

**The Appropriate Exchange Rate System
and the Regulation and Forecast of Exchange Rate
for Iran's Economy**

by:

Alireza Rahimi Boroujerdi, Ph.D.*

ABSTRACT

According to the theory of macroeconomics, achieving a stable equilibrium in economy is possible when the exchange rate regimes are consistent with the financial and monetary policies. Besides, regulating the real rate of exchange and its relation to a known exchange rate regime, which corresponds to economic conditions, is very important to create the equilibrium. This study tries to forecast an exchange rate which can guarantee the growth of non-oil exports, by emphasising on making the exchange rate regime consistent with the exchange rate on one hand and making financial and monetary policies harmonious with devaluation of Rial on the other hand. To this end, we have employed a VAR model to determine an appropriate exchange rate to forecast the behavior of the exchange rate and other related variables over the 1996-2000 (1375-79) period. In this framework, a model is considered which can simultaneously specify the effects of financial policies, liquidity growth, inflation, and devaluation of Rial on non-oil exports within a five-year period. For this purpose, a model including 5 endogenous variables and 4 exogenous variables is considered.

The results show that an increase in inflation neutralizes the positive effects of devaluation on non-oil exports. Rial devaluation will effect the growth of non-oil exports if it is

*. *Monetary and Banking Research Academy president and Economic and Research Adviser of Central Bank of I.R.I; Associate Professor of Faculty of Economics at Tehran University.*

accompanied by appropriate financial policies in economy. Therefore, if the control of government expenditures is accompanied by the devaluation of Rial, it can lead to a reduction in the growth of liquidity and inflation as well as to the growth of non-oil exports.

1. Introduction

One of the problems facing Iran's economy is regulating the real rate of exchange and its relation to a known exchange rate regime suitable with economic conditions as well as the inconsistency of macro-economic policies with the exchange rate used by government and firms in recent years. With this end in view, devaluation has been used as a means to eliminate or to reduce the inappropriate regulation of the exchange rate.

One of the major discussions in the literature of international finance is how to determine the real rate of exchange and its relation to the exchange rate regime. The question is whether an exchange rate appropriate to it should be determined or vice versa; or whether these two are not related. The experiences of different countries, including Iran, indicate the inconsistency of exchange rate regimes and macroeconomic policies with the real rate of exchange. Therefore, the main questions under study are as follows:

1. Should all countries follow one exchange rate regime?
2. Should the real exchange rate regime be regulated in accordance with the country's adopted exchange rate regimes and macroeconomic policies?
3. What is the most appropriate exchange rate that can guarantee the growth of non-oil exports in the present situation?

Answering these questions, forms the basis of the present paper. For this purpose, the paper has been organized in the following way. After the introduction, theoretical bases are studied in three parts. The first part will review the international monetary system. The international monetary system has been subjected to various alterations since 1880. Throughout this period, oil developing countries have had no role in the formation of the international monetary system, In fact the exchange rate system which was introduced as an international system to all the countries in the world has secured the interests of certain countries. However, it is important to note that the exchange rate was not determined without regard to an exchange rate regime, and before its regulation, an exchange rate regime corresponding to the economic structure was specified. In the second part, factors causing inappropriate regulation of exchange rate in the economy are studied. Next, policies on how to appropriately regulate exchange rate

for the growth of exports are presented. According to the macroeconomic theory, achieving a stable equilibrium will be possible only if financial and monetary policies are consistent with the exchange rate regimes. Therefore, opting for an exchange rate system can impose specific limitations on macroeconomic policies. In case these limitations are not in agreement with financial and monetary policies, the economy will undergo a severe disequilibrium resulting in the establishment of an inappropriate exchange rate system.

In the third part of the paper, we present a model to regulate and forecast the exchange rate on the basis of different scenarios. In this part, we consider a VAR model with five endogenous and four exogenous variables, which can simultaneously show the effects of financial policies, liquidity growth, inflation, and devaluation of Rial on non-oil exports over a five-year period. The final part of the paper includes a summary and the conclusions.

2. Theoretical Basis

The appropriate exchange rate system and regulation of the exchange rate has been studied by such economists as:

John Williamson⁽¹⁾, MacDonald⁽²⁾, Narayana⁽³⁾, Caramazza and Jahnguir Aziz⁽⁴⁾, Sebastian Edwards⁽⁵⁾, Krueger⁽⁶⁾, Peter Isard and Hamid Faruquee⁽⁷⁾.

In this paper, we will study the relation between the exchange rate regime, macroeconomic policies, and the real exchange rate as well as determining the exchange rate, which can guarantee the growth on non-oil exports in the current conditions of Iran. Hence, in the first part of the theoretical basis, we will briefly review the international monetary system, and in the second and third parts we will respectively discuss the factors causing inappropriate regulation of exchange rate in the economy and the policies which appropriately regulate the exchange rate to effect the growth of non-oil exports.

2.1. A Review of International Monetary System

The international monetary system has undergone various ups and downs

1. Williamson, John, *The Exchange Rate System*, IIE, 1985.

2. MacDonald, Ronald, "What determines Real Exchange Rate"? IMF, WP. 1998.

3. Narayana, K., "Why Do Different countries Use Different Currcies"? IMF, WP. 1998.

4. Caramazza, F., and Aziz, J., "Fixed or Flexible"? IMF, EL, 1998.

5. Edwards, S., "Real and Monetary Determinants of Real Exchange Rate Behavior", JDE, 29, 1988.

6. Krueger, Ann, D., *Exchange Rate Determination*, 1983.

7. Isard, P. Faruquee, H., *Exchange Rate Assessment*, 1998.

since 1880. In Gold Standard (1880-1914), monetary authorities pegged the price of gold to the national money and then sold and bought it at that price. The Gold Standard forced each country to limit its supply of currency to the gold reserves kept by its central bank. Thus, banknotes issued inside the country were supported by the country's gold reserves and while the inflow and outflow of gold was freely done, the central bank of each country was bound to sell and buy it at a fixed price. Here, while gold was considered as an international currency, the currency of each country was equivalent to gold, and therefore the foreign value of all currencies was determined on the basis of the value of gold. Consequently, in these circumstances the exchange rate was determined with regard to the special and unique conditions of the Gold Standard. The beginning of the WWI ended the dominance of the Gold Standard. One of the most important reasons was the debt of war-torn countries to the United State of America and the payment fo reparations by Germany, causing these countries' wealth and gold to flow to the United States. As a result, after the war, the balance of payments of these war-torn countries, and that of the United State faced substantial deficit and surplus respectively. The reduction of gold reserves in these countries could have far-reaching implications on their economic structures. Public trust in gold as an instrument for international payments decreased. Besides, this led to improper allocation of gold among some countries; that is to say, a large number of countries such as Germany, Hungary, Austria, and the countries of Central and East Europe did not have sufficient gold reserves, while a few countries, United States in particular, had large gold reserves. But the rules controlling money supply, which could make the gold distribution smooth, were ignored by countries which had excess gold.

Another important reason leading to capital exit was the difficulties emerging after war, which had affected the political, social, and economic stability of these countries in a way that as soon as one of these countries faced a crisis, capital exited from it which in turn added to the country's problems. In these countries, in addition to public uncertainties about gold, labour unions and some production companies which controlled commodities' distribution, prevented wage and price reduction, and therefore the relation of prices with the gold reserves was broken off and the economic role of the Gold Standard was weakened. At last, due to increasing flight of gold from countries confronting acute economic crises, stagnation and continued inflation, the policy of free import and export of gold was rejected and the laws prohibiting the sales of gold were put into effect in many countries like England. The relation of gold with national money was broken off and practically many countries except the United States stopped using this system.

At the time the first World War began, when the Gold Standard was weakened, the primary and exchangeable money of that time broke off its relation with gold and different exchange rate systems such as the fluctuating exchange rate system (by 1923), stability of the value of money (by 1928) and devaluation and the tripartite agreement (by 1939) were used by countries until Bretton Woods Agreement in 1944. Throughout these years, the exchange rate was based on the exchange rate regime of these countries.

The international monetary system was subject to many changes during the 1914-44 period. During this period, successive switches between floating exchange rates and the exchange rate in the Gold Standard did not leave any pleasing effects. The collapse of the Gold Standard had also created a gap in the international monetary system, which should have been filled with a new international system. This system should not have had the undesirable aspects of the past exchange rate regimes such as instability of exchange rates, exchange controls, and inflexibility of exchange rates. Therefore, in the Bretton Woods Agreement in 1944, it was agreed that countries peg the value of their money to the US Dollar by dealing Dollar in the home market, paying their debts in dollar, and using it as the international reserve currency so that they could later exchange it for gold; the dollar was pegged to gold at \$35.00 per ounce. The Bretton Woods monetary system which was also known as the Gold Exchange Standard left a margin of 1% for the fluctuation of monetary values.

Economic crisis at the beginning of the 1970s in the United States of America, which coincided with the unprecedented deficits in balance of payments, changed Bretton Woods monetary system. Due to the lack of liquidity for the increasing volume of international trade on one hand and the reduction of the United States gold reserves as well as the constant pressure on the dollar to reduce its value on the other hand, the public trust in the above system and the dollar decreased, and despite the attempts of the European countries, at last the conversion of dollars into gold was cancelled by Nixon, the United States President, on August 15, 1971, which prepared the grounds for the collapse of the Bretton Woods monetary system.

The managed floating exchange rates system has been actively used in the monetary systems of the United States of America, Japan, and W.European countries since March 1973. Initially, countries did not voluntarily employ this system; rather, the failure of the Bretton Woods system, the difficult situation of the foreign exchange market, and the instable speculation justified the use of the managed floating exchange rates regime. Although in this system supply and demand determine the exchange rate in the foreign exchange market, the government intervenes in the

foreign exchange market at necessary times. Nowadays, countries using the managed floating exchange rate regime dominate more than $\frac{4}{5}$ of international trade. In fact, this regime can secure the interests of these countries in the international trade market.

A glance at exchange rate regimes used by developing countries reveals that 87% of the developing countries used one of the fixed exchange rate regimes in 1975. This number fell to 50% in 1996. If we study developing countries on the basis of their economic volume, we will notice that 70% of countries which had a share in international trade, used one of the fixed exchange rate regimes in 1975. This figure fell to 20% in 1996. The general trend shows that many of the countries which officially announce the use of managed floating exchange rates or independent floating exchange rates, in practice unofficially determine and fix the value of their own money, or use them as instruments of policy making. Observations indicate that fixed exchange rate regimes were widely used in areas like Africa, Asia, Middle East, non-industrialized Europe and the Western hemisphere in 1975. By 1996, flexible exchange rate regimes were substituted in most of these areas.

Developing countries have had no role in the formation and implementation of the so-called international monetary system, and in fact the exchange rate system which was introduced as the international system to all the countries of the world, has benefited only a limited number of countries. Developing countries have always been obliged to follow the plans of those countries which have envisaged the most interests in the international economic system for themselves. In 1978, the International Monetary Fund revised its own monetary policy, officially accepted the managed floating exchange rate regime and recommended it to its members, as a result of which during the past years, this regime was used by some developing countries which has not been consistent with their economic structures. Developing countries have never played a key role in the formation of the international monetary system; also, the recommended exchange rate regimes have not been planned to secure their interests. But this should not mean that the existing exchange rate regimes cannot be exploited by developing countries. The point is that developing countries should be able to select the best exchange rate regime which is in agreement with their economic structure. Having these points in mind, the question is which exchange rate regime is appropriate for the developing countries? Can all the developing countries act according to the international monetary system which suggests only one exchange rate regime entitled "managed floating exchange rate regime"?

Why should developing countries such as Iran reject the managed floating exchange rate regime and incline to the managed fixed exchange rate regime? There are many reasons. Some of which are as follows:

- a. Developing countries usually specialize in one or a limited number of products.
- b. Since these countries are economically small, they are price-takers, and cannot influence their own terms of trade, particularly in view of their imports.
- c. The demand of these countries for imports and supply of exports lack elasticity, especially in the short run.
- d. Because the internal resources of these countries are in the initial stages of production and cannot compete with foreign industries, enjoying large scale production, it seems that government control on produce market, the use of exchange control policies along with quantitative restrictions to direct the economy, is necessary to achieve the targets of economic development.
- e. Financial markets in developing countries are limited and small. Consequently, international capital flows do not relatively respond to changes in the exchange rate.
- f. The economic structure of developing countries and their fundamental changes determine their exchange rate: thus the exchange rate which leads to the transparency of market in the short run differs substantially from the exchange rate used in the long run equilibrium.

As a result:

- g. Government's constant intervention in the foreign exchange market to facilitate the short run fluctuations of the exchange rate is necessary.
- h. Government's permanent interference in the foreign exchange market to neutralize or to minimize the effects of political, economic, social, and psychological shocks is essential.
- i. Constant interference of the government with the foreign exchange market to remove periodical and seasonal fluctuations in the balance of trade is inevitable.
- j. Government's strategic intervention in the foreign exchange market to modulate the volume or composition of the official reserves of the country is recommended.
- k. It is necessary for the government to decisively interfere in the foreign exchange market to bridle excess demand and control foreign factor's interventions, some of which are done in order to absorb foreign exchange existing in the foreign exchange market (due to economic or political reasons), in order to preserve the political system of country.

Given these points, in summary, it should be said that each country

should employ the exchange rate system which is in agreement with its economic conditions and which can be exploited to its favor. We should note that the countries' situations (especially when developing and developed countries are compared) are completely different from one another. For example, the nature of the debts of developed countries such as America is very different from that of the debts of developing countries in Africa and South America. The root of the former is extravagance, the manifestation of capitalism, but the latter has resulted from the lack of resources and productive opportunities, ignorance and incompetence of their leaders along with the plunder of their resources by metropolitan countries. To prescribe a common recipe for these two types of illnesses is not only dangerous but also fatal.

Theoretical studies and the existing realities in the Iranian economy show that "the creeping - managed fixed exchange rate" system will be an appropriate exchange rate system for the Islamic Republic of Iran. In summary, this system enjoys the following features:

- a. In this system, a part of the fluctuations of the exchange rate is neutralized and adjusted by market forces, and monetary authorities are permitted to manage the exchange rate by interfering in the foreign exchange market whenever due to economic, political and/or psychological reasons, the fluctuations in the exchange rate exceed the determined range. Therefore, one of the major advantages of such a system is that there is no need for the central bank to constantly interfere in the foreign exchange market in order to maintain and support the exchange rate. Only when the exchange rate exceeds the determined range, the intervention of monetary authorities becomes necessary.
- b. This regime is used to prevent extensive changes in the exchange rate parity and to stop unstable speculation. Therefore, when there is a need for adjustment of the exchange rate and change in its range, instead of immediately adjusting the value of foreign exchange, it gradually reduces the exchange rate parity on a monthly basis, for example, so that the exchange rate parity can finally reach an equilibrium.
- c. In-advanced declaration of change in the exchange rate can prevent unstable speculation. Furthermore, to reach equilibrium, we can use monetary policies and exchange rate regimes simultaneously; that is, in order to neutralize any interest arising from changes in the exchange rate, we can change the interest rate of short-term deposits.
- d. This system also enjoys two other advantages. First, adjustments

to the exchange rate can be made before economic pressures throw the country into total confusion. Secondly, this system minimizes political troubles which usually arise out of sudden and extensive changes in the exchange rate.

In "The Creeping - Managed Fixed Exchange Rate" regime, the plurality of the rates is omitted, and the exchange rate premium falls substantially. In this regime, all of the transactions are done at one rate. Being supported by monetary and trade policies, this rate is very close to the equilibrium rate; besides, in this regime, the value of money is pegged to the SDR basket. As a result, investment is determined, fixed, and managed by monetary authorities of the country, in view of the circumstances and economic conditions of the country. Therefore, there is no need for the allocation of foreign exchange with different rates to different economic sectors in this regime. In other words, planning out a foreign exchange budget to manage the affairs of the country is not needed and all the transactions are carried out by the national money.

Having in mind the above points, we can conclude that since the Gold Standard cannot be used as an international monetary system for all countries, and as the economic structures of all the countries differ from one another, therefore one single exchange rate regime cannot be recommended to all the countries. In other words, the international monetary system should be flexible to enjoy different exchange rate regimes; that is, each country should be able to use one of the exchange rate regimes in view of its own economic structure and position in the international economic system. It is impossible to suggest one exchange rate regime to all the countries.

In general, the international monetary system should be a collection of different floating and fixed exchange rate regimes, and every country should be allowed to select an exchange rate regime appropriate to its own economic structure under the supervision of the International Monetary Fund (IMF) as the regulator of exchange rate arrangements for the member countries.

Moreover, considering the above points, we may conclude that the exchange rate cannot be determined without regard to an exchange rate regime. Thus, an exchange rate regime should be specified in agreement with the economic structure of the country before the regulation of the exchange rate. Otherwise, the exchange rate which is used as a price stabilizing equilibrium in the external and internal accounts cannot produce its real effects on the macroeconomic aggregates.

2.2. Factors Causing Inappropriate Regulation of Exchange Rates in the Economy

According to the macroeconomic theory, achieving a stable equilibrium will be possible if exchange rate regimes are consistent with the monetary and financial policies. To this end, opting for an exchange rate regime can impose specific limitations on macroeconomic policies. In case these limitations do not agree with financial and monetary policies, the result will be an economy in a state of acute disequilibrium, which shows the enforcement of an inappropriate exchange rate system.

Perhaps the most obvious example of inconsistency between macroeconomic policies and exchange rates is substantial budget deficit arising from the adoption of the fixed exchange rate regime. In most of the developing countries such as Iran, the financial imbalance is usually financed by the issue of money. This kind of financing causes inflation to rise in the economy, and leads to inconsistency between budget deficit and the peg of the nominal exchange rate. In these conditions, the domestic price of non-trade goods rises according to the domestic inflation rate, and that of the trade goods according to the international inflation rate. These interactions reduce the real exchange rate in the economy.⁽¹⁾

Another potential source of inconsistency in macroeconomy is the monetary policies. In the economies following the fixed exchange rate regime, an increase in the domestic credit will be contrary to the peg of the exchange rate if it exceeds the growth of the domestic money demand. Under these conditions, excess domestic credit will cause excess demand for trade goods, non-trade goods and about further foreign trade deficit, a reduction in international reserves, and an increase in net foreign debts greater than what is accepted in the long run. Besides, excess demand for non-trade goods will lead to a rise in the price of those goods, and hence to an increase in the real exchange rate. But if the fundamental determinants of the real equilibrium exchange rate do not change, this real increase which is the result of the policy of domestic credit expansion, represents the separation of real equilibrium exchange rate from its equilibrium volume which, infact is the inappropriate regulation of the exchange rate and leads to difficulty in improving exports and balance of trade.⁽²⁾

In floating systems, a nominal exchange rate fluctuates freely and responds to changes in the macroeconomic policies. Nevertheless, domestic prices and nominal exchange rates adjust themselves to the economic shocks

1. Edwards, Sebastian, and Liaquat Ahmed, eds. 1980. Economic Adjustment and Real Exchange Rates in Developing Countries. Chicago University Press.

2. *Ibid.*

at different speeds. A major difference between nominal exchange rates and the prices is that the behavior of the exchange rate is like that of the price of financial assets and is highly sensitive to changes in expectations and new information. In this regard, Dornbusch⁽¹⁾ states that financial assets (including foreign exchange) quickly adjust to changes in expectations, while the markets of non-trade goods slowly adjust to changes. Therefore, monetary expansion causes a boom in the nominal exchange rate that is more than the nominal cuts in the long run equilibrium of exchange rate, while in the short run, the price of trade goods is fixed, with the passage of time, domestic prices will increase in accordance with the rise in the volume of money towards new equilibrium, and finally the nominal exchange rate will decline towards equilibrium.

2.3. The Policies of Appropriately Regulating the Exchange Rate for the growth of Non-oil Exports

Both in policy making and in theoretical analysis, it is useful to distinguish between two types of inappropriate regulations of the real exchange rate. The first type arises out of macroeconomic policies and happens when the real exchange rate deviates from its equilibrium due to the inconsistency between macroeconomic policies and the official system of the nominal exchange rate. As it was mentioned before, when monetary policies are expansionary (due to budget deficit or other reasons) and exceed the appropriate measure which is needed to peg the nominal exchange rate, the price of domestic goods tends to increase more than the world inflation. Consequently, there will be a fall in the real rate of foreign exchange, leading to a slowdown in the growth of exports. Along the same line, devaluation policies serve in effect as tools for eliminating inappropriate rates of exchange, or reducing at least the size of disparities. The implementation of these policies would enhance the country's competitive edge in the international arena, which is commensurate with the country's ultimate objective of improving the external situation of the economy.

But it is noteworthy that success in attaining this objective depends on the following important elements:

1. circumstances prior to the devaluation;
2. policies in conjunction with devaluation.

When the real rates of foreign exchange are out of line (overvalued), measures to reduce the nominal rate of exchange, help to restore the equilibrium in the external sector. Similarly, devaluation, if accompanied by

1. Dornbusch, Rudiger, "Expectation and Exchange Rate Dynamics", Journal of Political economics, 84, 1976, (December): 1161-76.

appropriate macroeconomic policies, will generally have positive effects on the real rate of exchange in the long or medium terms. In cases where the initial position of the inappropriateness of the real rate of exchange emanates from short-term macroeconomic policies, devaluation can result in adjustments in the rate of exchange only when transient macroeconomic policies are also corrected concomitantly.

It is important to note, however, that the degree of the effectiveness to be achieved by devaluation in real terms is set by the policies accompanying it. Since reduction in the nominal rate of exchange is carried out to eliminate its inappropriateness due to its being overvalued in real terms, with the objective of raising the level of the country's competitiveness, nominal devaluation should not be accompanied by a proportionate increase of domestic prices. Nevertheless, certain policies might boost domestic prices, monetary expansion being the most significant of such policies. If devaluation goes hand in hand with policies of this kind, the policy of raising the real value of Rial through promoting exports would be doomed to failure.

3. Setting Forth a Model to Regulate and Forecast the Rate of Exchange

In a previous article, I discussed the effects of devaluation on non-oil exports, using a VAR model.⁽¹⁾ It was demonstrated in that study that the incompatibility of devaluation with expansionary monetary policies has been among the most important factors responsible for the failure of the nominal devaluation of Rial in promoting non-oil exports. In this section, I will attempt to forecast the rate of exchange that is liable to generate growth in non-oil exports, with emphasis upon harmonizing fiscal, monetary and devaluation policies. In this regard, in order to arrive at the appropriate rate of exchange, I have used the VAR model to forecast the behavior of the rate of exchange and that of other major variables within the span of five years.

3.1. The Structure of the Model

The advent of the Islamic Revolution in 1979, the outbreak of the Iran-Iraq War in 1980, and subsequent shocks, such as the free fall of the oil price in 1986, were among important factors behind the depletion of Iran's foreign reserves. Under such circumstances, the decrease of foreign exchange earnings from oil which constitutes a major part of public revenue,

1. Rahimi-Boroujerdi, Alireza, "An Econometric and Applied Analysis of the Effects of New Foreign Exchange Policies on Iran's Foreign Trade", Review of Economic Studies, University of Tehran, 1998.

caused a large deficit in the government budget. Considering the inefficiency of tax collection, the absence of effective money and capital markets in the country and the inability of the government to borrow from abroad, the only way to cover the shortfall was central bank financing, with the inevitable economic outcome of rises in liquidity, and inflation picking up speed. On the other hand, the year 1986 coincided with the outset of policies oriented towards lowering the nominal rate of exchange and checking unruly price rises ensuing from monetary expansion, which in turn detracted from the favorable impact of devaluation on non-oil exports.

Within this framework, we aim at a model capable of determining the simultaneous effects of fiscal policies, liquidity growth, inflation and devaluation on non-oil exports in the span of five years. To this end, we use a model with five endogenous and four exogenous variables as follows:

$$X \equiv (LE_t, LCPI_t, LMS2_t, LGDPR_t, LXNODO_t)$$

$$Z \equiv (LG, LOi1R_t, DUM_{72}, T)$$

Where X is a 5x1 vector with variables given below:

LE_t : logarithm of nominal effective rate of foreign exchange;

$LCPI_t$: logarithm of retail price index;

$LMS2_t$: logarithm of liquidity;

$LGDPR_t$: logarithm of GDP;

$LXNODO_t$: logarithm of non-oil exports;

and Z is a 4x1 vector with the following exogenous variables:

LG : logarithm of nominal public expenditures;

LOi1R_t : logarithm of oil revenue;

DUM : dummy variable for foreign exchange single rate policies in the year 72;

T: Trend variable.

In the Z vector, the logarithms of government expenditures play the part of the controlled variable in the economic system. The importance of this variable in our economy is such that it affects our monetary policies and inflation.

Considering our budget structure and the role of our Central Bank in financing it, the possibility of implementing fiscal and monetary policies independently appears to be quite scanty. In our model, disciplining this variable, with its attendant control of liquidity growth and inflation, makes it possible to arrive at the appropriate rate of exchange for the promotion of non-oil exports.

Now, taking X and Z vectors into account, I set forth the VAR model as follows:

$$\begin{bmatrix} \text{LXNODO} \\ \text{LE} \\ \text{LCPI} \\ \text{LMS2} \\ \text{LGDPR} \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5 \end{bmatrix} + \begin{bmatrix} \beta_{11}^1 & \beta_{12}^1 & \dots & \beta_{15}^1 \\ \vdots \\ \vdots \\ \vdots \\ \beta_{51}^1 & & & \beta_{55}^1 \end{bmatrix} \begin{bmatrix} \text{LXNODO}_{t-1} \\ \text{LE}_{t-1} \\ \text{LCPI}_{t-1} \\ \text{LMS2}_{t-1} \\ \text{LGDPR}_{t-1} \end{bmatrix} + \dots +$$

$$\begin{bmatrix} \beta_{m1}^n & \beta_{15} \\ \beta \\ \vdots \\ \vdots \\ \beta_{51}^n & \beta_{55}^n \end{bmatrix} \begin{bmatrix} \text{LXNODO}_{t-n} \\ \text{LE}_{t-n} \\ \text{LCPI}_{t-n} \\ \text{LMS2}_{t-n} \\ \text{LGDPR}_{t-n} \end{bmatrix} + \begin{bmatrix} \gamma_{11} \\ \vdots \\ \vdots \\ \vdots \\ \gamma_{51} \end{bmatrix} \begin{bmatrix} \text{LG} \\ \text{LOi1R} \\ \text{DUM}_{72} \\ \text{T} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \end{bmatrix}$$

3.2. Computed Estimates of the Model

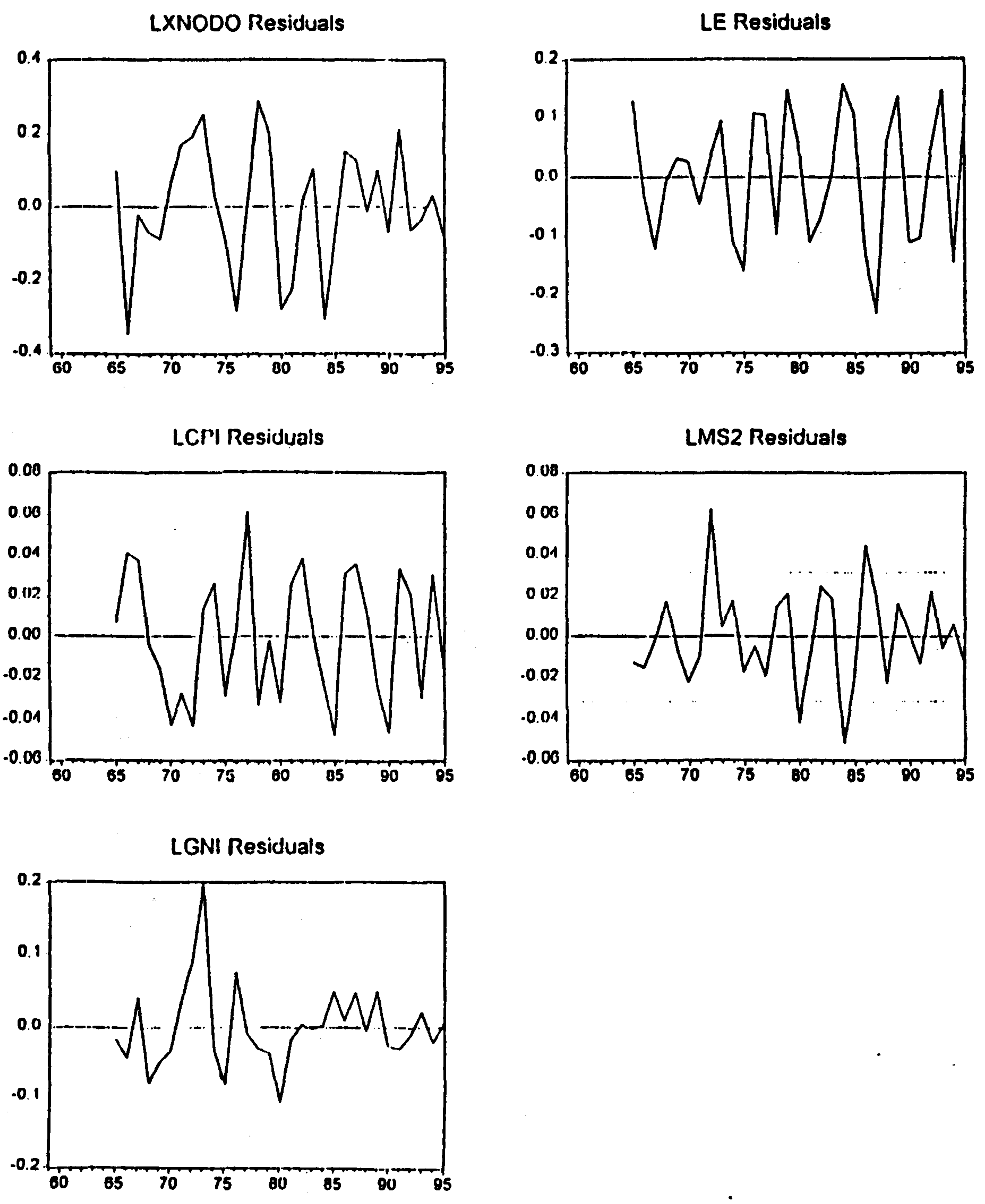
Model (1) has been estimated on the basis of yearly data for the period 1959-1995 with two selected lags because of the limited number of observations. Table 1 shows the computed estimates of the model, and figure 1 the residuals of each of the 5 equations. According to Table 1, the correlation between government expenditures and non-oil exports has been negative, as expected, but not significant at 5 percent level. As to other equations, government expenditures seem to be positively correlated to the rate of foreign exchange, output, price level and liquidity. But the correlation between government expenditures and the rate of foreign exchange and output are not statistically significant, whereas it is significant with price level and liquidity at 5 and 1 percent respectively. The coefficients of the oil revenue in the two equations of the money supply and output are positive, but significant only in the output equation at 1%. In the same vein, according to Figure 1, the residuals of each equation fluctuate around their mean value, which in effect make it possible to make appropriate forecasts on the basis of the model.

Table 1
Vector Autoregression Estimates

Date: 10/21/97 Time: 03:55					
Sample: 1965 1995					
Included observations: 31 after adjusting endpoints					
Standard errors & t-statistics in parentheses					
	LXNODO	LE	LCPI	LMS2	LGDP
LXNODO(-1)	0.757281 (0.18921) (4.00235)	-0.019317 (0.13763) (-0.14035)	0.093624 (0.03897) (2.40269)	0.038650 (0.02806) (1.37721)	-0.016848 (0.06322) (-0.26648)
LXNODO(-2)	-0.180069 (0.23475) (-0.76708)	0.441675 (0.17076) (2.58657)	-0.040547 (0.04834) (-0.83871)	0.068108 (0.03482) (1.95611)	-0.065761 (0.07844) (-0.83835)
LE (-1)	-0.037558 (0.24607) (-0.15263)	0.001917 (0.17899) (0.01071)	-0.012778 (0.05068) (-0.25215)	-0.088340 (0.03650) (-2.42043)	0.010970 (0.08222) (0.13342)
LE (-2)	0.24624 (0.31063) (0.78107)	0.354691 (0.22596) (1.56973)	-0.134503 (0.06397) (-2.10252)	-0.032548 (0.04607) (-0.70643)	0.049557 (0.10380) (0.47744)
LCPI (-1)	-2.374996 (0.99491) (-2.38714)	-0.662968 (0.72371) (-0.01607)	0.853081 (0.20490) (4.16350)	-0.276244 (0.14757) (-1.87197)	-0.457591 (0.33245) (-1.37642)
LCPI (-2)	2.438140 (1.17807) (2.06961)	1.48774 (0.85694) (1.73265)	0.172383 (0.24261) (0.71052)	0.444709 (0.17473) (2.54505)	0.167745 (0.39365) (0.42612)
LMS2 (-1)	1.251837 (1.13416) (1.10376)	0.516551 (0.82500) (0.62612)	0.089757 (0.23357) (0.38428)	0.614394 (0.16822) (3.65228)	-0.055730 (0.37898) (-0.14705)
LMS2 (-2)	-1.632671 (0.65534) (-1.70931)	-0.592492 (0.69493) (-0.85260)	-0.099946 (0.19675) (-0.50799)	0.015025 (0.14170) (0.10604)	0.012976 (0.31923) (0.04065)
LGPD(-1)	-0.106828 (0.66442) (-0.16077)	-0.289835 (0.48330) (-0.59970)	-0.032274 (0.13683) (-0.23587)	-0.030229 (0.09855) (-0.30674)	0.244338 (0.22201) (1.10055)
LGPD(-2)	-0.580926 (0.56640) (1.02564)	-0.693937 (-0.41201) (-1.68428)	-0.063831 (0.11665) (-0.54721)	0.065644 (0.08401) (0.78138)	-0.016187 (0.18926) (-0.08553)
C	-3.031834 (3.87883) (-0.78164)	8.050237 (2.82151) (2.85317)	0.442984 (0.79882) (0.55455)	0.552609 (0.57532) (0.96052)	5.925901 (1.29611) (4.57206)

DUM93	0.3171643 (0.25819) (1.43939)	0.263189 (0.18781) (1.40134)	-0.044837 (0.05317) (-0.84323)	-0.067605 (0.03830) (-1.76531)	0.017203 (0.08628) (0.19940)
LOILR	0.118456 (0.15852) (0.7426)	-0.064152 (0.11531) (-0.55635)	-0.089486 (0.03265) (-2.74106)	0.009631 (0.02351) (0.40962)	0.194580 (0.05297) (3.67341)
LG	-0.440122 (0.51009) (-0.86284)	0.343390 (0.37104) (0.92547)	0.233902 (0.10505) (2.22661)	0.241396 (0.07566) (3.19064)	0.087459 (0.17045) (0.51312)
T	0.154921 (0.06728) (2.30260)	-0.051153 (0.04894) (-1.04520)	-0.015433 (0.01386) (-1.11384)	0.018256 (0.00998) (1.82939)	0.057073 (0.02248) (2.53863)
R-squared	0.975530	0.990681	0.999481	0.999888	0.991560
Adj. R-squared	0.954119	0.982526	0.999027	0.999791	0.984174
Sum sq.resids	0.638968	0.338096	0.027100	0.014057	0.071345
S.E. equation	0.199839	0.145365	0.041155	0.029641	0.066776
Log likelihood	16.18229	26.04843	65.16714	75.34149	50.16336
Akaike AIC	-2.914147	-3.550672	-6.074460	-6.730869	-5.106474
Schwartz SC	-2.220282	-2.856807	-5.380595	-6.037005	-4.412609
Mean dependent	-0.454281	4.865734	4.420932	8.018016	8.999891
S.D. dependent	0.932962	1.099685	1.319645	2.049689	0.530814

Figure (1)



3.3. Predicting The Exchange Rate Using Different Scenarios

Using the said model, the exchange rate for the 1375-79 period can be predicted. This prediction which is based on the government expenditure control variable, must facilitate a growth of non-oil exports in the economy. But before dealing with the details of the exchange rate prediction, the ability of the model to predict the variables must be calculated. Figures 2 to 6 show the simulations of the model according to historical data of the 1338-74 period. According to the figures, the simulated values of all 5 endogenous variables of the model emphasise its the ability to predict the coming years. With this assurance of the model's prediction, we calculate the values of endogenous variables for the next 5 years. regarding the oil revenues, we suppose that its growth will be zero in this period. This supposition can be suitable considering the relative stability of oil prices at US\$12.00 during the past few years. Government expenditure, as a control variable, can make the harmonization of monetary and financial policies with Rial devaluation. Therefore 2 scenarios can be viewed for the government expenditure variable.

1. The growth rate of government expenditures can be predicted to be 30% annually since in the 1368-74 period. This was its average growth rate.
2. We suppose that the government can control and balance its expenditure, which leads to a control in liquidity and price increase in the economy. Therefore, we can suppose that there will be an annual 5% reduction in the expenditure growth during the next 5 years.

Table 2 shows the effective exchange rate prediction, government expenditure growth rate, money volume growth rate, non-oil export growth rate, and Rial devaluation and inflation decrease based on the first scenario. According to this table, a 3% annual growth in government expenditure causes further increases in liquidity and inflation. Inflation increase

Table (2)
Forecast of the variables according to the first scenario

Year	Effective exchange rate	Percentage of Variable growth rate				
		liquidity	price	non-oil exports	government expenditure	effective exchange rate
1375	4611	32	25	-10	30	42
1376	4594	23	24	-3.7	30	17
1377	7393	25	23	-5	30	29
1378	9358	25.4	25	0.4	30	23
1379	11934	25	26	-1	30	24

neutralizes the positive effects of Rial devaluation on non-oil exports such that, during the next 5 years, the export will show a negative growth excluding a 0.4% growth in 1378. Therefore according to this scenario, even if the government adopts the devaluation policy to boost non-oil exports, the 30% annual growth in government expenditure will not only ruin this policy but we shall also witness a further fall of Rial against other currencies and the resulting inflation growth and other negative effects on economy.

Table 3 shows the model's prediction according to the second scenario. In this table, the government expenditure is supposed to reach a 9% growth in 1379 from a 30% in 1375. In this scenario the model's prediction of effective exchange rate is Rls 4611 in 1375 to 10184 in 1379. During these 5 years, the level of Rial devaluation is 42%, 15%, 26% and 18% in the last 2 years (1376-79) respectively. The liquidity and inflation will respectively reach 19% and 17% in 1379 from 32% and 25% in 1375.

Table (3)
Forecast of the variables according to the second scenario

Year	Effective exchange rate	Percentage of Variable growth rate				
		liquidity	price	non-oil exports	government expenditure	effective exchange rate
1375	4611	32	25	-10	30	42
1376	5401	22	22	-1.5	25	15
1377	7038	22	19	2	20	26
1378	8498	21	19	15	15	18
1379	10184	19	17	20	9	18

One the other hand, one of the conditions which could boost non-oil exports in middle-term or long term is an increase in real exchange rate. Comparing columns 4 and 7 in table 3 guarantees an increase in the real exchange rate, based on a supposition of an annually 3% increase in world prices.

Along the same line of analysis, column 5 of table 3, which shows the prediction of non-oil exports during the next 5 years, signifies the emergence of positive effects of devaluation policy during the 5-year period, such that there will be a 2% increase in 1377 and 15% and 21% increases in 1378 and 1379 respectively. In general, the results of table 3 indicate that appropriate financial policies are the prerequisite of nominal devaluation of Rial to boost non-oil exports. Therefore, this boost in the exports and the fall of liquidity and inflation growth can materialize only if government expenditure control is exercised along with the Rial devaluation policy.

Figure (2)

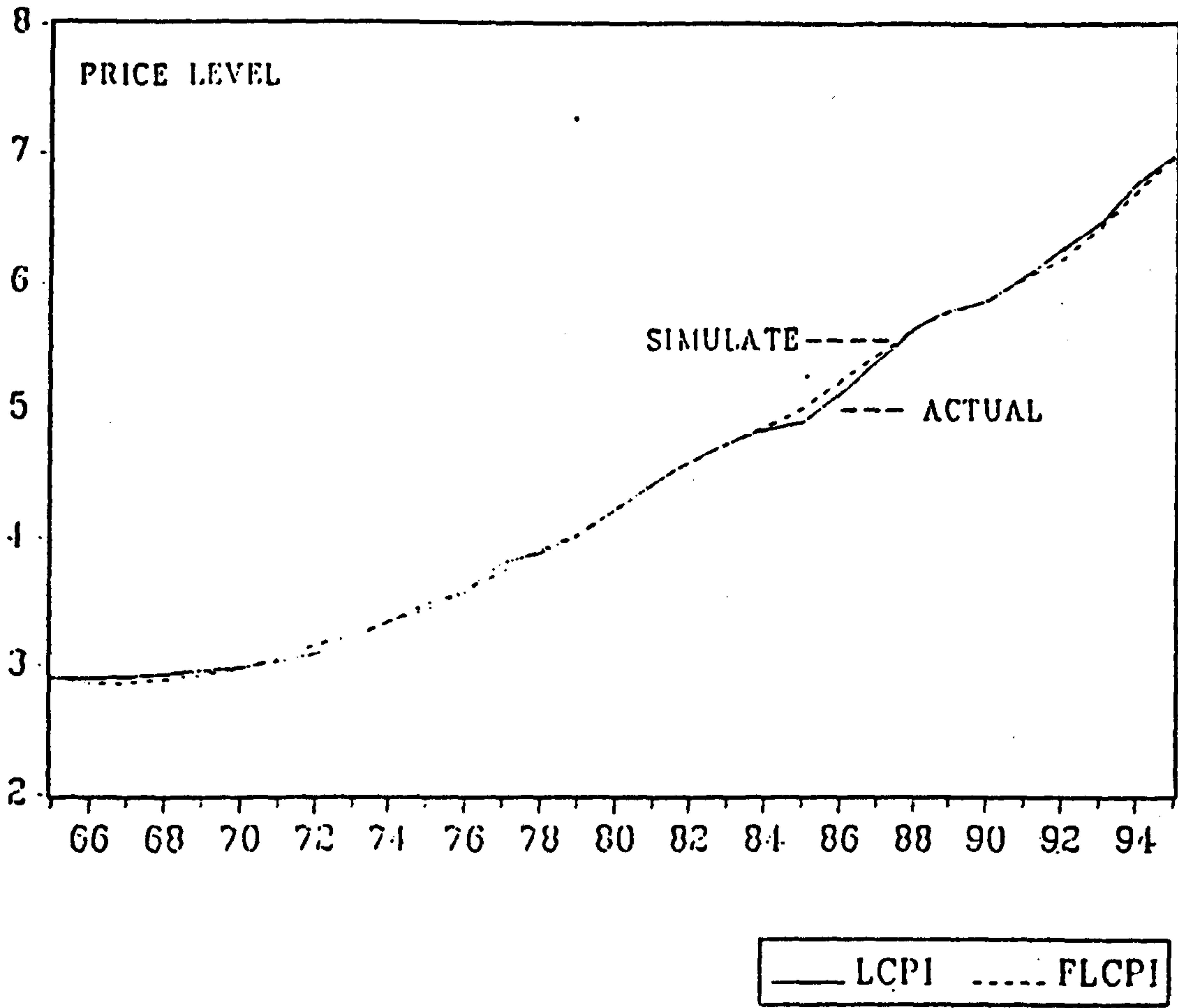


Figure (3)

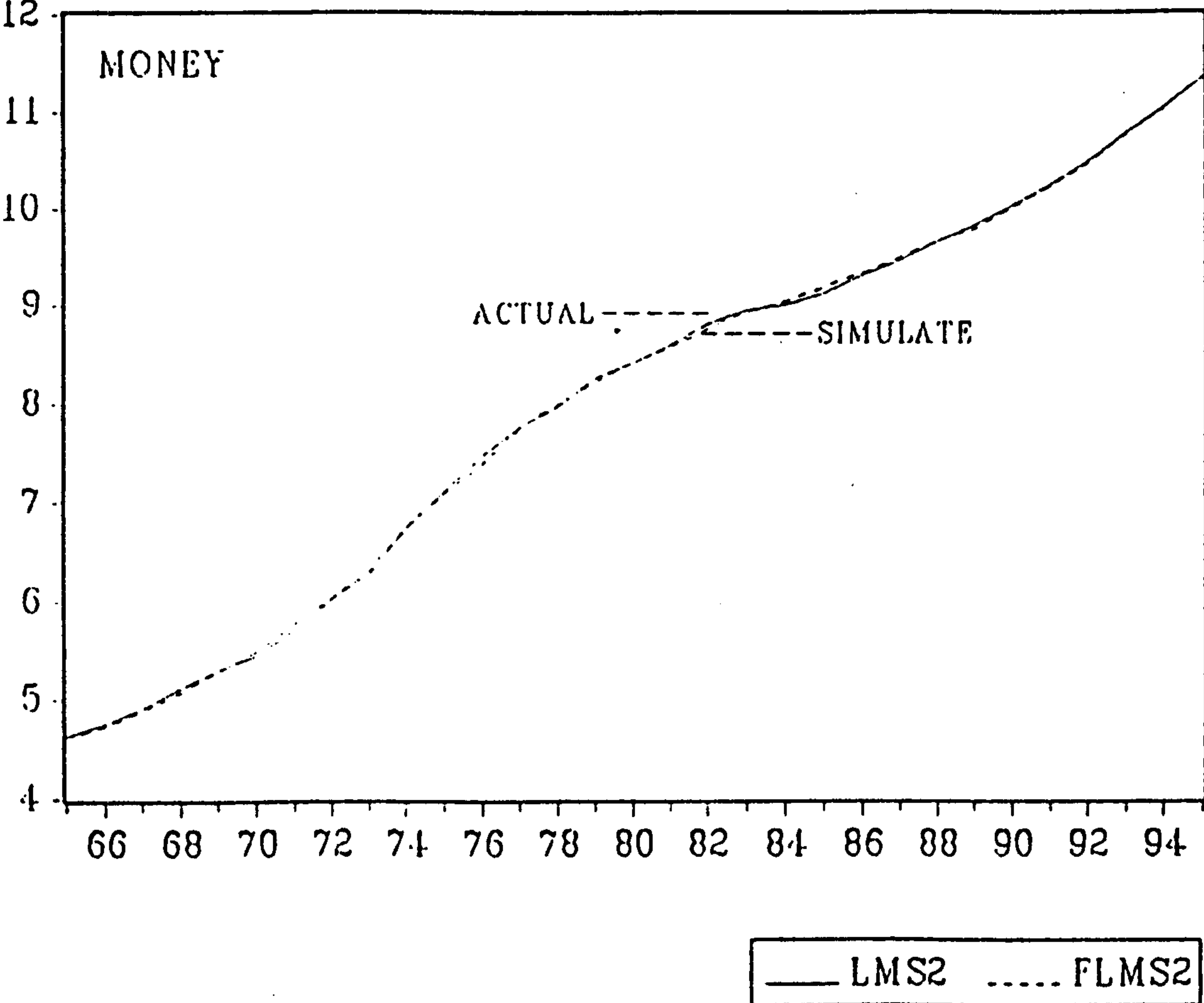


Figure (4)

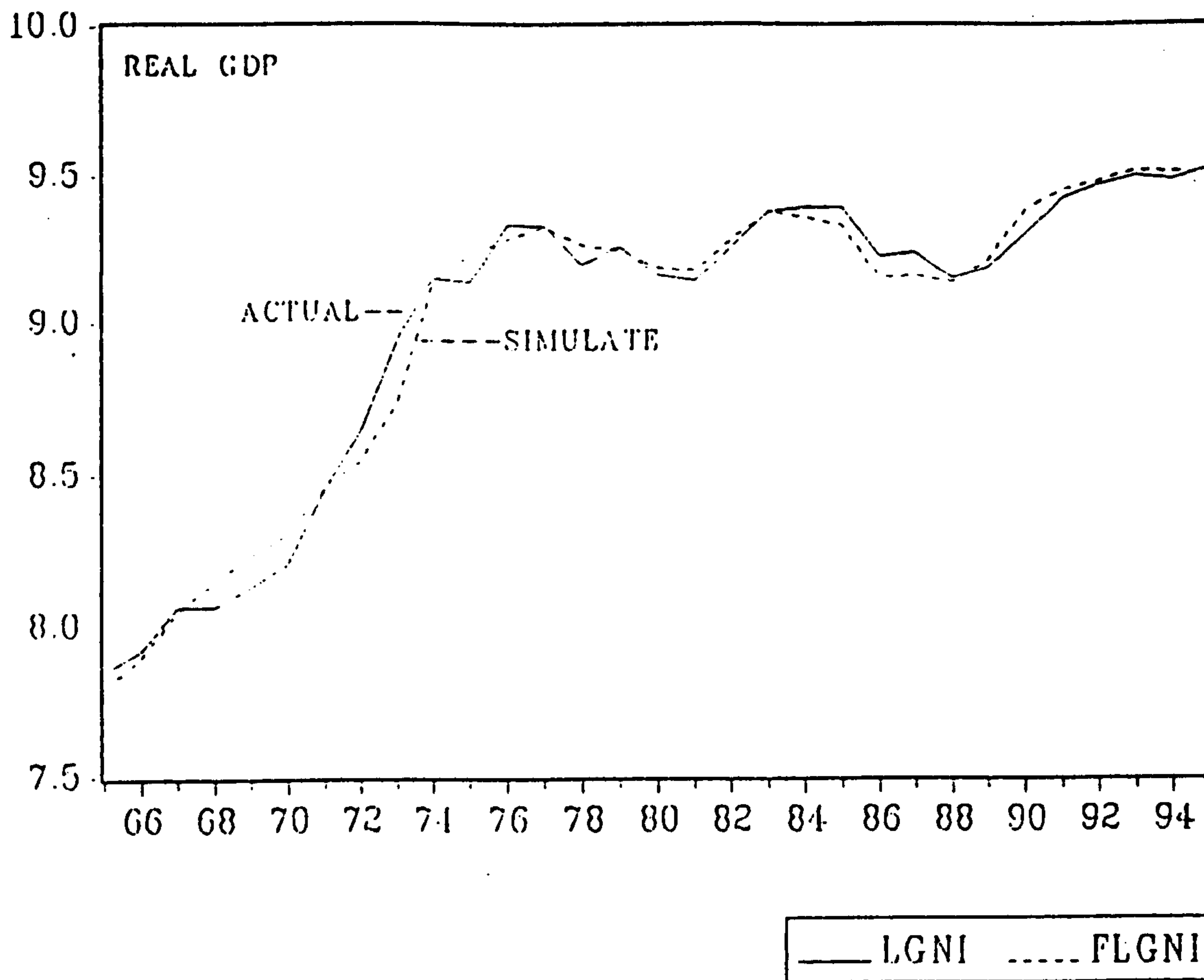


Figure (5)

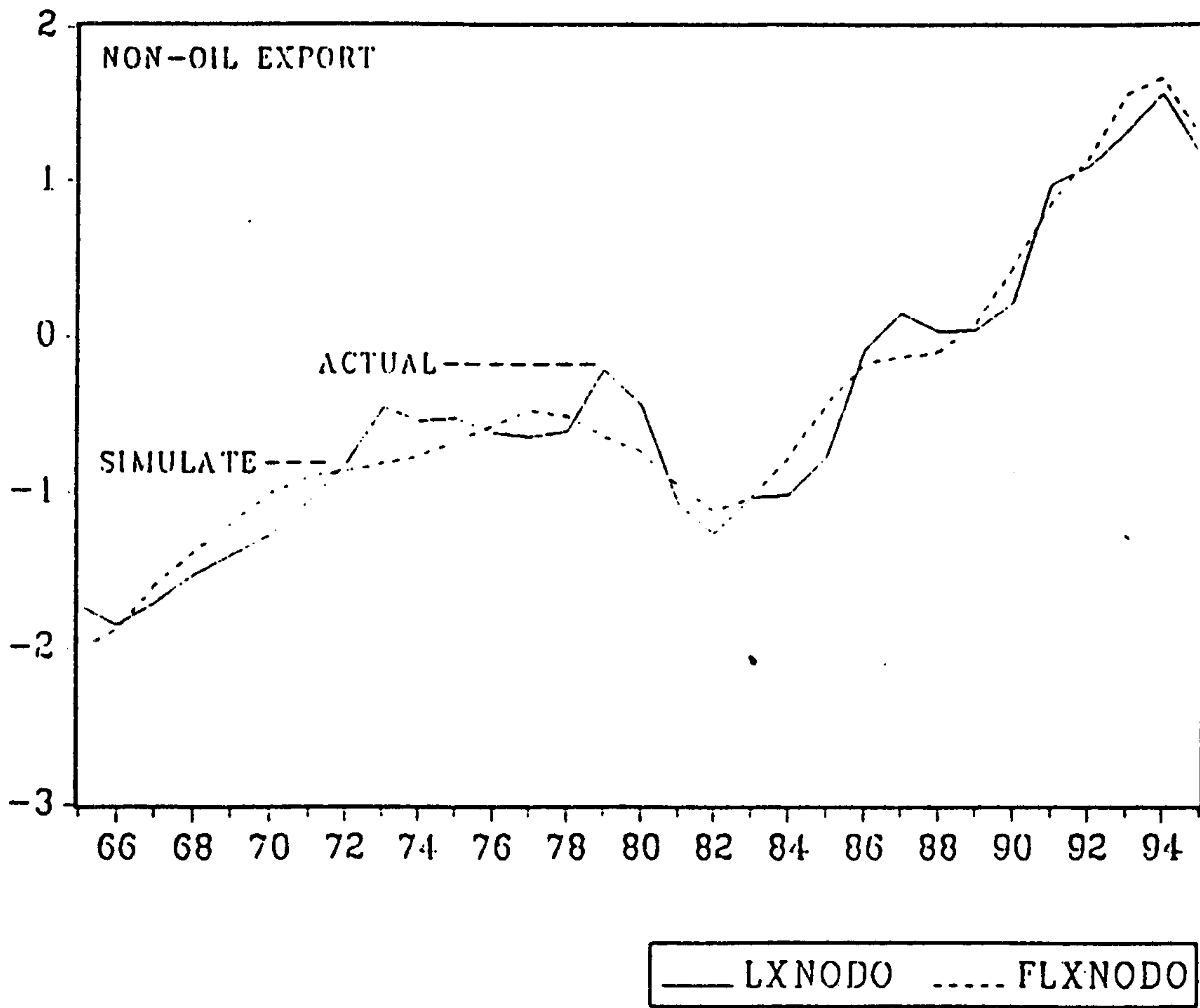
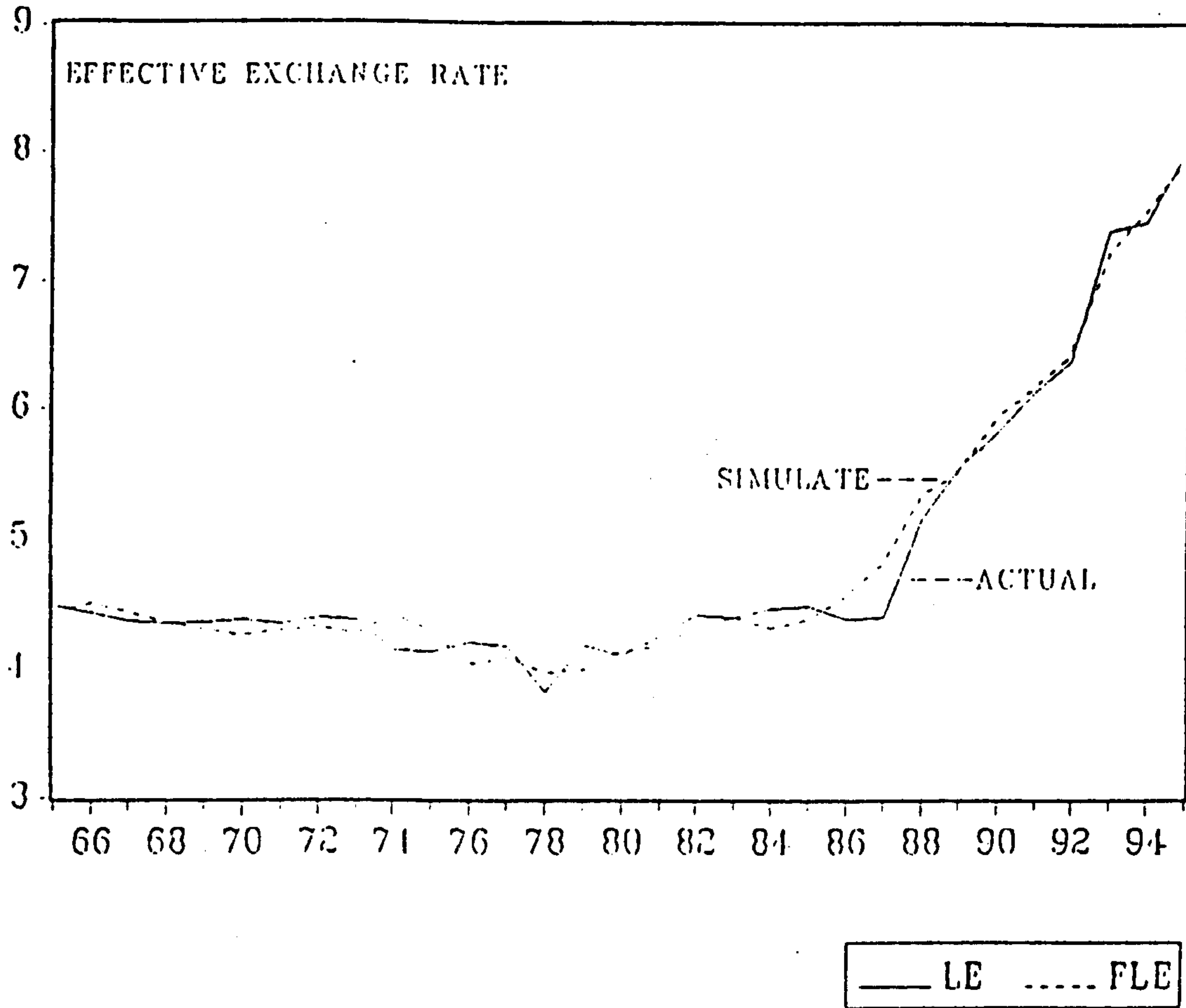


Figure (6)



Conclusion

The manner of settling the real exchange rate and its relation with the exchange regimes is one of the major topics in international financial literatures. The question is whether the exchange regime is to be clarified first and a suitable exchange rate should follow, or is it the other way around? Or are these two related at all? Experiences of different countries including Iran during the previous years point to the inconsistency of the exchange regime and macroeconomic policies with the real exchange rate.

The international monetary system has witnessed many ups and downs since 1880. In the Gold Standard system (1880-1914), the monetary officials of each country fixed the gold price based on their national currency, and were prepared to buy and sell any quantity of gold at that price.

At the onset of W.W.I, and upon weakening of single gold monetary currency, the main exchangeable currencies of the time cut their relation with gold. Until the Bretton Woods talks in 1944, different exchange methods were used including the fluctuating exchange rate system (until 1923) currency value stability (until 1928) and the tripartite agreement and currency devaluation (until 1939). During all these years, the exchange rate was set according to the exchange regime of each country. In 1944, after the implementation of the Bretton Woods monetary system, different countries pegged their currency on US dollar, while US dollar was pegged on gold. The Economic crisis of early 1970's caused the fall of this system and from the beginning of March 1973, the managed floating exchange rate regime is being actively used in the monetary system of developed and some developing countries. In 1975, 70% of the developing countries with shares in international business, used one of the fixed exchange rate regimes, but this number fell to 20% in 1996, meaning that the managed floating exchange rate regime has gradually substituted the fixed regime.

According to the macroeconomic theory, a stable equilibrium will be available only when the financial and monetary policies are harmonious with the exchange rate. Therefore, choosing an exchange regime can impose certain limitations on the large-scale economic policies. Inconsistency of these limitations with financial and monetary policies is a sign of unsuitable exchange system and will lead to heavy imbalance in economy. It must be noted that it is useful to distinguish between 2 different unsuitable regulations both in theoretical analysis and in policy makings. The first kind of unsuitable regulation of the real exchange rate is a consequence of large-scale economic policies and happens when the real exchange rate deviates from its equilibrium value due to the inconsistency between large scale economic policies and the official system of the nominal exchange rate. Also when the devaluation policies lead to a reduction or loss of unsuitable exchange rate regulation, if the real exchange rate is very unsuitably set,

devaluation helps restore equilibrium in the foreign sector.

In this article, we based the suitable setting of the exchange rate on a VAR model, and predicted the behavior of the exchange rate and other selected variables in a 5-year span. In this framework, a model is designed to simultaneously specify the effects of monetary policies, liquidity growth, inflation and Rial devaluation on the non-oil exports in a 5-years period. The model is evaluated using the annual data of the 1338-74 period. There are 2 gaps in the model due to the limitation of observations. According to the specified scenario, the Rial devaluation policy will succeed to increase the non-oil exports, only if the government expenditure growth rate falls and the liquidity growth and inflation rate are controlled. Generally, it can be said that nominal Rial devaluation to boost non-oil exports can be fruitful when it goes hand in hand with suitable financial policies in economy. Therefore, government expenditure control and Rial devaluation policies can not only boost non-oil exports, but also cause a drop in liquidity growth and inflation rate.

References

1. Caramazza, Francesco, and Aziz Jahanguir, "Fixed or Flexible"?, *Economic Issues, IMF*, 13, April 1998.
2. Dornbusch, Rudiger, "Expectation and Exchange Rate Dynamic", *Journal of Political Economics*, 84, December 1976.
3. Edwards, Sebastian, "Real and Monetary Determinants of Real Exchange Rate Behavior, Theory and Evidence from Developing Countries", *Journal of Development Economics*, 29, 1988, pp. 311-341.
4. Edwards, Sebastian, and Liaquat Ahmed eds., *Economic Adjustment and Real Exchange Rates in Developing Countries*, Chicago University Press, 1986.
5. Feyzioglu, Tarhan, "Estimating the Equilibrium Real Exchange Rate: An Application to Finland", *IMF Working Paper*, September 1997.
6. Isard, Peter, and Faruqee, Hamid, *Exchange Rate Assessment, Extensions of the Macroeconomic Balance Approach*, Occasional Paper, 167, IMF, 1998.
7. Krueger Anne, O., *Exchange-Rate Determination*, Cambridge University Press, 1998.
8. MacDonald, Ronald, "What Determines Real Exchange Rates? The Long and short of It". *IMF Working Paper*, January 1997.
9. Narayana, Kocherlakota and Krueger, Thomas, "Why Do Different Countries Use Different Currencies"?, *IMF Working Paper*, February 1998.
10. Sims, G., "Macroeconomics and Reality", *Econometrica*, 48, 1980.
11. William, John, *The Exchange Rate System*, Institute for International Economics, Washington, D.C., June 1985.