AN ANALYSIS OF THE STRUCTURAL CHANGES IN THE IRANIAN ECONOMY DURING 1969-1994 WITH SPECIAL REFERENCE TO THE FOREIGN TRADE STRATEGIES*

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Abstract

In this paper the researchers examine the economic structural change in the Iranian economy under two scenarios: oil + non-oil exports and non-oil exports during 1969-1994. We have used decomposition approach where five decomposed output growth have been worked out. Five input-output tables of 1969, 1974, 1984, 1988 and 1994 with price adjustment of 1974 have been used for analysis. All the input-output tables are aggregated into five sectors. Four sub-periods and one overall period have been distinguished. The overall results of the present study suggest a revival of the trade front of the Iranian economy, particularly durign sub-period 1988-1994 which corresponds with the advent of the economic liberalization and the same applies to overall period 1969-1994. This is more pronounced when considering the scenario of oil + non-oil exports, than non-oil exports alone. Import substitution in intermediate goods contributed more favourably on the growth process under non-oil export scenario than the oil + non-oil exports during sub-periods and overall period. However, the effects of import substitution in final goods in both scenarios during the above mentioned periods are not substantial, which suggest the end stage of import substitution and beginning of import liberalization in final goods.

Introduction

In consonance with the other developing countries, Iran has exercised a variety of economic policies for attaining an acceptable rate of growth during the past four decades. From the inception of the planning era in the early fifties, Iran has attempted to adopt different economic policies. For instance, the Fourth Five Year Plan (1967-1972) was marked by building industry through Import Substitution strategy (Banouei, 1989). This was the

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first plan which formally used a specific development strategy.[1]

Considering all external and internal factors, such as world economic situation and lack of wild fluctuations among the social, political and economic variables, the overall growth rate of this plan was fixed at 9 percent (Razavi and Vakil, 1984).

In the early seventies, Iran was marked by a new phase of planning which for the first time attempted absolute sectoral transformation from agricultural and industrial based into a fully industrial based economy (Banouei, 1992 a, 1992 b, Prasad, Banouei and Swaminathan, 1992).

With the oil price rise in the mid seventies (during the Fifth Plan, 1973-1978) and the realization that oil is an exhaustible resource, the plan strategy with the exogenous shock before 1978, had advocated resource-based heavy industrialization with projected growth rate of 25.9 percent (Banouei, 1989).

During the eighties, the first decade of Islamic Revolution was marked by the war and the economic embargo, which made it impossible for Iran to formulate and implement comprehensive plans. Consequently, the country suffered GDP losses and a downward trend in per capita income (Plan and Budget Organization and United Nations, 1999).

In the nineties (the second decade of hte Islamic Revolution), the emphasis has, for the first time, shifted towards structural reforms of the type IMF-Word Bank proposed policy packages which in fact implies unbridled economic liberalization (Prasad and Banouei, 1996).

The overall policies as well as the impact of the economic liberalization on the economic growth of the country, according to the joint report of the Plan and Budget Organization and the United Nations (P.B.O. and U.N., 1999) are as follows: The first decade after the Islamic Revolution was marked by the imposed war and the economic embargo, which made it impossible for Iran to formulate and implement comprehensive development plans. Consequently, the country suffered GDP losses of a downward trend in per capita income. In the next ten years, because of a strategic change of direction under the First Five Year Plan (1989-1993) towards economic liberalization and privatization, GDP grew at an average annual growth rate of 7.3 percent.

The absence of a logical relationship between the Second Development Plan's general economic policies (1995-1999) and its operational program was the key impediment to the full implementation of economic reforms (P.B.O. and U.N., 1999).

The average annual growth rate of the economy during the second Plan was estimated to be 5.1 percent, however, its actual average annual growth rate was less than 3 percent (P.B.O. 1998).[2]

The above literature suggests that during the past four decades, two distinct economic policies have been exercised in Iran. One is inward-looking policy of the sixties and seventies with emphasis on building industries via import substitution strategy and the second is outward-looking policy based on structural reform with emphasis on export expansion. Due to the exhaustibility of oil resources, both policies emphasised the diversification of the mono-economy into poly-economy.

The main objective of this paper is to examine the impact of these economic policies on the total and the sectoral growth rates of the economy with special reference to trade policies during 1969-1994 using Structural Decomposition Analysis (SDA).[3]

This paper is organized as follows: the next section presents an overall view of the changes in the industrial structure of the economy. In the section after that, the approach of the paper is discussed. Sources of data and the process of adjustment are shown in the next section. Empirical results and their analyses are presented after that. Summary and conclusions are alloted to the last section.

An Overview of the Changes in the Industrial Structure of the Economy

Table 1 shows the overall picture of the Iranian

Table 1. Domestic demand, intermediate demand, value added, exports, imports, export and import by industrial group (oil and non-oil) in constant 1974 prices (%)

Sector 1969	DD	ID	OVA	NOV	SOE	SNOE	SM	ERO	ERNO	IMR
Agri	9	35	22	24	3	15	5	1	1	12
Min	3	8	13	3	81	6	7	65	2	18
L. ind.	21	10	8	9	15	74	21	8	8	20
H. ind.	19	10	7	8	1	5	66	1	1	70
Serv.	48	37	50	56	0	0	0	0	0	0
Total	100	100	100	100	100	100	100	8	2	20
1974										
Agri	6	11	7	13	*	3	6	2	2	30
Min	*	12	49	9	90	1	*	88	1	2
L. ind.	17	12	6	11	1	14	13	4	4	26
H. ind.	18	74	7	12	7	62	74	17	17	141
Serv.	59	23	31	55	2	20	7	2	2	4
Total	100	100	100	100	100	100	100	32	5	34
1984										
Agri	8	19	11	11	*	8	6	*	*	14
Min	*	1	11	11	95	3	*	94	*	18
L. ind.	18	14	10	10	1	16	17	*	*	19
H. ind.	18	35	14	14	2	37	68	1	1	0.76
Serv.	56	31	54	54	2	36	9	*	*	3
Total	100	100	100	100	100	100	100	8	*	20
1988										
Agri	16	13	16	18	6	11	3	4	4	3
Min	11	2	21	13	51	2	*	42	2	*
L. ind.	12	1	7	8	17	35	9	15	15	11
H. ind.	10	52	18	20	5	10	71	3	3	106
Serv.	51	22	38	41	21	42	17	7	7	5
Total	100	100	100	100	100	100	100	11	6	14
1994										
Agri	30	14	22	24	10	20	3	4	4	*
Min	12	2	18	7	52	3	*	23	*	*
L. ind.	3	4	3	4	12	25	15	17	17	17
H. ind.	18	43	15	18	4	8	76	2	2	27
Serv.	37	37	42	47	22	45	6	5	5	1
Total	100	100	100	100	100	100	100	8	4	45

Sources: based on the Input-output Tables of 1969, 1974, 1984, 1988 and 1994.
DD= percentage of domestic demand to gross output
ID= percentage of intermediate demand to gross output
OVA=percentage of value added with oil to gross output
NOVA=percentage of non-oil value added to non-oil gross output
SOE= share of non-oil exports to total exports
SNOE= share of non-oil exports to total non-oil exports
SM= share of imports to total imports
ERO= non-oil export ratio. Non-oil export to total non-oil domestic output
ERNO= Oil export ratio. Oil + non-oil export to total oil + non-oil domestic output
IMR= Import ratio. Import to total domestic Output.
* Less than 0.5 percent.

economy in terms of the shares of the domestic final demand (DD), intermediate demand (ID), value added with oil (OVA), non-oil value added (NOVA), share of exports of oil (SOE), share of non-oil exports (SNOE), share of imports (SM), oil export ratio (ERO), non-oil export ratio (ERNO) and import ratio (IMR) during 1969-1994 for five major sectors of the Iranian economy.

The percentage shares of the sectoral domestic final demand to the gross output during the years under consideration reveals that, service sector has the largest share. In 1969, its share was 48% and increased by 59% in 1974 and later on has shown decreasing trends of 56% , 51% and 47% for the years 1984, 1988 and 1994.

Light and heavy industries are the two other sectors which have considerable shares for the years 1969, 1974 and 1984 (between 21 to 18%) and their share later on decreased considerably specially for the years 1988 and 1994. Share of agriculture has shown the opposite trends. In 1969, 1974 and 1984, its share was 9% , 6% and 8% respectively, however in 1988 and 1994, it increased by 16% and 30% . Shares of sectoral intermediate demand during these years show that major outputs of service and agriculture (37% and 35%) in 1969 have been used as intermediate inputs by the productive sectors of the economy whereas the intermediate shares of light and heavy industries were 10% . This trend has shifted in 1974 . The intermediate shares in 1974 show that the shares of service and agriculture have decreased by 23% and 11% respectively whereas the intermediate share of heavy industry has increased by 74% which is a major sectoral shift in 1974 as compared to 1969. For the remaining years (1984, 1988 and 1994), the heavy industry has a dominant share as compared to other sectors of the economy.

Regarding the shares of sectoral value added (oil + non-oil and non-oil), the table shows that the major contribution of value added (both in oil and non-oil) goes to service sector in all these years. For example, the value added share (oil + non-oil) in 1969 was 50%, it decreased to 31% in 1974, increased by 54% in 1984, again decreased by 38% in 1988 and increased by 42% in 1994.

The share of this sector under the non-oil value added shows 56% in 1969 slightly decreased by 55% in 1974, afterward shows a decreasing trend of 54%, 41% in 1984 and 1988 and increased by 47% in 1994.

Regarding the share of sectoral exports (oil+ non-oil) and non-oil exports, Table 1 shows that the mining sector (including crude oil and gas) has predominant share in total exports in all the years under consideration. For example, its share in 1969 shows 81% and it increased by 90% in 1974 and further by 95% in 1984. Its share in 1988 and 1994 remained around 51 percent which indicates that the export shares of non-oil sectors, particularly industries, services and agriculture have shown an increasing trend during 1988-1994.

Shares of sectoral non-oil exports to total non-oil exports during the years under consideration show that 74% of the total non-oil exports went to light industries in 1969 and 15% share went to agriculture. This trend has been reversed in 1974 with predominant share of heavy industries of 66% . Except for the year 1984 which heavy industries and service sectors have had the largest shares, shares of light industries and service sector have contributed major shares during 1988-1994. On the whole, the export shares of industries (light+heavy) except for the year 1994, were between 87% to 45% during 1969-1988, and in 1994, the share of services surpassed the other sectors of economy. Therefore, it is observed that as compared to the other sectors of economy, industrial sectors appeared to be more export oriented sectors.

Likewise sectoral import shares shows that heavy industries have the largest import share with increasing trend between 66% to 76% during 1969-1994.

Export and import ratios which show the degree of integration of economy in the international trade have been computed. Export ratios (oil + non-oil) show that its share was 8% in 1969 and increased by 32% in 1974. It decreased by 8% in 1984 and again

increased by 11% in 1988 and finally decreased by 8% in 1994. Therefore, we observe that total export ratio during 1969-1994 remain, more or less constant, whereas non-oil export ratio during 1969-1994 remain, more or less constant, whereas non-oil export ratio during 1969-1988, rose from 2% to 6% during 1969-1988 and again decreased by 4% in 1994.

Approach of the Present Study

The approach of the present study is based on the Strutural Decomposition Analysis that was first propounded by Chenery (1960) and later on modified and used by several authors (for instance, Dervis, Demelo and Robinson, 1982; Chenery, Robinsons and Syrquins, 1986; Rose and Casler, 1996; Skolka, 1989, Albala-Bertrand, 1999; Dietzenbacher and Los, 1998; Zakaria Abdul-Rashid and Ahmad Elyas Elameer, 1999.

The literature shows that although different authors apply the spirit of the same approach for analyzing structural decomposition, they have used different terminologies. For example, in their fifty year historical survey of development and application of Inut-Output analysis, Rose and Miernyk (1989) have used Structural Decomposition Analysis (SDA). According to them the (SDA) represents a way of distinguishing a major source of change in an economy. It basically involves a set of comparative static exercise in which set of cofficients are changed in turn and activity levels compared to reference point (p. 245). In their recent article, Dietzenbacher and Los (1998), applying the same approach with more refinement, have used "Structural Decomposition Techniques" (SDT). According to them "Using Structural Decompoition Techniques allows for quantification of underlying source of change in a wide variety of variables" (p. 308). Others have used "Compositional Structural Change" to distinguish institutional change (Albala-Bertran, 1999, P. 302) and Factor Decomposition Change" (Zakaria Abdul Rashid and Ahmad Elyas Elameer, 1999, p. 170).

The above observations suggest that the approach of Structural Decomposition is similar to that of growth accounting, where the objective is to decompose several factors on demand and supply side of the economy.

Analytical Framework

The approaches of Chenery et al (1986), Albala-Bertrand (1999), Dervis et al (1982) and Zakariah (1999) begin with an accounting identity of demand and supply, allowing it to explain differential changes in disaggregated sectoral production as a non-proportional expansion. For this purpose, an Input-Output accounting framework shows how the gross output of each industry is distributed among the corresponding demands.

In IO framework, these demands are: the n×n matrix W of intermediate demands for the inputs of the n classified industries (domestic intermediate inputs+ intermediate imports); the n×l matrix F of domestic final demand (including final imports); the n×l matrix E of foreign; and n×l matrix M of total imports (intermediate and final).

In an open static Leontief system balanced equation with respect to the n×l domestic gross output vector of X of the n industry can be expressed as:

$$X = W_i + F + E - M \qquad (1)$$

Where i is the n×l column summation vector, consisting of ones, and X, W, F, E and M are respectively domestic gross output, intermediate demand (domestic intermediate demand + intermediate imports), domestic final demand (including final imports), export demand and imports. Let a represent the unit-input requirement of the jth industry for the output of the ith industry in terms of technical coefficients, $a_{ij} = \frac{W_{ij}}{X_j}$

Therefore, this generates an n matrix A of coefficients. Rearranging that, we have

$$AX = W_i \qquad (2)$$

substituting equation (2) into equation (1), we obtain,

$$X = AX + F + E - M \qquad (3)$$

In order to estimate domestic input-output

matrix, sectoral intermediate imports, sectoral domestically produced final goods and also sectoral final imports, it is assumed that at level of each industry, imports are demanded for intermediate input use and final use in the same proportions respectively.[3] Based on this assumption, import ratio which shows total import to total domestic supply can be computed as follows[4]:

$$m_i = \frac{M_i}{(W_i + F_i)} \tag{4}$$

$$M_i = \hat{m}_i^w \; W_i + \hat{m}_i^f \; F_i$$

$$M_i = \hat{m}_i^w \; AX + \hat{m}_i^f \; F$$

Equation (4) shows that part of total imports is used as an intermediate in the process of production and remaining is consumed as final imports by the institutional sectors.

Substituting equation (4) in (3), we have

$$X = (I - \hat{m}^w)AX + (I - \hat{m}^f)F + E \tag{5}$$

In equation (5), matrices $I - \hat{m}^w$ and $I - \hat{m}^f$ show the ratios of domestic to total intermediate demands and domestic to the final demands respectively. These ratios are indicators of import substitutions in intermediate and final imports respectively.

Let for simplicity $\hat{\alpha}^f = (I - \hat{m}^f)$ and $\hat{\alpha}^w = (I - \hat{m}^w)$ where $\hat{\alpha}^w$ and $\hat{\alpha}^w$ represent the diagonal matrices of domestic intermediate and domestic final supply.

Using these expressions, equation (5) becomes

$$X = \hat{\alpha}^w \; AX + \hat{\alpha}^f F + E \tag{6}$$

Therefore, solving for X, we obtain the IO model.

$$X = (I - \hat{\alpha}^w A)^{-1} \; (\hat{\alpha}^f F + E) \tag{7}$$

In equation (7), the term $(I - \hat{\alpha}^w A)^{-1}$ shows the Leontief inverse for domestically produced intermediate goods and services only and represents coefficients of weights, while the second term contains both domestically produced and foreign final demands, and shows volumes.

In order to analytically elaborate the decomposition of output change, i.e., absolute growth and growth rate due to changes of different sources between two periods (5), it is necessary to calculate the first difference equation (7). Let $\overset{-1}{W} = (I - \hat{\alpha}^w A)^{-1}$ and $D = (\hat{\alpha}^f F + E)$, then the equation (7) becomes,

$$X = \overset{-1}{W} D \tag{8}$$

and taking the first difference of equation (8), we have either the first term or the second term on the RHS of equation (8) can absorb the third term. If the first absorbs the third term, then the calculation will be weighed by the terminal year of the structural $\overset{-1}{W}$ and the base year of the volume D, and vice versa, if the third term is absorbed by the second term. This is similar to Paasche and Laspeyres weighting respectively, i.e.,

$$\Delta X = \Delta(\overset{-1}{W} D) = \tag{9}$$

$$\overset{-1}{W}_0 \Delta D + \Delta \overset{-1}{W} D_0 + \Delta \overset{-1}{W} \Delta D$$

$$\Delta X = \overset{-1}{W}_1 \Delta D + \Delta \overset{-1}{W} D_0 \tag{10}$$

$$\Delta X = \overset{-1}{W} \Delta D + \Delta \overset{-1}{W} \Delta D_1 \tag{11}$$

It should be mentioned that the numerical results from the two alternative weighting are not normally equivalent and can be very different if interaction term is large.

To remedy this index number problem, several methods have been devised by different authors, such as creating an appropriate divisia index and so on (see Fane, 1971, 1973 and Syrquin and Urata, 1985).

However, a simpler method that distributes the interactive proportionally in the other two terms is to take the simple arithmetical average of Paache and Laspeyres. This simple method has been used by several authors during 1980s and early 1990s (see for example, Chenery, Robinson and Syrquin, 1986; Wychoff and Sakurai, 1992). Dietzenbacher and Los (1998) have questioned the technical aspects of this method, specially the potential seriousness of the non-uniqueness problem, and concluded that "in the simplest case, with only two determinants, the problem is solved on an ad hoc basis by taking the average of the two possible forms. The resulting decomposition has the intuitive advantage that mid-point (or average) weights are used for the change in each of the determinants" (p. 16).

In this paper, the average approach that has been followed by the others has been used here for all our calculations.

The total decomposition of equations (10) and (11), i.e., Paache weighting (using terminal year structural coefficients and initial year volumes) and Laspeyres weighting (using initial year initial year structural coefficients and terminal year volume for the absolute growth rate of variation in gross output can be expressed as follows.[5]

$$\Delta X = \overset{-1}{W_1}\,\hat{\alpha}_1^f\,\Delta F + \overset{-1}{W_1}\,\Delta E + \overset{-1}{W_1}\,\Delta\hat{\alpha}^f\,F_0 + \overset{-1}{W_1}\,\hat{\alpha}_1^w\,W_0 i + \overset{-1}{W_1}\,\hat{\alpha}_1^w\,\Delta AX_0 \qquad (12)$$

$$\Delta X = \overset{-1}{W_0}\,\hat{\alpha}_0^f\,\Delta F + \overset{-1}{W_0}\,\Delta E + \overset{-1}{W_0}\,\Delta\hat{\alpha}^f\,F_1 + \overset{-1}{W_0}\,\Delta\,\hat{\alpha}_0^w\,W_1 i + \overset{-1}{W_0}\,\hat{\alpha}_0^w\,\Delta AX_1 \qquad (13)$$

The RHS of both the equations contains five terms, which show a direct and indirect contribution to the total demand for gorss output of the economy. The standard meanings of these terms with respect to equation (13) are as follows:

$\overset{-1}{W_0}\,\hat{\alpha}_0^f\,\Delta F$ Contribution of domestic demand expansion (DDE)

$\overset{-1}{W_0}\,\Delta E$ Contribution of export demand expansion (EDE)

$\overset{-1}{W_0}\,\Delta\,\hat{\alpha}^f\,F_1$ Contribution of import substitution of final goods (ISF)

$\overset{-1}{W_0}\,\hat{\alpha}_0^w W_1 i$ Contribution of import substitution of intermediate goods (ISI)

$\overset{-1}{W_0}\,\hat{\alpha}_0^w\,\Delta AX_1$ Contribution of changes in IO coefficients (IOCS)

The RHS of equation (13) shows five terms which have the same standard meanings, as equation (12).

After deriving the equations (12) and (13), the simple arithmetic average of Paäche and Laspeyres weightings have been worked out for all the actual calculations for all the sub-periods and overall period.

Sources of Data

Basically, the present study uses secondary data from the Iranian IO Tables published by the Bank Markazi of Iran (BMI), PBO and the latest one that has been updated by the present authors.

These tables are as follows:

1. Input-Output Table, 1969 (BMI, 1976)
2. InputOutput Table, 1974 (BMI, no date)
3. Updated Input-Output Table, 1984 (PBO, 1988)
4. Input-Output Table, 1988 (BMI, 1996)
5. Updated Input-Output Table, 1994 (by the authors)

These tables have many common characteristic features, such as uniform sectoral classifications, conceptual definitions, and data collections. However, methods of valuation of all these tables are at current prices.

Based on the availability of data and for the purpose of the price adjustment, initially all the tables have been aggregated into 16 sectors and then price adjustment taking 1974 as the base year have been made by the double deflation method (6) (Jahangard, 1997). These sectors are: 1) agriculture, 2) crude oil and natural gas, 3) mining, 4) food, beverages and tobacco, 5) textile cloth and leather, 6) wood and wood products, 7) printing and publishing, 8) chemical, rubber and plastic, 9) non-

metallic mineral products, 10) basic metals, 11) other manufacturing, 12) electricity, 13) construction, 14) transportation and communication, 15) financial and monetary services and 16) other services.

In order to bring our empirical results in a manageable proportion and also to facilitate comparison with other studies, we have aggregated the above 16 sectors into five sectors, such as: 1) agriculture, 2) mining including crude oil and natural gas, 3) light industries, 4) heavy industries, and 5) services.

Empirical Results and Analysis

The results of the present study under two scenarios of oil and non-oil exports have been presented in Tables 2 and 3 respectively during 1969-1994 under the four sub-periods, 1969-1974, 1974-1984, 1984-1988 and 1988-1994 and overall period 1969-1994.

Columns of each sub-period and overall period shows the direct and indirect effects of decomposed sources on the sectoral output changes and total economy. The rows of each sub-period and overall period show the direct and indirect effects of all decomposed sources on output changes of each sector and total economy.

Sub-period 1969-1974

The results of Table 2 which indicate oil + non-oil exports, show that the effects of export expansion, as compared to the effects of the other sources, appear to be the major source of output growth with 55.3% . In this case, the mining sector including crude petroleum and gas alone contributed around 48% of the overal output growth of the economy. The obvious reason could be the quadrupling of the 1973 oil revenues. Heavy industries and services are the sectors which have sizeable output gorwth of 4.1% and 3.4% respectively. This shows that during this period, the heavy industries, particularly the petroleum related industries, their development which had been initiated in the Fourth Five Year Plan (1968-1972) became export oriented industries during the Fifth Five Year Plan (1973-1978).

Considering the sectoral and overall output growth of the economy, the results show that while the effects of non-oil export expansion on the sectoral and overall output growth rate of the economy are favorable, they do not appear to be major sources of growth. However, the results indicate that the shares of sectoral output growth, particularly heavy industries have considerably increased. Therefore, in both cases (oil + non-oil and non-oil exports) the heavy industries and services under the export expansions have shown considerable output growth during the period under consideration.

Coming to the import substitution in final and intermediate goods, the results in Table 2 reveal that the direct and indirect effects on overall output growth in both cases are negative which show the import liberalization in final and intermediate import. However, the share of import liberalization in final goods appears to be much more than the import liberalization in intermediate goods. The same trend can be observed under the second scenario (non-oil exports in Table 3).

The overall results of Tables 2 and 3 during this period suggest that on accounts of quadrupling of oil revenues, the effects of export expansion on the total output growth of the economy with predominant output growth share of mining sector (including petroleum and gas) appear to be a dominant source of growth, however, when considering the effects of non-oil exports, the results in Table 2 show that the non-oil export expansion is no longer a dominant source of growth and in this case the domestic demand expansion with 90% on the output growth of economy appears to be the dominant source of growth under the non-oil exports.

Comparing the process of import substitutions, the results of Tables 2 and 3 show that under the oil export scenario, the export expansion could be matched with import liberalization (import liberalization in final goods is much higher than import substitution in intermediate goods). However, the same trend cannot be observed from the scenario of non-oil exports of Table 3. The

Table 2. Sources of industrial growth in Iranian economy with oil exports (1969-1994)

Sector 1969-1974	DDE	EDE	ISF	ISI	IOCS	TOTAL
Agri	1.9	0.02	-0.3	-0.5	-2.1	-0.9
Min	0.6	47.7	0.05	0.9	-2	47.2
L. ind.	6.1	0.1	-0.4	-0.1	1.3	7
H. ind.	6.2	4.1	-0.2	-0.2	5.8	15.5
Serv.	35.7	3.4	-1.6	-0.5	-5.7	31.2
Toral	50.4	55.3	-2.5	-0.4	-2.8	100
1974-1984						
Agri	30.2	-0.9	2.5	2.1	-1	32.8
Min	6.7	-83.9	1.8	0.8	-22.1	-96.8
L. ind.	40.7	-2.4	2.4	0.9	-5.4	36.3
H. ind.	33.6	-10.4	8.3	8.4	-19.1	20.9
Serv.	113.9	-4.9	2.5	1.4	-5.8	106.8
Total	224.8	-102.6	17.5	13.7	-53.4	100
1984-1988						
Agri	-0.9	-6.3	-4.1	-2.5	6.3	-7.6
Min	-32.3	19.3	-1.7	-0.7	-3.5	-18.9
L. ind.	57.3	-12	-5.8	-2.3	-3.4	33.6
H. ind.	69.4	-5.9	-13.7	-18.2	-44.4	-12.7
Serv.	120.1	-14.7	4	-1.4	1.2	105.6
Total	213.5	-19.7	-24.9	-25.1	-43.7	100
1988-1994						
Agri	12.7	1.6	0.2	0.2	7.7	22.5
Min	17.7	3.7	0.01	0.2	1.9	23.7
L. ind.	0.03	0.6	-0.09	0.01	0.7	1.2
H. ind.	-14.8	2.5	-0.3	4.7	20.6	12.7
Serv.	8.5	3.5	1.1	1.3	25.3	39.8
Total	24.2	12.1	0.9	6.6	56.2	100
1969-1994						
Agri	9.8	1.3	0.1	0.1	0.07	11.5
Min	17.3	5.1	2.3	0.4	-1.7	23.3
L. ind.	1.6	1.4	0.2	0.3	0.6	4.2
H. ind.	-2.3	3.3	-1.6	8.0	11.1	18.5
Serv.	23.2	5.6	-2.54	1.7	12.2	42.5
Total	49.8	16.7	0.8	10.5	22.2	3.17

results suggest that the domestic demand expansion is the major source and the positive non-oil export expansion is followed by the import liberalization in final goods and a relatively but not very significant import substitution in intermediate goods.

Sub-periods 1974-1984 and 1984-1988

On accounts of the changes in the Iranian political scene, followed by the eight-year war, a precise economic policy could not be formulated in the plan framework. However, the results of Tables 2 and 3

Table 3. Sources of industrial growth in Iranian economy with non-oil exports (1969-1994)

Sector 1969-1974	DDE	EDE	ISF	ISI	IOCS	TOTAL
Agri	5.5	0.1	-0.9	-0.9	-5.5	-1.7
Min	0.8	1.2	0.1	2.3	3	7.5
L. ind.	10.6	0.1	-0.6	-0.2	2.4	12.3
H. ind.	10.5	6.9	-0.4	-0.3	10.5	27.3
Serv.	62.5	3.6	-2.8	-0.6	-7.9	57.3
Total	89.9	11.9	-4.6	0.3	2.5	100
1974-1984						
Agri	1.8	-0.05	1	0.1	-0.07	2
Min	4.5	-1.2	1.2	0.9	-16.1	-10.4
L. ind.	27.9	-1.5	1.7	0.6	-4.1	24.6
H. ind.	22.6	-6.8	5.8	5.9	-14.4	12.9
Serv.	77.8	-2.5	1.7	0.9	-7	70.9
Total	134.8	-12.1	10.5	8.6	-41.8	100
1984-1988						
Agri	-0.09	-0.6	-0.4	-0.2	0.6	-0.7
Min	-38.6	-0.9	-0.5	-0.5	-4.1	-44.7
L. ind.	66	-13.8	-6.6	-2.7	-4.1	38.8
H. ind.	79.9	-6.7	-15.5	-20.8	-4.2	-15.1
Serv.	138.5	-16.5	0.8	-1.3	0.3	121.8
Total	245.8	-35.6	-22.2	-25.6	-59.4	100
1988-1994						
Agri	1.4	0.2	0.03	0.03	0.9	2.5
Min	26	0.2	0.003	0.3	2.7	29.4
L. ind.	-0.1	0.8	-0.1	0.01	0.7	1.3
H. ind.	-22.5	1.7	-0.5	6.9	27.7	13.3
Serv.	11.9	3.2	1.5	2	34.7	53.4
Total	16.8	6.1	0.9	9.3	66.8	100
1969-1994						
Agri	9.1	1.3	0.3	0.7	1.3	12.6
Min	23.6	0.3	3.7	0.6	-7.4	20.8
L. ind.	1.8	1.5	0.2	0.3	0.6	4.5
H. ind.	-3.1	1.9	-1.8	8.8	11.7	17.6
Serv.	26.7	4.2	0.07	1.9	11.5	44.5
Total	58.2	9.2	2.5	12.3	17.8	100

show the inward looking policy with substantial share of domestic demand expansion on output growth of economy under two scenarios. For example, the output growth of demand expansion under the oil exports rose 5.04% in 1969-1974 to around 225% in 1974-1984 and decreased to 213% in 1984-1988. The service sector during these sub-periods has the greatest output shares. For example, output growth of services rose from 35.7% in 1969-1974 to 113.6% in 1974-1984 and further to 120% in 1984-1988. Besides, industries (light+heavy industries) are the sectors which have benefited

considerable output growth. For instance, the output growth of industrial sectors which was around 12% in 1969-1974, rose by 74% in 1974-1984 and further to 126% in 1984-1988. Coming to the effects of oil exports on the output growth of the overall and sectoral economy, the results show that the effects of exports has negative impact on the overall and sectoral output growth of the economy during these periods. For example, the export expansion of 55.3% in 1969-1974, decreased by 103% in 1984-1988 and in 1984-1988, its share was around negative 20% .

As far as the sectoral output growth during this period is concerned, it is observed that the share of mining is around negative 84% followed by heavy industries with negative 10.4% .

Coming to the import substitution in final and intermediate goods, the results show that during 1974-1984, the import substitution in both cases has favorable impact on the overall and the sectoral growth rate of the economy. For example, the effect of import substitution in final goods on the overall growth rate is around 18% and the share of heavy industries appears to be the greatest one (8.3%). Likewise, the effects of import substitution in intermediate goods during the period on the output growth of total and sectoral are favorable. For instance, around 14% of output growth of the economy goes to import substitution in intermediate goods and the share of heavy industries as compared to the other sectors is considerably high (8.4%). A similar trend is observed under the scenario of non-oil exports during 1969-1974. For instance, the results in Table 3 show that the non-oil export expansion has unfavorable impact on the overall growth rate of 12% which has further decreased by 36% in 1984-1988. The major negative impact on the sectoral output growth in 1974-1984 goes to heavy industries (7%) and in 1984-1988, the output growth of service sector and then light industries, as compared to the other sectors have the most unfavorable shares.

As far as import substitution in final goods and intermediate goods are concerned, the results show that during 1974-1984, unfavorable export expansion is followed by favorable import substitution both in final goods and intermediate goods in 1969-1974 (see Table 1). The effects of import substitution in final goods on the overall economy is 10.5% and share of heavy industries is the greatest one. The import substitution in intermediate goods on the overall economy is 9% where the share of output growth of heavy industries as compared to the other sectors is greater as compared to other subperiods.

The effects of non-oil exports expansion and import substitution in final good and intermediate goods during 1984-1988 show that both non-oil export expansion and import substitution have unfavorable impact on the overall and sectoral growth rate of the economy (36% , 22% and 26% respectively) which suggest that unfavorable impact of non-oil export is followed by the unfavorable import substitution.

Sub-period 1988-1994

As compared to the two previous sub-periods (1974-1984 and 1984-1988 respectively), the period under consideration shows post war era where in the new economic policy, i.e., structural adjustment had been initiated and embedded in the First Five Year Plan of the Islamic Republic of Iran (1988-1993). As compared to the previous period, the results of this period appear to be interesting because the overall results with respect to the two alternatives are not comparable with the results of the previous periods. First of all, it seems that the overall results are comparable with one of the main strategies of the plan, i.e., export expansion and import substitution. Secondly, the impact of the technological change appears to have the greatest effect on the sectoral and the total output growth of the economy. In the case of oil export it is 56.2% and non-oil exports around 67% . However, in the previous periods, it is observed that the effects of technological change on output growth of the sectoral and output growth of the economy had always appeared to be unfavorable.

Considering the results of Table 2 with respect to export expansion and import substitution, we observe that, for the first time, the favorable impact of the structural change on the output growth of the different sectors and total economy, has brought about a modest effect on the impact of the export expansion on the output growth of the total and different sectors of the economy. In this case, the mining sector including petroleum sector has contributed the largest output growth share for obvious reasons. Thereafter, services and heavy industries appeared to be more export oriented sectors. Considering the non-oil export scenario shown in Table 3, it is observed that services and heavy industries have contributed the largest output growth shares during the period under consideration.

The results of import substitutions in final and intermediate goods under two scenarios show that in both cases, the effects on the output growth of total economy as well as different sectors was modest. However, it should be noted that the economy is leading towards import substitution mainly in intermediate goods with the considerable share of export expansion.

The overall period 1969-1994

The results of the overall period under two scenarios show that all the decomposed factors do have favorable effects on the growth process of the Iranian economy. However, domestic demand expansion and then technological change appeared to have the largest shares of output growth. For example, Table 2 shows that these shares are 50% and 22% respectively and in Table 3 they are 58% and 18% . These results suggest that the effect of domestic demand expansion in scenario one is less than scenario two. However, the effect of the technological change on the output growth gives the opposite direction.

With respect to the effects of export expansion and import substitution in final and intermediate goods under two scenarios, the results show that the effect of export expansion (oil + non-oil exports) contributed 17% share of output growth with less than 1% of import substitution in final goods and around 11% in intermediate goods. If we compare these results with the similar results of non-oil exports, we observe that the share of non-oil export expansion on output growth in 9.2% followed by 2.5% and 12.3% in import substitution in final and intermediate goods respectively.

The overall results of the present study suggest that the growth process of the Iranian economy is reacting favorably to the concerned factors. This is true in the sub-period 1988-1994, particularly after the ceasefire of Iran-Iraq war and the advent of new economic liberalization as well as in the overall period (1969-1994). However, the results show the shares of domestic demand expansion and then technological change in both the scenarios appeared to be key factor in the growth process of Iranian economy. In the trade front, we observe that export expansion in both cases during the sub-period and overall period appeared to have considerable share of output growth. This is supplemented only by the import substitution in intermediate goods but not in final goods which suggests that import substitution in final goods has almost reached to an end stage.

Summary and Conclusions

The primary purpose of this study has been to examine structural change in the Iranian economy under two scenarios of oil + non-oil and non-oil exports during 1969-1994 period, using decomposition method where decomposed output growth has been divided in to five sources: domestic demand expansion, export expansion, import substitution in final goods, import substitution in intermediate goods and technological change. The present study used 1969, 1974, 1984, 1988 and 1994 input-output tables. Four sub-periods of 1969-1974 , 1974-1984, 1984-1988, 1988-1994 and one overall period 1969-1994 under two scenarios oil + non-oil export and non-oil export has been used for analytical purposes.

The input-output tables for 1969, 1984. 1988 and 1994 were deflated to the year 1974 constant prices in order to reveal the real changes in structure of

the economy. Similar to the other studies, all input-output tables were aggregated in five sectors: agriculture, mining including crude petroleum and gas, light industries, heavy industries and service sectors.

The results of the analysis indicate that under the scenario oil + non-oil export except for the two sub-periods of 1969-1974 and 1988-1994, the domestic demand expansion was the dominant source of the growth for Iranian economy, and the service sector and then industrial sectors contributed the major shares.

The sub-periods 1969-1974 and 1988-1994 altogether present different pictures. For instance, during the sub-period of 1969-1974, export expansion appeared to be the main source of growth with predominant share of output growth of mining sector including crude petroleum and gas. On the other hand, in the sub-period 1988-1994, the economy's growth was mainly due to the technological change with predominant shares of service and heavy industries sectors followed by domestic demand expansion, export expansion, impot substitution in intermediate goods which was in consonance with one of the main strategies of the First Five Year Plan of the Islamic Republic of Iran.

The overall period of 1969-1994 showed that although the domestic demand expansion and technological changes played the key role in the growth process of the Iranian economy, export expansion was supplemented by import substitution mainly intermediate goods rather than final goods. Services, mining including crude petroleum and industrial sectors appeared to have major shares due to export expansion.

The overall results under the oil + non-oil export suggest that in the initial stage (period 1969-1974), export expansion due to the oil revenues played a dominant role on the growth process of Iranian economy. This has been supplemented by the import liberalization mainly in final goods than in intermediate goods. During the sub-periods 1974-1984 and 1984-1988, export expansions played an unfavorable role on the growth process of Iranian economy, followed by import substitution in period 1974-1984 and import liberalization in period 1984-1988. Sub-period 1988-1994 and overall period 1969-1994 gave similar results wherein, it is observed that both technological change and domestic demand expansion did have considerable shares on the growth process of the Iranian economy. This has been supplemented by the export expansion and import substitution in intermediate goods.

Almost similar results, albeit with different sectoral overall growth shares, can be found in the case of non-oil export scenario.

On the whole, this study suggests that the trade front of Iranian economy particularly during sub-period 1988-1994 with the advent of new economic liberalism and overal period 1969-1994 has been reviving. This is more pronounced when considering the scenario of non-oil exports. Import substitution in final goods has reached at the end stage and could no longer be considered as an important source of growth. However, import substitution in intermediate goods has yet the key role in the growth process of the Iranian economy.

Notes

1- The First two Seven Year Plans (1949-1955, 1956-1962 respectively) were "partial plans" covering only public sectors. Due to the lack of quantitative data at the national and sectoral levels, and also poor institutional sectors, these plans suffered from a quantitative target and also a specific development strategy. In the Third Five Year Plan (1963-1967), the quantitative planned target of 6 percent per annum had been fixed without a specific formal development strategy.

2- The Third Five Year Plan (1999-2004) which has recently been formulated by the P.B.O., following the policy of its predecessors, aims at average annual growth rate of 6 percent.

3- Regarding the separation of sectoral intermediate and final imports from the sectoral total imports, works done on this issue can be classified as

follows: some authors rightly mentioned some of the limitations of this approach and suggested an alternative approach (Dervis, Demelo and Robinson, 1982). Others have applied this approach for the purpose of evaluating import substitution in intermediate and final imports (Bertrand, 1999). Finally the last group used this approach for analysing only import substitution (Zakariah and Ahmad, 1999).

4- This approach has been used by Chenery (see Chenery, 1960)

5- For the elaboration of the analytical framework, especially index problems with respect to Paache and Laspeyres, it is assumed here that we have available I-O accounting matrices for a given economy for at least two years, i.e., a base (O) and a comparison year (terminal year 1).

6- Recently Dietzenbacher and Los (1998) pointed out some limitations of double deflation method, especially cropping up of negative value added for some sectors and suggested an alternative method to remove these limitations. Due to lack of information, this method could not be worked out here.

References

1. Amuzegar, J. (1977). *Iran: An economic profile.* Washingtion. DC.: The middle East Institute.
2. Albala-Bertrand, J. M. (1999). Structural Change in Chile: 1960-1990. *Economic System Research,* Vol. 11, No. 3.
3. Banouei, A. A. (1989). Planning Model for Iran in input-output framework. Unpublished PhD Thesis, Bombay, University of Bombay.
4. Banouei, A. A. (1992a). Application of a Dynamic system for planning in Iran. *Economic Systems Research,* Vol. 4, No. 1.
5. Banouei, A. A. (1992b). Planning and development under the monarchy and the Islamic government of Iran: a critical assessment. *International Studies,* Vol. 29, No. 1.
6. Chenery, H. B., Robinson, S. and Syrquins, M. (1986). Industrialization growth: A comparative study. *A World Bank Research Publication.*
7. Chenery, H. B. (1960). Patterns of industrial growth. *American Economic Review,* Vol. 50, No., 4.
8. Dervis, K., Demelo, J. and Robinson, S. (1982). *General equilibrium models for development policy.* Cambridge, England: Cambridge University Press.
9. Dietzenbacher, E. and Los, B. (1998). Structural decomposition techniques: sense and sensivity. *Economic Systems Research,* Vol. 10, No. 4.
10. Dietzenbacher, E. (1998). Deflation of Input-Output tables form the user's point of view: a heuristic approach. *Review of Income and Wealth,* Vol. 44, No. 1.
11. Fane, G. (1971). Import substitution and export exponsion: Their measurement and example of their application. *Pakistan Development Review,* Vol. 11, No. 1.
12. Fane, G. (1973). Consistent measure of import substitution. *Oxford Economic Papers,* Vol. 25, No. 2.
13. Jahangard, E. (1997). A study of the structure of the Iranian economy: An analysis of I-O Table at constant prices. M. A. Thesis, Faculty of Economics, University of Allameh Tabatabai, Tehran, Iran.
14. Prasad, K. N., Banouei, A. A. and Swaminathan A. M. (1992). Trade strategies and development in India and Iran. *Economic Systems Research,* Vol. 4, No. 1.
15. Plan and Budget Organization and the United Nations (1999). *Human Development Report of the Islamic Republic of Iran.* Tehran, Islamic Republic of Iran.
16. Prasad, K. N. and Banouei, A. A. (1996). Optimal Trade Strategies in India and Iran. In R. R. Koti, P. Venkatramaiah, R. Radhakrishna and S. R. Hashim (Eds.) *Studies in Indian Economy.* New Delhi: Himalaya Publishing House.
17. Plan and Budget Organization of Iran (1998). *The 1997 economic report, Macro economic bureau.* Tehran, Iran (in Persian).
18. Razavi, H. and Vakil, F. (1984). *The Political Environment of Economic Planning in Iran: 1971-1983, from Monarchy to Islamic Republic.* Colorado, Boulder: Colorado Westview.
19. Rose, A. and Casler, S .(1996). *Input-output structural decomposition analysis: A critical appraisal. Economic Systems Research,* Vol. 8.
20. Rose, A. and Miernyk, W. (1989). Input-output analysis, the first fifty Years. *Economic Systems Research,* Vol. 1, No. 1.
21. Skolka, J. (1989). Input-output structural decomposition analysis for Austria. *Jouranl of Policy Modelling,* No. 11.
22. Syrquin, M. and Urata, S. (1985). Sources of changes in factor intensity of trade. *Journal of Developmental Economics,* Vol. 13, No. 3.

23. Wychoff, A. and Sakurai, N. (1992) Structural change and industrial performance. Paris: Chenery, Robinson and Syrquin, 1986.

24. Zakariah, A. R. and Ahmad, E. E. (1999). Sources of industrial growth using factor decomposition Approach: Malaysia, 1978-87. *The Developing Economies,* Vol. XXXVII, No. 2.

بررسی تغییرات ساختاری اقتصاد ایران با توجه به اثرات توسعه صادرات (۱۳۷۳-۱۳۴۸)

دکتر علی‌اصغر بانویی، دکتر منوچهر عسگری و دکتر حمیدرضا برادران شرکاء
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چکیده

در این مقاله سعی می‌شود تغییرات ساختاری اقتصاد ایران تحت دو سناریوی صادرات نفتی و بدون نفت در دوره ۱۳۷۳-۱۳۴۷ مورد بررسی قرار گیرد. برای این منظور از یک رویکرد تجزیه‌ای استفاده می‌گردد که در آن رشد تولید به پنج عامل مشخص تفکیک شده است. در تحلیلهای کمی مقاله حاضر، از جداول داده-ستانده سال‌های ۱۳۴۸، ۱۳۵۳، ۱۳۶۳، ۱۳۶۷ و ۱۳۷۳ به قیمت ثابت سال ۱۳۵۳ استفاده شده است. کلیه جداول به پنج بخش اقتصادی تجمیع و نتایج حاصله در چهار زیر دوره و یک دوره کامل ارائه گردیده است. نتایج حاصله به طور کلی و به ویژه در زیر دوره ۱۳۷۳-۱۳۶۷ که با ظهور آزادسازی اقتصادی در ایران مطابقت دارد بیانگر عملکرد متناسب اثرات گسترش صادرات برفرایند رشد تولید بخشها و کل اقتصاد است. در این مورد نتایج حاصله در سناریوی اول نسبت به سناریوی دوم محسوس‌تر می‌باشد. اثرات جایگزینی واردات واسطه‌ای در فرایند رشد اقتصادی در کلیه زیر دوره‌ها و دوره کامل سناریوی دوم بیشتر از سناریوی اول می‌باشد. اما اثرات جایگزینی واردات کالاهای نهایی در فرایند رشد اقتصادی در کلیه دوره‌های مورد بررسی و در هیچ یک از دو سناریو نقش قابل ملاحظه‌ای ندارند و بدین ترتیب بیانگر مرحله پایانی جایگزینی واردات کالاهای نهایی و شروع آزادسازی آن کالاها می‌باشد.