekrat, M., Ali(1971) ,Iran: Economic Development Under Dualistic Conditions,Chicago, The University of Chicago press.
- Balassa, Bela(1978), Exports and Economic Growth: Further evidence ,Journal of Development Economics,Vol.5,PP.181-189
- Baumol, W.J(1967) Macroeconomics of Unbalanced Growth: The American Economic Review,57,PP.415-426.
- Bamoul, W.J, Blackman, S.A.B, Wolff, E.N (1985) Un balanced Growth Revisited: Asymptotic Stagnancy and New Evidence ,The American economic Review,75(4),PP.806-817.b
- Berument,H.,Ceylan,NB (2005) The Impact of Oil Price Shocks on the economic growth of the selected MENA countries, Working Paper, Bilkent University.
- Cunado,J.,Garcia,de.,F.P.,(2005) Oil Prices, Economic Activity and Inflation: Evidence for some Asian Countries, The Quarterly Review of Economics and Finance,45,PP.65-83.
- El-Anashasy,A,etal(2006), Oil Prices,Fiscal Policy and Venezuela economic growth, Working Paper,University of Washington.
- Eltony,M.N.,Al-Awadi,M.,(2001), Oil Price Fluctuations and Their impact on the Macroeconomic Variables of Kuwait: a Case study using a VAR Model, International Journal of Energy Research 25,PP.939-959

- Farzanegan,M.R,and Markwardt (2009),The Effects of Oil Price Shocks on the Iranian Economy ,Energy Economics,No.31,PP.131-151
- Haberlear, G (1956) International Trade and Economic Development, National Bank of Cairo Egypt.
- Heller, Peter, S and Porter, Richard, C (1978),Exports and Growth, An Empirical Reinvestigation ,Journal of Development Economics,Vol.5,No.2,PP.191-193.
- Krueger, A (1978) Foreign Trade Regimes and Economic Development: Liberalizations Attempt and Consequences, National Review of Economic Research, New York.
- Keesing ,D.B., and Sherk,D.R.,(1871) “ Population Density in Patterns of Trade and Development”,American Economic Review,Vol.61.(December), PP.956-61.
- Little ,I (1982) Economic Development Theory, Policy and International relation, New York, Basic books.
- Little, I., Scitovsky, T., and Scott, M., (1970) Industry and Trade in Some Developing Countries: A Comparative Study, London, Oxford University Press.
- Looney Robert,E(1984 ) The Impact of Petroleum Exports on the Economy of Saudi Arabian Economy, in Robert Stookey (ed) The Arabian Peninsula Zone of Ferment, Standford, California, Standford University Press.PP.37-64.
- Raguindin.C.E. ,Reyes, R.C.,(2005) The Impact of Oil Price Shocks on the Philippine Economy: a VAR Approach, Working Paper, University of the Philippines School of Economics.
- Yousefi, Mohammadgholi(1993) Globalization Experiences of OPEC economies, Political Economy Journal of India,Vol.2, Issues3&4, July.
- Yousefi, Mohammadgholi(1995) Impact of Oil Export on the Economy of OPEC Countries: An empirical Investigation, The Indian Economic Journal ,Vol. 42, January