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The Effects of Exchange Rate Unification on the Iranian economy

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Abstract

The exchange rate unification is one of the most important instruments of economic adjustment, which is used in many countries.

This paper shows the effects of the exchange rate unification on price level (inflation), gross domestic production (GDP), non-oil exports, private conception, government expenditure and stock of money. The data, is used related to the period 1959-2000. To analyze the above-mentioned effect we employed a model of nine simultaneous equations. The method used to estimate the model is 2sls. After the estimation, the model is simulated by Newton method in order to determine the effects of unification on the endogenous variables the model.

Keywords: Unification/ Exchange Rate/ Newton Method/ Simulation

1- Introduction

Iran's foreign exchange problems have a matter internet to researchers to analyze how they appeared, and how they affect the economy. A large part of foreign exchange income and expenditure is under government control, the income is due to crude-oil exportation, and indeed the economy is very much dependent on this foreign exchange revenue, thus the choice of foreign exchange regime is crucial to the government policymakings.

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That is why the unification of exchange rate in Iran is an important problem to be studied. Obviously, unification should not be identified as a devaluation of the currency, nor it necessarily implies adapting a floating exchange rate.

In 1993 the government practiced a unified exchange rate, but due unexpected events like a sharp fall in oil revenue it was doomed to failure. Therefore, that on May 1995 the control Bank of Iran had to issue an statement, and thereby pegging the exchange rate again. Recently, the unification of exchange rate again. Recently, the unification of exchange rate has been under consideration again. The government must use previous experiences to prevent repetition of past failures (Noorbash, 2001).

This paper analyzes the exchange rate variations in Iranian economy, and the short and long effects of unified exchange rate on macroeconomic variables.

2- Unification of Exchange rates

Unification of foreign exchange rates have been done in two different ways: a complete unifications which means the adoption of one unique rate of exchange for the whole foreign transactions; b; Partial unification that means the adoption of one rate of exchange for the whole current account, and another more restricted exchange rate for capital account.

To confront the balance of payment crisis, with normally a large parallel market of exchange rate, most governments opt to unifying their exchange rates. For example, Venezuela after having experienced multi-exchange rate system for six years, and a high black market exchange rate and inflation, unified its exchange rate by floating the exchange rate.

In Mexico (1987), exchange rate unification was a part of stabilization policy, which was adopted by Mexican government in order to control inflation and harmonize the balance of payment of the country.

Countries where governments have extensive exchange controls, unification would take a longer time. Turkey is an example where this precedence took about one decade. This process started in 1980 by formal devaluation of Turkish currency and leaving the multi exchange rate system. Later the Turkish government the exchange rates, lib-rated imports and decreased the level of its control on capital account. The process was fulfilled in 1989 when the public was allowed to own foreign assets. Then the black market of exchange lost its significance. The Success of the unification if exchange rate policy is due to the fulfillment of the important conditions: First, the unified exchange rate must be suitable, such that it is accepted by and demanders in the exchange market. This is very important for the success of the unification in the short time. Second, the exchange rate must be compatible with the monetary, credit, and fiscal policies of the government.

3- Lauten Shlager and Sorab Behdad studies

Lauten Shlager (1986) in his paper "The effects of an overvalued exchange rate on the Iranian economy" has studied the Iranian economy after the Islamic revaluation, under the fixed exchange rate system. He believes that the Iranian economy has suffered several important fluctuations due to variations in oil price and reduction in its supply.

Sohrab Behdad (1988) in his paper "foreign exchange gap..." has concentrated of factors that affect Iranian exchange system and also the problems and the effects of a fall in the value of Iranian currency on the supply and demand of the exchange market.

He believes that Iranian oil supply to the world markets is not affected by exchange rate fluctuations, thus it does not affect their oil revenue. However, changes in world oil price and oil supply affects the equilibrium exchange rate of Iran. For these reasons the initial years of the revolution due to the imposed war and also the over supply of crude oil Iran faced serious exchange problems and made efforts to compensate somehow the falling oil revenue.

Table1 presents the results of the above- mentioned studies in a summarized form.

4- The model: structure and results

Here we focus on the effects of exchange rate unification on the following variables: Non- oil export, import, price of exported goods, domestic prices, volume of money, GDP, government expenditure, government development expenditure and private sector consumption.

The aim of the model is to assess the effects of exchange rate unification on endogenous variables. We have used 2SLS method to estimate the equations of the model and then ran a simulation according to the estimated coefficients.

The estimation results are as followings:

Table (1): The results of Behdad and Shlager research

	Variables System	Domestic Prices	Domestic Prices for import	Domestic Prices for export	Direction of non-oil export goods	Import Volume	Real GDP	Exchange Black Market	Real Exchange Rate
Shlager	Fixed Exchange Rate	Rapid Increase	Low	Low	Decrease	Increase	Decrease	Rapid Increase	Rapid Increase
	Floating Exchange Rate	Reasonable Increase	High	High	Reasonable Increase	Decrease	Increase	-	Reasonable Increase
Behdad	Fixed Exchange Rate	Rapid Increase	Low	Low	Decrease	Increase	Increase	Rapid Increase	Rapid Increase
	Floating Exchange Rate	Rapid Increase	High	High	Reasonable Increase	Decrease	Decrease	-	Reasonable Increase

Source: Shlager (1986) and Behdad (1988)

Table (2): Estimation Results

Eq. No	Dependent Variable	Equation																
		A_0	$LGYD_{1(t-1)}$	$LGYoil_1$	$LGDP_t$	$Lco_{(t-1)}$	D_4	LPXDt	$LBMR_t$	$LNOX_{(t-1)}$	D_1	$LPMD_t$	LPXt	$LPX_{(t-1)}$	$DLPD_t$	$DLPD_{(t-1)}$	LG_t	$LM_{1(t-1)}$
1	LGI_{1t} R^2=.93 D.W=1.89	0.19 (1.52)	0.26 (2.67)	0.54 (8.26)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	LCO_t R^2=0.99 D.W.=1.99	-0.57 (-2.97)	-	-	0.22 (5.31)	0.84 (28.79)	0.09 (2.06)	-	-	-	-	-	-	-	-	-	-	-
3	$LNOX_t$ R^2=0.97 D.W.=1.61	-2.36 (-2.4)	-	-	0.49 (3.22)	-	-	0.29 (2.57)	-0.14 (-2.22)	0.71 (8.22)	-0.21 (-2.45)	-	-	-	-	-	-	-
4	LIM_t R^2=0.83 D.W.=1.32	2.58 (2.05)	-	-	0.65 (4.93)	-	-0.82 (-2.76)	-	-1.01 (4.69)	-	0.6 (4.83)	-4.87 (-6.02)	-	-	-	-	-	-
5	LPX_t R^2=0.99 D.W.=1.92	0.09 (0.81)	-	-	-	-	-	-	-	-	-	-	-	0.99 (43.25)	0.81 (2.26)	-	-	-
6	LPD_t R^2=0.68 D.W.=0.88	3.09 (10.22)	-	-	-	-	-	-	1.02 (3.37)	-	-1.08 (-2.78)	-	-	-	-	8.37 (5.12)	-	-
7	LM_{1t} R^2=0.99 D.W.=2.09	-0.09 (-2.1)	-	-	-	-	-	-	-	-	-	-	-	-	-0.54 (-4.53)	-	0.16 (7.52)	0.91 (48.22)

And Identities are: GDP= C0+I+G+(X-IM)

$G= GI_1 + GC_1$

Equation 1: Government Development Expenditures

The estimation results show that there is a positive relationship with all of the explanatory variables, so all of them have positive effect on government development expenditures.

One percent increase in government domestic revenue would cause a 0.26 percent increase in government development expenditures in the year after, LM Heration technic is used to overcome an auto correlation problem.

The positive and significant coefficient for LGYD(-1) is in agreement with the theoretical framework.

As the variables have a logarithmic form, so their coefficients are the elasticity of the dependent variables with respect to the variables in the independent variables. Government development expenditures have a low elasticity with respect to government domestic revenue, while of YOIL implies higher elasticity of government development expenditure with expenditure with respect to government domestic revenue.

Equation 2: Private consumption

The estimation results show that one percent change in GDP and previous year's private consumption increase the current private consumption by 0.22 and 0.84 percent expletively. The LCO(-1) higher coefficient indicates that despite short run effects of GDP in consumption, the variable has a sticky trend in the long-run.

It is worth mentioning that as the model is dynamic and involves lagged variables, the coefficients indicate short-run which then transformed in the long- run. In the long-run the elasticity of private consummation with respect to GDP is equal to: (0.22/1-084 = 1.37). The coefficient of D_4 is significant and shows the positive effect of exchange rate unification on private consumption, which is nevertheless small due to recent implementation (lie. only the last two years) of the unification if the exchange rate.

Equation 3: Non-Oil Exports supply

The results of estimation indicate that 1 percent change in GDP, the ratio of export price in input price and non-oil export of the previous year affect the current non-oil export 0.49, 0.29, and 0.7 percent respectively.

As the exports are done through the official exchange rate, a bigger gap between black-market (BM) and, official market (R) exchange rates increases BMR and hence decreases export. D1 (a dummy) variable) indicates that oil price in crease in years 1983 and 1982 has increased oil revenue and decreased non-oil exports.

The elasticity of non-oil variable to relative exchange rate is (-0.14/1-0.7) = -0.47).

Equation 4: Import Demand

As the results show, 1 percent increase in GDP would increase imports by 0.65 percent, and 1 percent increase in import price to domestic price ratio (relative price of import) and relative exchange rate would decrease imports by 4.87 and 1.01 percent respectively.

The negative relationship between relative import price and imports is justified as follows: Increase in import prices (PM) or decrease in domestic prices (PD) would increase PM/PD ratio (PMD) so imports would be more expensive and therefore the volume of imports would decrease. Also as black market exchange rate to official rate ratio (BMR) increases, imports would cost more and would decrease.

The effect of oil price shocks on imports is positive but the effect of exchange rate unification on imports is negative. Oil price shocks, first increase oil export revenue then the national income would increase and consequently imports increase.

Imports are sensitive to black market exchange rate, and as exchange rate unification, increases exchange rate for imports, so imports would cost more and their volume decrease.

Comparing equations 3 and 4, we find that income and price elasticity in equations (for exports) relatively are weaker than equation 4 (for imports). It seems that in Iran, imports are a more important than production and exports.

The wider the gap between black market exchange rate and official exchange rate; import would take impression more than export, because black market exchange rate has a more powerful effect on import rather than export. The coefficient of BMR in import equation is more than export equation. The results indicate that exchange rates policies have powerful effects on imports rather than on exports.

Equation 5: Export goods price

The results indicate that all equation coefficients are significant and a 1 percent increase in export prices of the previous period and inflation would respectively increase export prices by 0.99 and 0.81 percent. Inflation increases domestic prices and so the export goods prices would increase.

Equation 6: Domestic prices

As the results show, a 1 percent increase in the relative exchange rate would increase domestic prices by 1.02 percent. This is because imports are dependent on exchange rates and when the gap between the black market exchange rate (BM) and official exchange rate (R) expands, the BMR ratio would increase and import decrease; this in turn would increase demand for domestic goods which would increase domestic prices. In addition, a 1 percent increase in the previous period of inflation would increase domestic prices by 8.37 percent. This is because it creates expectations for more inflation. The D1 coefficient (dummy for oil price shocks) is also significant. An oil price shock would increase imports and so the demand for domestic goods decreases and as a result domestic prices would fall.

Equation 7: Money stock

The results indicate that a 1 percent increase in government expenditure and money stock for the previous period would increase money stock by 0.16 and 0.91 percent respectively.

As the government issued money to compensate budget deficit, whenever government expenditure increased, money supply has also increased. In addition, a 1 percent increase in inflation would decrease real money stock by 0.54 percent. Among all the variables, money stock and government expenditure (both of the previous year) had more effect on money stock.

5- A review of exchange rate unification by simulation results

To analyze the reactions of the model to different shocks we have used a simulation method of Newton technique with an analytic Jacobean matrix.

The existence of lagged variables implies that a dynamic simulation method would be suitable. The result of simulation indicates that growth ate for government development expenditure private consumption, export goods prices, money stock, and government expenditure until 1979, due to historical figures [estimated results for endogenous variables by simulation method] are insignificant and very small. It means that enforcement of exchange rate unification policy before 1979 has not been successful, and had no effects on mentioned variables. It is reasonable, because before 1979 there was only one exchange rate, but after 1979 we faced a multi rate system and have encountered several political and economic shocks, such as the Islamic revolution (1979), imposed war (1980), and so PDCS [growth rate for each endogenous variable (percent)] shows fluctuations. We can calculate PDCS as fallow:

$$PDCS = \left[(y_t^s c - y_s^s)/y_t^s\right] \times 100$$

That y_t^s represents the endogenous variable of unification policy effects, and y_s^s is a base line solution or historical simulation of variable.

Table (3): The average of PDCS indicator calculated of endogenous variables

Variables	GDP	GI1	G	IM	NOX	PX	PD	M	CO
PDCS(%)	-3.66	0.54	0.6	43.35	8.13	-6.07	-30.66	-0.15	1.51

Now we can say that the exchange rate unification policy during the period of (1961-2000) on average has decreased our GDP by 3.66 percent annually.

An important point to mention is that, a major portion of national income consists of government revenues. Thus, a fall in government revenues means, resources are transferring from public to private sector. This is a sign of privatization policy, which is an evidence for a transition situation in the Iranian economy.

The best record for GDP growth is for 1356 (1977-78) and the worst year was 1359 (1980-81) figure 1 shows PDCS trend for GDP during (1961-2000). .

Exchange rate unification had a small effect on government development expenditure; the rate of government's development expenditure growth has been 0.54 percent annually (figure 2). This small growth really is an evidence of resource transfer from public to private sector. Therefore, it means that exchange rate unification may help the country in its attempts of privatization.

According to PDCS calculated for total government expenditure (0.06), we conclude that there is small effect on public sector and decrease the government size.

We expect that under the exchange rate unification policy, government expenditure would have negative growth. This is also an evidence of tendency to have a smaller size government. The best record for government development expenditure growth was in (1365) 1986-7 and in 1992-93 (1371). This variable had experienced the largest fall. Therefore, privatization is one of the favorite results of a unification policy (figure 3).

Imports and non-oil exports during the period of 1961-2000 and after the enforcement of the exchange rate unification policy respectively have experienced an average growth rate of 43.35 and 8.13 percent annually. Exchange rate unification policy in 1994 caused a major fall in non-oil exports.

Imports can be analyzed from the two points of view. First, when official exchange rates goes up to black market rate, (a devaluation policy) imported goods would be more expensive than if they were imported by the official exchange rate, so imports volume would decrease. While on the other hand, there are still many goods, imported by using the black market exchange rate. Thus, as we still import those goods, the volume of imports would increase. Furthermore, as the major portion of imports has a black market exchange source, we expect that imports would increase.

As exchange rate unification is a kind of liberalization policy, it may increase import. Before the enforcement of exchange rate unification policy, we had several different rates for import but after unification, we faced an outward looking situation in our economy.

It seems that in long run, an increase in imports would strengthen non-oil exports (figure 4, 5). Figures (6, 7), indicate that after enforcement of exchange rate unification policy, growth rate of export prices have annually decreased by 6.07 percent on average. Why have total exports increased? Unification of exchange rate increased the official exchange rate and this would increase export's, remember that exports are assessed by the official exchange rate.

During the 1961-2000 periods, and after exchange rate unification, domestic prices have experienced a decrease of 30.66 percent on average. There are two justifications for the decrease in domestic prices. First, if unification of exchange rate was under-taken via devaluation, we expect an increase in prices, especially in the short run, but these are not the same. Exchange rate unification is a kind of adjustment on the black market exchange rate, so it is really strengthen the national currency value.

Second, the existence of a market for exchange rates, in the long run helps domestic prices to decrease, which is followed up by an increase in potential capacity of production.

Figures (6) and (7) show that export prices have grown on the highest rate in 1986 and the least growth for export prices was in 1984. Rate of growth for domestic prices have been at its maximum in 1977 and at its minimum in 1981.

As figure (8) shows, during the 1961-2000 period and after exchange rate unification, money supply has decreased by an average of 15 percent.

Private consumption has a moderate rate of 1.51 percent, (figure 9). Maximum growth rate for private consumption was in 1984 and minimum rate was in 1980. We can say that exchange rate unification prevents consumption-oriented behavior and in the long- run by increasing potential capacity of production, deflation and import-export expansion leads the society to a more production- oriented situation.

Conclusion

The aim of unification is solving the problems of economic sectors and elimination of the restraints caused by different exchange rates.

The results of this investigation show, that application of the policy of exchange rate unification will increase the government reconstruction expenditures, private sector expenditures, non-oil exports, imports, and total government expenditures. The average rate of this growth is 0.54%, 1.51%, 8.31%, 43.35% and 0.06% respectively. The application of the unification policy also results in decrease of variables such as export material prices, internal level of prices, money volume, and gross domestic production. The average rate of this decrease will be 6.077, 30.66%, 0.15% and 3.66% respectively.

Figure : The trend of PDCS(%) of GDP variable

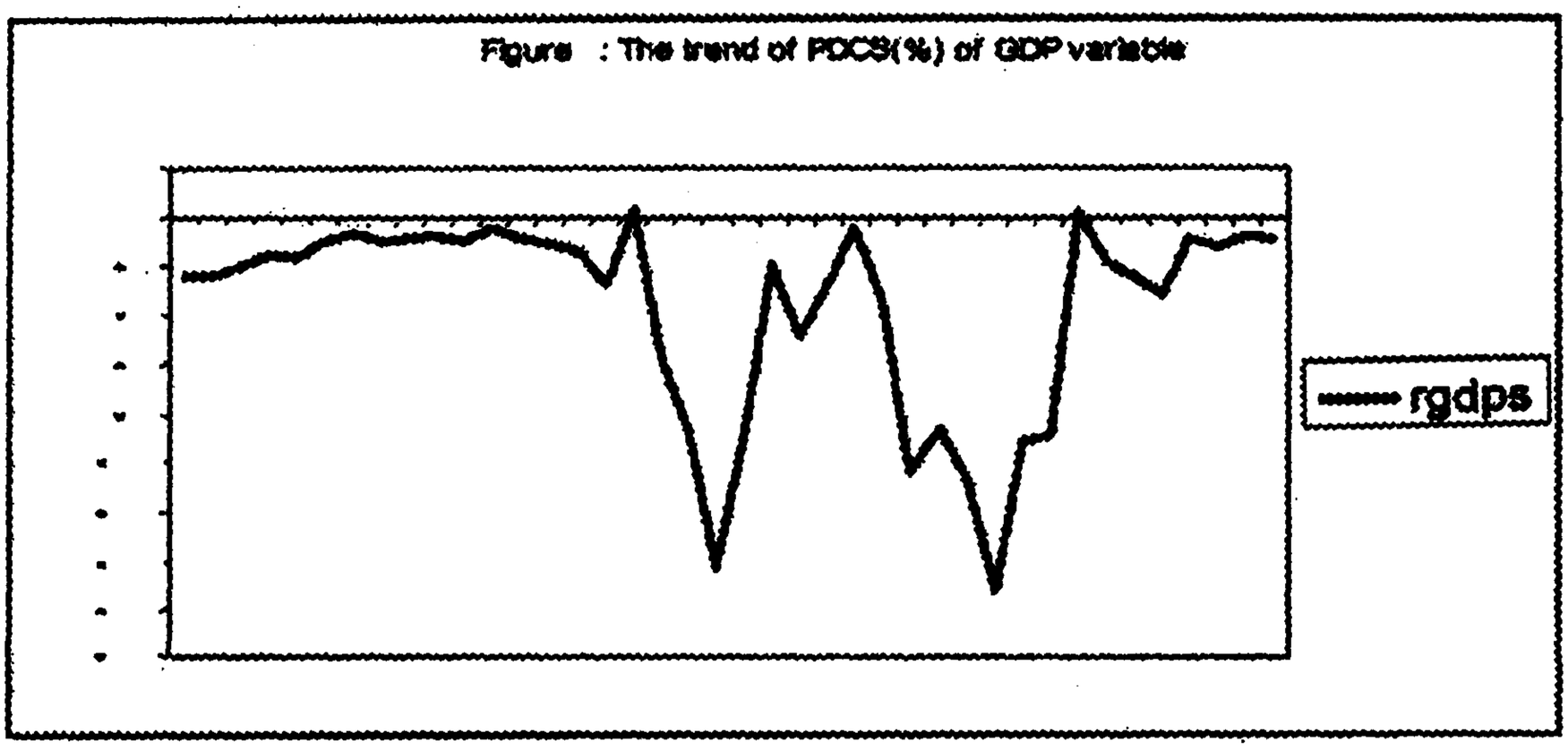


Figure : The trend of PDCS(%) of GI variable

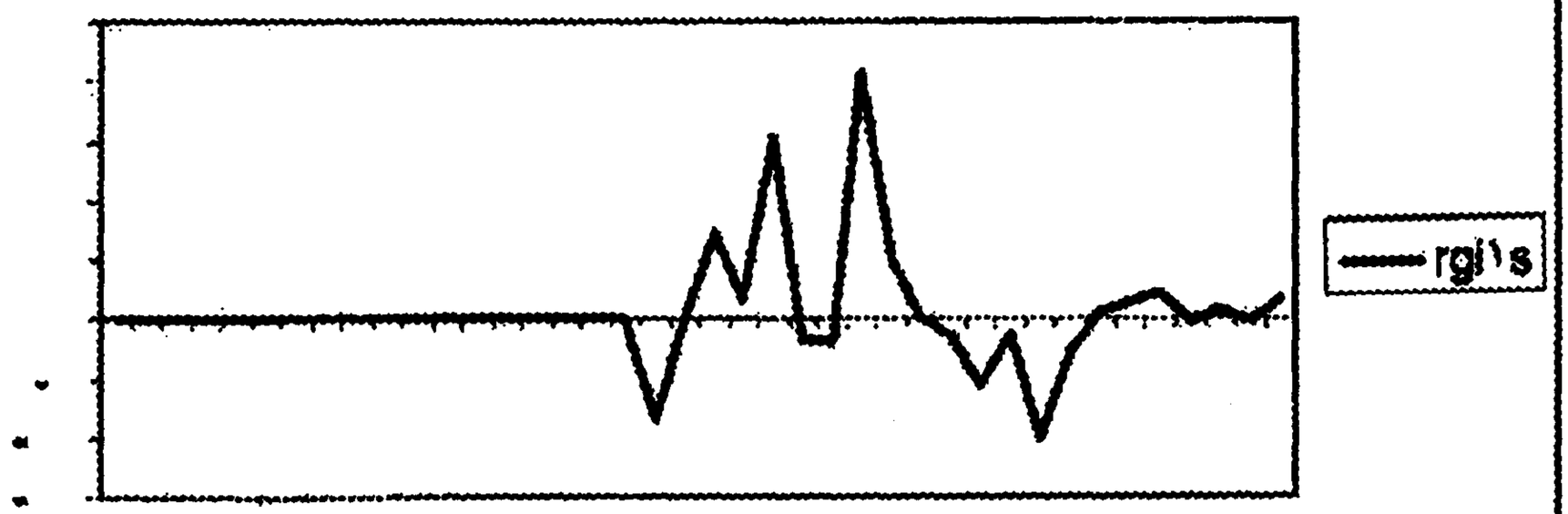


Figure : The trend of PDCS(%) of CO variable

Figure : The trend of PDCS(%) of PX variable

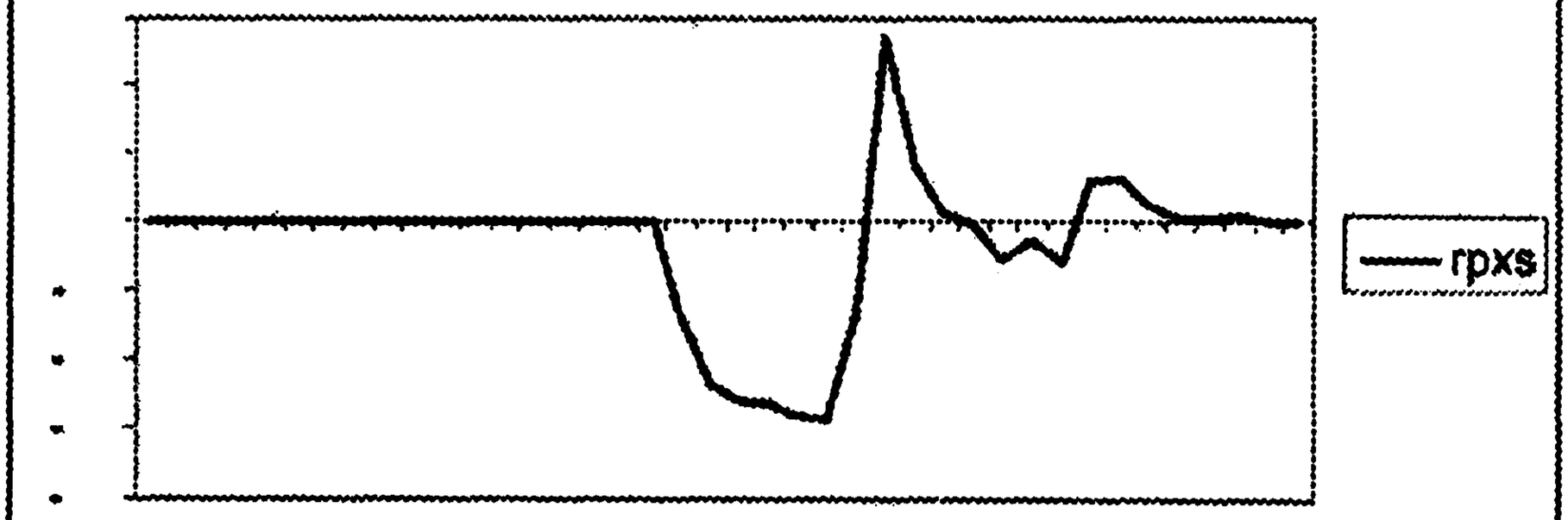


Figure : The trend of PDCS(%) of PD variable

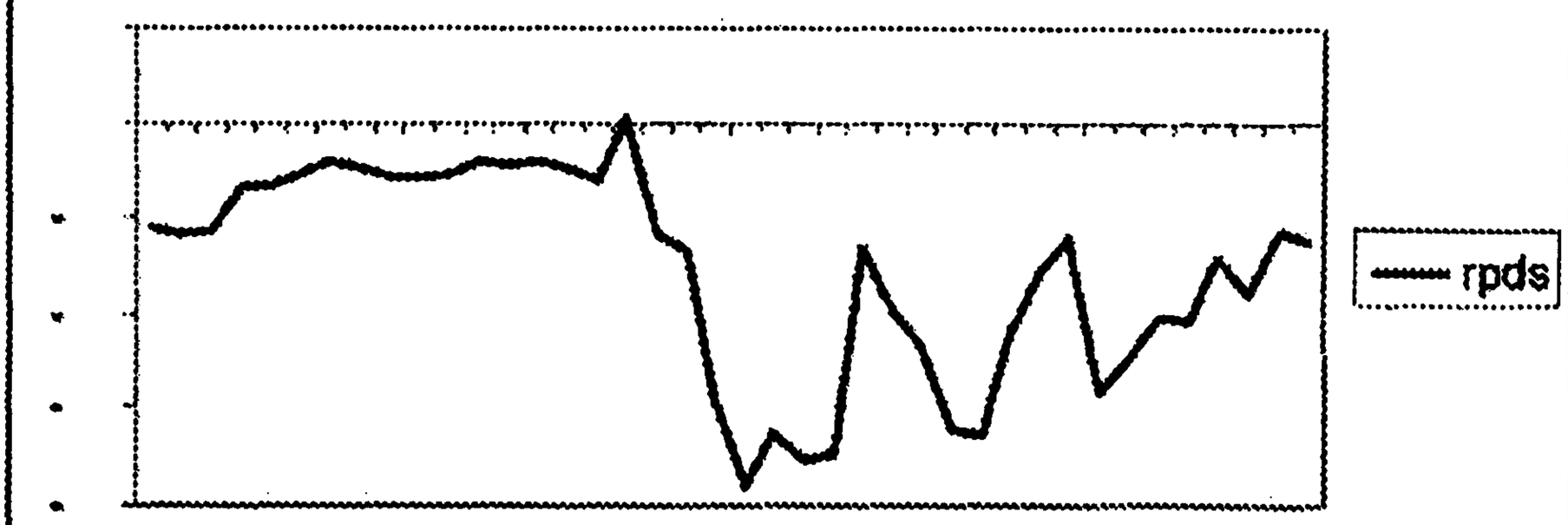


Figure : The trend of PDCS(%) of M variable

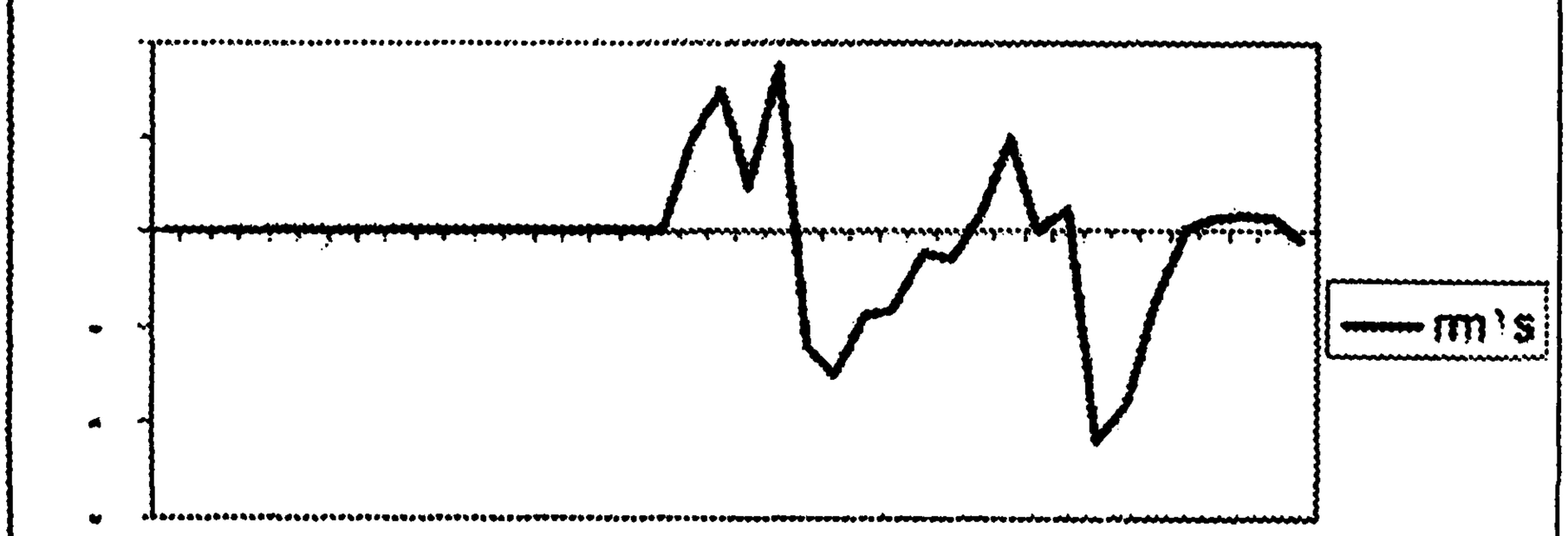


Figure : The trend of PDCS(%) of G variable

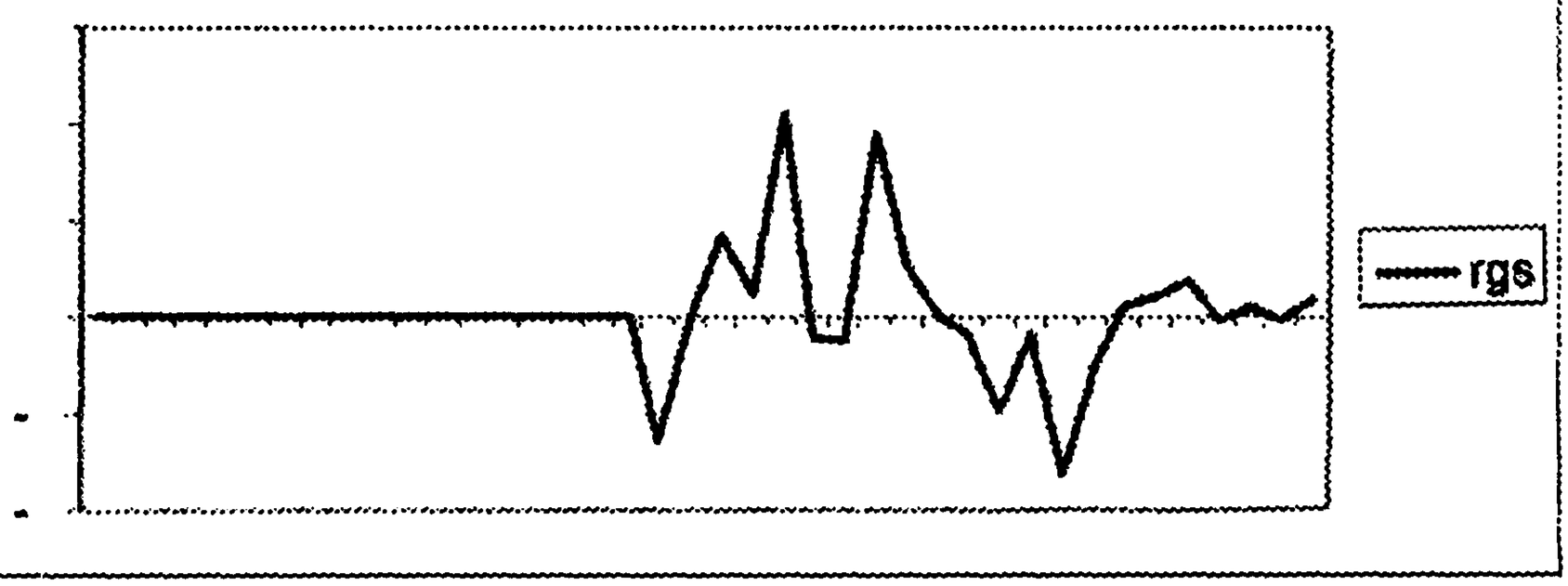


Figure : The trend of PDCS(%) of IM variable

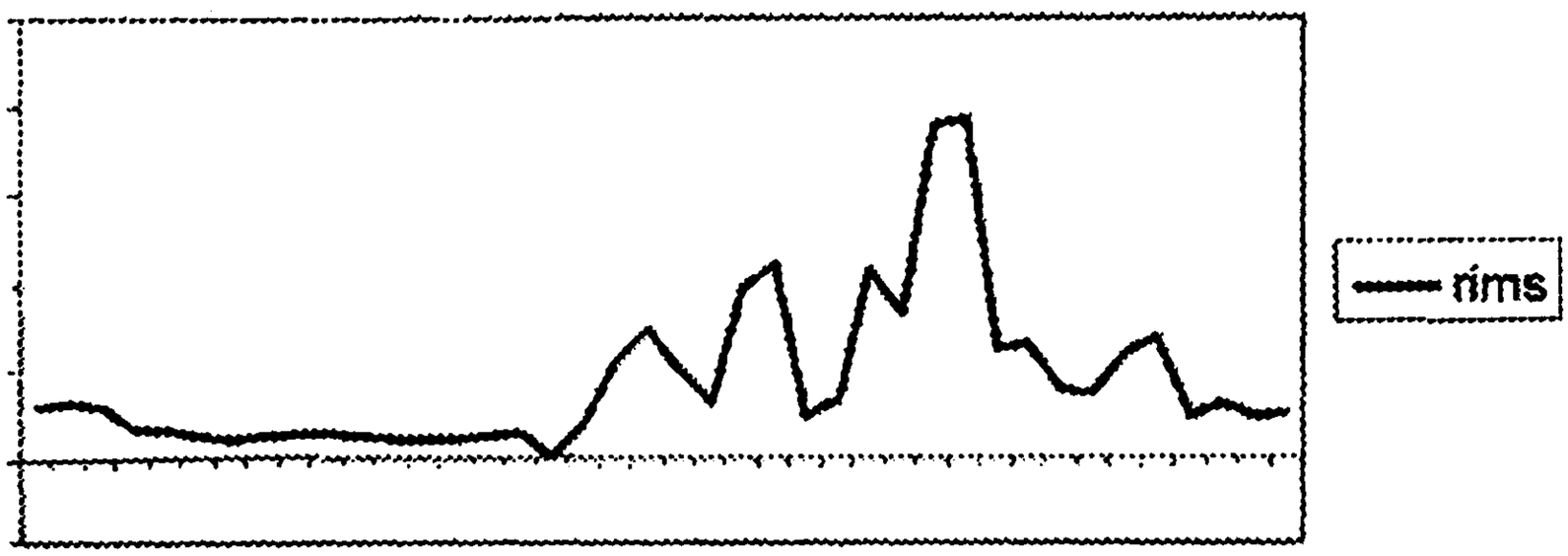
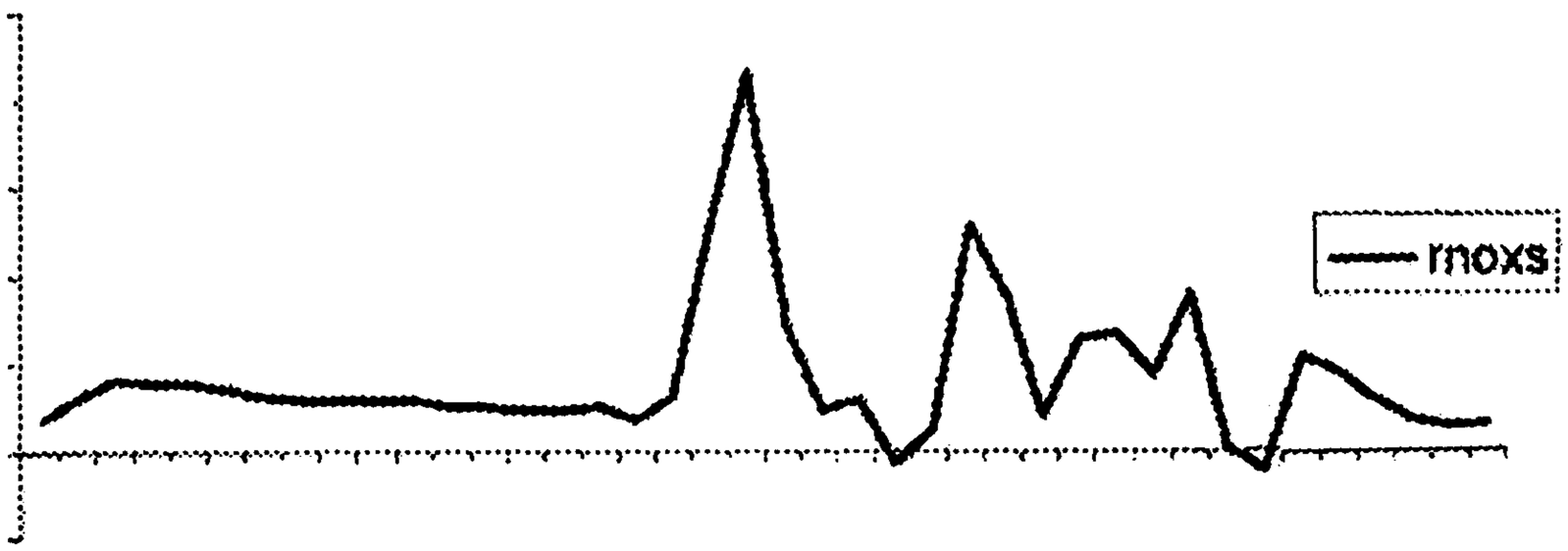


Figure : The trend of PDCS(%) of NOX variable



Reference

1- Aghvali. B. and B. Sassanpour, 1982, "*Prices, Output, and the Trade Balance in Iran*".World Development, Vol.10, No.9, PP. 88-89.

2- Bahmani Oskoie M. (1995), "*Macroeconomics' effects of exchange rate devaluate after Islamic revolution*", 3rd Congress of Money and Exchange Policies, Research Institution of Money and Banking.

3- Barro.R, 1977, "*Unanticipated Money Growth and Unemployment in the United States*". American Economic Review, Vol.67, PP.15-101.

4- Barro. R, 1978, "*Unanticipated Money, Output, and the Price Level in the United States*". Journal of Political Economy, Vol. 86, PP. 80-549.

5- Barzegari Zahra, (1992), "*The experiences of several countries in exchange rate unification policy, equivalent change of national money and economic adjustment*", Journal of Ravand, Vol. 1992, PP 24-40.

6- Behdad. S, 1988, "Foreign *Exchange Gap, Structural Constraints, and the Political Economy of Exchange Rate Determination in Iran*". Cambridge University Press, 0020-7438/88.

7- Central Bank of Islamic Republic of Iran, (2001) "Annual report of balance account".

8- Hall. R ,1978, "*Stochastic Implications of Life Cycle Permanent Income Hypothesis: Theory and Evidence*". Journal of Political Economy December, 1978.

9- Khan. M.S and M.D Knight, 1991, "*Stabilization Programs in Developing Countries*: A Formal Frame Work". IMF staff Paper, PP.38-85.

10- Lautenschlager. W, 1986, "*The Effects of an Overvalued Exchange Rate on the Iranian Economy:* 1979-84. I. Middle East Stad. PP. 31-52.

11- Rahimi Borodjerdi A. (2000). "*A review of exchange rates system in Iran*", 10th Congress of Money and Exchange Policies. Research institution of money and banking.

12- Tayyebi. S.K, 1996. "*Econometric Modeling of Import Demand in Developing Countries:* The Case of Iran. Unpublished Doctoral Dissertation, University of Wollongong Australian, (1970-1993).

13- Tayyebi. S.K and A. Tavakoli, 1999, "*Impacts of Non-Oil Export Promotion on the Iranian Economy*". The Asian Economic Review, Vol.41, No.2, August 1999.

14- Year Book of International Financial Statistics, IMF. 1987-1998.