Iranian Economic Review, Vol.9, No.11, Fall 2004

The Growth Pattern of Iran's Economy in the First Five Year Development Plan (1989-1994)

Mansour Khalili-Araghi*
Ali Souri**

Abstract

The effective factors on the economic growth of Iran during the first 5-year development plan are studied. The main characteristics of this period are that the first development plan began after the end of war during which some of the unused capacities of the war period were utilized. While the budget deficit was continued in this period the government also pursued policies such as devaluation of Rial, borrowing from aboard, liberalization and privatization to reconstruct the economy and promote the export. In this paper we consider growth factors as consumption and investment of domestic demand, promotion of export, import substitution for consumer, investment and capital goods and also domestic demand for intermediate goods as a proxy for change in technology of production. It is shown that despite intensive devaluation of national money (Rial) in this period, due to weak production infrastructure and technology, the Iran's economy was unable to efficiently take advantage of foreign trade for its growth. The impact of foreign trade i.e. the total impact of export promotion and import substitution in his period is almost equal to zero; and the growth of Iran's economy dependent on the domestic demand.

Keywords: Input - Output, Devaluation, Export Expansion Import Substitution, Liberalization

1- Introduction

Iran's economy experiences a new chapter of economic policies in the post-war era, beginning with the first 5 – year development plan. The main goals are: reconstructing the economy, liberalization and reducing government ownership. The official exchange rate which was equal to 69.2 Rails in 1988 was devaluated

---

* - Associate Professor; University of Tehran, Iran.
** - Assistant Professor; University of Boali Seina, Iran.

to 1750 Rials based on floating rate and to 2345 Rials based on export rate. Also, the exchange rate at free and unofficial market was increased from 1018 in 1988 to 2808 Rials in 1994 which shows 176 percent growth in exchange rate. Therefore, the rate of foreign exchange increase by government was 13 to 19 times more than free market accordingly.

During this period, the average annual inflation rate was 21.3% and the rate of population growth was 1.7%, private consumption expenditure in real terms was 6.7% and government consumption expenditures was 5.2%, investment 11.57%, exports 10.8%, imports 19.6- up to 1992 – and 28% from 1992 to 1994. Also in this period, most of the economic sectors had high growth in such a way that the average annual growth of metal industries was 17.4%, chemical industries 9.5%, water, electricity and gas 12.5%, transportation 11.9%, agriculture 5.3% and oil 5.4%.

2- Methodology

Here, we are using the method of analyzing the impact of factors upon growth, which is similar to the method used by Fujista and James (1991) and Albala - Bertrand (1999). In this method, the growth factors will be divided into domestic demand of consumption, investment and intermediate goods also import substitution for consumption, investment and intermediate goods. Then the impact of export promotion of each sector of the economy on the growth of other sectors will be addressed.

We start by the main equation of input-output:

$$X = Zl + Y \qquad (1)$$

X: Vector of total production of sectors with dimensions of n×1.

Z1: Matrix of exchange of intermediate goods among sectors or matrix of intermediate demand for inputs with n×n.

Y: Vector of final demand with dimension of n×1.

l: Vector of n×1 with elements 1.

Final demand (Y) is defined as follows:

$$Y = C + I + E - M \qquad (2)$$

Where *C, I, E* and *M* are vectors of consumption demand (private and government), investment, export and import respectively. Now we define the matrix of technical coefficient in the form of $A = Z(\hat{X})^{-1}$ in which $\hat{X}$ is diagonal matrix of vector *X* and *A* is matrix of technical coefficient with elements $a_{ij} = Z_{ij} / X_j$.

By multiplying both sides of $A=Z(\hat{X})^{-1}$ with X and then with I the relation of $A(\hat{X})1=Z1$ is obtained. Since $\hat{X}=X$ then $AXl=Zl$ we can rewrite *(1)* as follows:

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

Now, we write the vector of imports in terms of consumption and investment goods:

$$M=M^{C}+M^{I}+M^{Z} \qquad (4)$$

Supposing the ratio of imports to total demand is fixed:

$$m^{C}=(\hat{C})^{-1}M^{C} \quad , \quad m^{I}=(\hat{I})^{-1}M^{I} \quad , \quad m^{Z}=(\hat{Z}_o)^{-1}M^{Z} \qquad (5)$$

in which (^) is diagonal matrix of related vectors. Also Z_o is vector of intermediate demands in which its elements is $Z_{io}=\Sigma_j Z_{ij}$ and $Z_o=Z1=AX$.

By using the relations (5) M^{C}, M^{I} and M^{Z} can be written:

$$M^{C}=\hat{C}m^{C}=\hat{m}^{C}\,C \;,\; M^{I}=\hat{I}m^{I}=\hat{m}^{I}\,I \qquad (6)$$

$$M^{Z}=\hat{Z}_o\,m^{Z}=\hat{m}^{Z}\,Z_o=\hat{m}^{Z}\,Zl=\hat{m}^{Z}\,AX$$

By substituting (4) and (6) in (3) and rearranging, we have:

$$X=AX+C+I+E-(\hat{m}^{C}\,C+\hat{m}^{I}\,I+\hat{m}^{Z}\,AX) \qquad (7)$$

$$=(I-\hat{m}^{Z})\,AX+(I-\hat{m}^{C})C+(I-\hat{m}^{I})I+E$$

$$=\hat{U}^{Z}\,AX+\hat{U}^{C}\,C+\hat{U}^{C}\,I+E$$

Where $I-m^{z}=U^{z}$, $I-m^{c}=U^{c}$ and $I-m^{I}=U^{I}$. By solving (7) for X we have:

$$X=(1-\hat{U}^{Z}\,A)^{-1}(\hat{U}^{C}\,C+\hat{U}^{I}\,I+E) \qquad (8)$$

$$=B(\hat{U}^{C}\,C+\hat{U}^{I}\,I)$$

Where $B(I-\hat{U}^{Z} A)^{-1}$.

Now we write the relation (8) for two years 0 and t and subtract from each other:

$$\Delta X_t = X_t - X_o = B_t(\hat{U}_t^{C} C_t + \hat{U}_t^{I} I_t + E_t) - B_o(\hat{U}_o^{C} C_o + \hat{U}_o^{I} I_o + E_o)$$
$$= B_t K_t - B_o K_o$$

With $K = \hat{U}^{C} C + \hat{U}^{I} I + E$. Rewriting (9) as follows.

$$\Delta X_t = (B_t - B_o + B_o)K_t - B_0 K_o$$
$$= \Delta B_t K_t + B_o \Delta K_t \qquad (10)$$

The changes in B results from two factors, one originate from changes of matrix of technical coefficient (A) and the other results from changes in the combination of demand for domestic and imported intermediate goods (U^Z). Therefore due to the fact that $X_t = B_t K_t$, the first term on the right hand side of (10) can be rewritten as follows:

$$\Delta B_t K_t = B_t K_t - B_o K_o$$
$$= X_t - B_o B_t^{-1} X_t$$
$$= B_o(B_o^{-1} - B_t^{-1})X_t \qquad (11)$$
$$= B_o(\Delta \hat{U}_t^{Z})A_t X_t + B_o \hat{U}_o^{Z} (\Delta A_t)X_t$$

Since:

$$B_o^{-1} - B_t^{-1} = (I - \hat{U}_o^{Z} A_o) - (I - \hat{U}_t^{Z} A_t)$$

$$= \hat{U}_t^{Z} A_t - \hat{U}_o^{Z} A_o = (\Delta \hat{U}_t^{Z})A_t + \hat{U}_o^{Z} (\Delta A_t)$$

By adding and subtracting the term, $U_o C_t + U_o I_t$ we can write ΔK_t as follows:

$$\Delta K_t = (\hat{U}_t^{C} C_t + \hat{U}_t^{I} I_t + E_t) \qquad (12)$$

$$-(\hat{U}_o^C C_t + \hat{U}_o^I I_o + E_o) + (\hat{U}_o^C C_t + \hat{U}_t^I I_t) - (\hat{U}_o^C C_t + \hat{U}_t^I I_t)$$

$$= (\Delta\hat{U}_t^C)C_t + (\Delta\hat{U}_t^I)I_t + \hat{U}_o^C(\Delta C_t) + \hat{U}_o^I(\Delta I_o) + \Delta E_t$$

By replacing (11) and (12) in (10) ΔX_t can be rewritten and rearranged as follows:

$$\begin{aligned}
\Delta X_t = {} & B_o(\hat{U}_o^C)\Delta C_t && (a_1)\\
& + B_o(\hat{U}_o^I)\Delta I_t && (a_2)\\
& + B_o(\Delta\hat{U}_t^C)C_t && (b_1)\\
& + B_o(\Delta\hat{U}_t^I)I_t && (b_2)\\
& + B_o(\hat{U}_t^Z)A_t X_t && (b_3)\\
& + B_o\hat{U}_o^Z(\Delta A_t)X_t && (d)\\
& + B_o\Delta E_t && (e)
\end{aligned} \qquad (13)$$

Where in equation (*13*) we have the following terms:

(a_1) : the impact of changes in demand for domestic consumption goods,

(a_2) : the impact of changes in demand for domestic investment goods,

(b_1) : the impact of changes in substitution of import of consumption goods,

(b_2) : the impact of changes in substitution of import of investment goods,

(b_3) : the impact of changes in domestic demand for intermediate goods due to changes of technological coefficient,

(d) : the impact of changes in export.

Now by applying the method used by Fujita and James (1991) we analyze the impact of export promotion. Specifically the impact of export expansion of sector j on the growth of other sectors has been studied. For this purpose, $B_o\Delta E_t$ that shows the impact of export expansion is written as follows:

$$V = B_o(\Delta\hat{E}_t) \qquad (14)$$

Where $\Delta\hat{E}_t$ is the diagonal matrix of vector ΔE_t.

Thus, matrix V has dimensions of n×n with elements V_{ij}; where V_{ij} indicates impact export expansion of sector *j* on sector *i*. In addition, $\Sigma_j V_{ij}$ is the impact of export expansion of all sectors on sector *j*, which is equal to the elements of vector $B_o \Delta E_t$. Furthermore, the weighted average of column *j* of matrix *V* shows the impact of export expansion of sector j on the total growth of the economy.

3- Application to Iran's Economy

The result of solving the model for Iran is presented in table (1). The figures of this table show the annual average growth rates which has been stated in terms of each factors of growth. The last column of this table shows the growth rates of sectors. The highest growth rates belongs respectively to main metal production; water, electricity and gas; transportation and other industries. One of the reasons of relatively high growth rates of these industries is because of ending the war and utilization of unused capacities. Activities such as agriculture, oil and mining had growth rates of between 5.3 to 6; while the industrial sectors had growth rates of between 4.4. to 17.4. In addition, the growth rates of service sectors, except transportation were between 5.3 to 5.5 percent. As it is observed, the disperse of growth rates in the industry is higher than other sectors.

Columns a_1 and a_2, indicate the impact of increase in domestic demand for consumer and investment goods which is positive for all sectors; and in total explain 3.65 percent of the economy's growth rate which is more than half the growth (i.e. 6.33 per cent).

Changes in technological coefficient, which means changes in demand of producing sectors for intermediate goods indicates expansion of domestic demand (column d). This factor explains 2.7 percent of 6.33 percent growth rate of the economy. Therefore, expansion of domestic market (final and intermediate demand) has caused 3.65+2.78=6.43 percent of the growth rate. Another interesting point is that the portions of domestic demand expansion for final consumer goods were about 2.8 percent while this portion was 0.85 percent for investment goods. Of course, this ratio was different for different sectors.

The portion of foreign trade has been stated by two factors of export expansion and import substitution. In that respect share of export expansion was 0.96 percent among which the export of oil sector and main metal industries were high. This situation is in a way that if we omit oil export this figure will reduce to 0.29 and if we omit the main metal the figure comes down to only 0.14 percent.

Export and the production of main metals which the production capacities were existed and did not need new technologies, and competition was not tight in the world market have had high rate of growth. This is while the rate of

foreign exchange was intensively increased in the period of study, but had no considerable impact on export and economic growth.

The impact of import substitution is stated with respect to consumption, investment and intermediate goods, which are shown in columns b_1, b_2 and b_3 respectively. The impact of import substitution of investment goods is positive but its figure is 0.12 percent, which is mainly resulting from the impact of import substitution; substitution for main metal producing industries and machineries that are 4.4 and 2.06 percent respectively. The impact of import substitution for intermediate goods is negative for all sectors, which can be attributed to expansion of post-war economic of oil revenue and foreign loan were available to provide raw materials for the factories. Therefore, the impact of import substitution for most of the industries shows high figures, for example the figure is -9 percent for chemical industries and main metals. Also in general it caused the economy's growth to be about -1.22 percent. Thus, column b shows that total impact of import substitution for all activities was negative and for the economy as a whole was -1.06 percent.

The comparesion of the impact of export expansion and import substitution shows that foreign trade had no impact on Iran's economic growth and its net impact is almost zero (0.96-1.06= -0.1). Therefore, the total growth of economy in the period of study was resulted from the growth of domestic demand. This situation is in a way that the impact of export expansion and import substitution was only considerable for industries of main metal production, oil and mine and for other sectors was near zero and negative. In the latter case, these activities need not tight competition and high technology. But in industries, which demand higher economic and competitive potentials, the impact of export expansion and import substitution was negative.

The analysis of the export expansion is shown in table (2). This impact on the growth of industries of main metals production was 10. 1 percent, this is the highest figure. After that are mining and oil industries with the growth rates of 6.5 and 5.2 percent respectively. This figure is 1.2 percent for chemical and less than 1 percent for other industries. Therefore, the export expansion has only helped the growth of mentioned industries. The total impact of export expansion on the growth of the economy was 0.96 percent, which only explains 1 percent of the economic growth of 6.33 percent. Amid these, the impact of expansion of oil export was 0.7 percent and 0.13 percent for main metals. Other sectors show low figures in such a way that the following figure belongs to mining sector in which the impact of export expansion of this sector on economy's growth was only 0.03 percent. In this way, oil export has allocated (0.704/0.958=73.5) percent of total impact of export expansion to itself. This ratio for main metals, mining and agriculture were 13.7, 3 and 2.3 percent respectively. Thus, of the total impact of export expansion on economic growth, 92.5 percent belongs to

Table 1: The Impact of Different Factor on Economic Growth (per cont)

	a_1	a_2	$a_1+a_2=a$	e	b_1	b_2	b_3	$b_1+b_2+b_3=b$	d	$e+b=f$	$a+f+d$
1-Agriculture	*1.91*	*0.06*	*1.97*	*0.09*	*-0.03*	*0.01*	*-0.41*	*-0.42*	*3.64*	*-0.33*	*5.28*
2-Crud oil & Natural gas	*0.04*	*0.00*	*0.05*	*5.25*	*0.00*	*0.00*	*-0.02*	*-0.02*	*0.10*	*5.23*	*5.38*
3-Mining	*3.22*	*2.65*	*5.87*	*6.49*	*-0.76*	*0.95*	*2.44*	*-2.25*	*-4.17*	*4.24*	*5.94*
4-Food Products	*11.82*	*0.51*	*12.33*	*0.20*	*-0.34*	*0.10*	*-7.05*	*-7.28*	*3.95*	*-7.08*	*9.20*
5-Textile Industry	*5.76*	*0.85*	*6.61*	*0.27*	*-0.03*	*0.04*	*-3.82*	*-3.80*	*2.25*	*-3.53*	*5.33*
6-Woods Products	*8.94*	*3.75*	*12.69*	*0.30*	*-1.63*	*0.18*	*-1.11*	*-2.56*	*-2.51*	*-2.27*	*7.91*
7-Paper Industry	*3.53*	*1.37*	*4.89*	*0.11*	*1.61*	*0.72*	*-1.53*	*0.80*	*-1.37*	*0.91*	*4.43*
8-Chemical Industry	*14.06*	*1.58*	*15.65*	*1.19*	*-2.81*	*0.41*	*-9.62*	*-12.02*	*4.64*	*-10.83*	*9.46*
9-Non-Metal Mining Products	*4.08*	*3.46*	*7.54*	*0.70*	*0.03*	*0.71*	*-1.06*	*-0.32*	*0.34*	*0.37*	*8.25*
10-Basic Metals	*2.13*	*7.21*	*9.34*	*10.09*	*-0.09*	*4.40*	*-9.54*	*-5.23*	*3.21*	*-3.97*	*6.80*
11-Machinery	*2.62*	*2.23*	*4.85*	*0.40*	*-0.16*	*2.06*	*-6.28*	*-4.38*	*5.92*	*-3.97*	*6.80*
12-Other Manufactures	*3.39*	*10.50*	*13.88*	*0.17*	*-1.69*	*0.08*	*-0.96*	*-2.56*	*-0.12*	*-2.39*	*11.38*
13-Electricity, Gas and Water	*13.74*	*0.96*	*14.70*	*0.57*	*-0.05*	*0.38*	*-1.73*	*-1.40*	*-1.37*	*-0.84*	*12.49*
14-Construction	*0.40*	*4.66*	*5.06*	*0.06*	*-0.01*	*0.02*	*-0.11*	*-0.10*	*0.45*	*-0.05*	*5.46*
15-Transportation and Communication	*5.88*	*1.47*	*7.35*	*0.48*	*0.00*	*0.21*	*-1.52*	*-1.32*	*5.43*	*-0.83*	*11.94*
16-Trade, Restaurants and Hotels	*2.26*	*0.28*	*2.54*	*0.11*	*0.01*	*0.06*	*-0.51*	*-0.44*	*3.08*	*-0.33*	*5.30*
17-Other Services	*2.86*	*0.12*	*2.99*	*0.07*	*0.11*	*0.05*	*-0.31*	*-0.15*	*2.60*	*-0.08*	*5.50*
Aggregate	*2.80*	*0.85*	*3.65*	*0.96*	*-0.05*	*0.21*	*-1.22*	*-1.22*	*2.78*	*-0.11*	*6.33*

Table 2 : The Impact of Export of Differentt Sectors on the Growth of Production Sector (per cont)

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*Tatal*
1-Agriculture	0.07534	0.00235	0.00081	0.00296	0.00289	2.5E-05	3E-06	0.00107	0.00068	0.00068	0.00034	2.5E-05	0	0	0.00021	0.00037	2.2E-05	0..093
2-Crud oil & Natural gas	5.8E-05	5.24748	0.00012	9.4E-06	6.8E-05	3.5E-07	7.2E-07	0.00135	0.00013	0.00082	3E-05	2.2E-06	0	0	5E-05	5.9E-06	1.5E-06	5.250
3-Mining	0.00148	0.03644	4.83149	0.00088	0.00162	1.9E-05	3.1E-05	0.01516	0.2907	1.30267	0.0061	0.0002	0	0	0.00267	0.00158	0.00013	6.492
4-Food Products	0.00696	0.02886	0.00336	0.08746	0.00212	1.6E-05	3.9E-05	0.00871	0.00445	0.05149	0.00271	0.00017	0	0	0.00172	0.0032	0.00014	0.201
5-Textile Industry	0.00142	0.01464	0.00272	0.00086	0.23201	4.6E-05	1.3E-05	0.00403	0.00132	0.00997	0.00124	904E-05	0	0	0.0016	0.00102	0.00012	0.271
6-Woods Products	0.00229	0.0482	0.13281	0.00058	0.00416	0.00837	0.00011	0.00797	0.01115	0.05938	0.00491	0.00047	0	0	0.0039	0.01035	0.00041	0.295
7-Paper Industry	0.00522	0.03108	0.00567	0.001	0.00484	9.E-06	0.00991	0.01447	0.00649	0.02013	0.00375	0.00045	0	0	0.02478	0.00556	0.00033	1.187
8-Chemical Industry	0.01159	0.07779	0.03547	0.00228	0.02893	0.00012	0.00024	0.76509	0.02811	0.19535	0.01044	0.00106	0	0	0.02478	0.00556	0.00033	1.187
9-Non-Metal Mining Products	0.00116	0.03489	0.00505	0.00042	0.00 103	1.8E-06	1.7E-05	0.00631	0.61155	0.02904	0.0208	0.00012	0	0	0.00137	0.00179	0.0002	0.695
10-Basic Metals	0.0034	0.11518	0.03066	0.00104	0.0027	1.9E-05	7E-05	0.00851	0.01088	9.87427	0.03319	0.00093	0	0	0.00839	0.00343	0.0002	10.093
11-Machinery	0.00407	0.18097	0.05106	0.00107	0.00404	2.5E-05	7.5E-05	0.00983	0.00823	0.05952	0.07004	0.00019	0	0	0.01137	0.00357	0.00033	0.404
12-Other Manufactures	0.0025	0.03967	0.00571	0.00159	0.00166	9.4E-06	2.1E-05	0.00821	0.00326	0.02487	0.00411	0.06308	0	0	0.01137	0.00357	0.00033	0.404
13-Electricity, Gas and Water	0.02305	0.0839	0.03346	0.00325	0.01089	8.6E-05	0.00019	0.0243	0.0521	0.29645	0.00741	0.00024	0	0	0.00461	0.02596	0.00052	0.566
14-Construction	0.00032	0.04013	0.00065	0.00012	0.0008	3.3E-06	1.6E-05	0.0034	0.00113	0.00737	0.00`045	3.3E-05	0	0	0.00035	0.00143	3.2E-05	0.056
15-Transportation and communication	0.01221	0.14724	0.02072	0.00348	0.00561	3.4E-05	6.3E-05	0.00921	0.0194	0.14094	0.00466	0.00018	0	0	0.11438	0.00363	0.00016	0.482
16-Trade, Restaurants and Hotels	0.00459	0.01195	0.00344	0.00106	0.00292	1.8E-05	3.5E-05	0.00417	0.00388	0.03328	0.00146	7.1E-05	0	0	0.00159	0.04221	5E-05	0111
17-Other Services	0.00164	0.02098	0.00555	0.00045	0.00157	6.9E-06	2.5E-05	0.00456	0.00273	0.02171	0.00119	5.5E-05	0	0	0.00279	0.00361	0.00178	0.069
Aggregate	0.02185	0.70355	0.02941	0.00315	0.00993	4.7E-05	1E-04	0.01817	0.01779	0.13108	0.00493	0.00022	0	0	0.00747	0.00946	0.0004	0.958

Note: Each Column indicates the impact of the export of the concerned sector on the economic growth of other sector; each line indicate the impact of the export of different sectors on respective sector

four sectors of oil, main metals, mining and agriculture. Export of industries such as paper, machineries and foodstuff had no considerable impact on economic growth.

It seems that policies purposed by the government to promote export, specially intensive devaluation of Rial did not have considerable impact on economic growth. One of the main economic features in this period was high inflation rate, i.e. 22 percent per annual, which had sterilized the devaluation policy. In addition, issuing licenses for importing goods have caused the policy of liberalization not to function efficiently.

4-Summary and Conclusion

The obtained results shows that the growth of Iran's economy in the First Five Year Plan was relatively high which is mainly due to the domestic market. The impact of foreign trade on economic growth was almost zero. i.e. the impact of export was about one percent and that of the import was about minus one percent. While the impact of export is mainly resulting from the export of raw materials such as oil and gas, agricultural products, mine products and also chemical products. These occurred when the government concentrated its economic policies on the expansion of export out of which one can refer to intensive devaluation of national currency.

However, this policy was ineffective in the concerned period because (1) in this period, the average inflation rate was about 22 percent, which acted as a factor against the mentioned policy (2) the organizational and institutional structure of the country created problems for the exporters. The multicipility of organizations where the exporter had to observe from other side can be considered as the factors of slowness of export.

Also due to inefficient economic structure, partly the exporters had to wait for obtaining their export currency from banking system for more than one month. The situations of the import also were not included within the macro policy and many goods had been import based on governmental case license for people or specific organizations. (3) the weakness of manufacturing institutions of the country and their small size compared with large foreign companies had increased the production cost in a way that they had no power to compete. (4) the tariff policies of the governments is mainly against the export, for instance the obtained tariff policies of the government is mainly against the export, for instance the obtained tariff from export is determined based on the price of domestic market which in some occasions is higher than prices of world market and this imposed double cost on exporter. (5) the general attitude towards export is in a way that it considers it as the surplus of local demands, thus exporters could not maintain their foreign markets.

References

1- Albala- Bertrand, J.M. (1999); Structural Change in Chile: 1960-1990; Economic Systems Research Vol. 11, No.3, PP. 301-319.
2- Cella, G (1984); The Input-Output Measurement of Interindustry Linkages, Oxford Bulletin of Economics and Statistics, No. 46, PP. 73-84.
3- Central Bank of I.R. of Iran, Iran's National Accounts, different years.
4- Central Bank of I.R. of Iran, Tables of Input-Output, 1988-1996.
5- Duchin, F. (1988) "Analysis Structural Change in the Economy" in: Mourizio Ciachini (ed) Input-Output Analysis (London, Chapman and Hall).
6- Fotela, E. (1989) Industrial Structures and Economic Growth: An Input – Output Perspective, Economic Systems Research, Vol. 1, PP. 45-52.
7- Fujita, N. and James, W.W. (1991) Growth Patterns of the Japanese Economy in the 1980s: Before and After the Appreciation of the Yen, Economic Systems Research, Vol. 3, No. 4, PP. 399-412.
8- Gowdy, J.M. (1991) Structural Change in the United States and Japan: an Extended Input-Output Analysis; Economic Systems Research, No. 3, PP. 413-423.
9- Irans's Center of Statistics, Input-Output, 1986 General Report, 1991.
10- Irans's Center of Statistics, Input-Output, 1991 and 1997.
11- Kraines, S. and Yoshida, Y.; Process System Modeling of Production Technology Alternatives Using Input-output Tables with Sector Specific Units; Economic Systems Research, Vol. 16. No.1, 2004.
12- Marengo, L. and Sterlacchini, A. (1989) Intersectoral Technology Flows: Methodological Aspects and Empirical Applications; Paper at the Ninth International Conference Input- Output Techniques, Keszthely, Hungary
13- Ozaki, I., Kuroda, M. & Nomura, K (2000); Economics of Plant – Scale and Structural Change; Paper Presented at the 13th International Conference on Input-Output Techniques, Macerate, Italy.
14- Rose, A. and Casler, S. (1996) Input-Output Structural Decomposition Analysis: A Critical Appraisal, Economic Systems Research, Vol. 8, No. 1, PP. 33-62.
15- Sanchez- Choliz, Julio and Duarte Rosa; Production Chains and Linkage Indicators; Economic Systems Research, Vol. 15, No. 4, 2003.
16- Van den Cruyce Bart; Use Tables for Imported Goods and Valuation Matrices for Trade Margins an Integrated Approach for the Computation of the Belgian 1995 Input-Output Tables.
17- Weisskoff, R. and Wolff, E. (1986) Development and Trade Dependence: the case of Purto Rico, Ira Shonceds in: *Reading in Input-Output, Analysis: Theory and Application,* (Oxford University Press).
18- Wilson Daniel J., Embodying Embodiment in a Structural, Macroeconomic Input-Output Model; Economic Systems Research, Vol. 15, No.3, 2003.