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Demand for Money in Iran by an Autoregressive Distributed Lag Approach

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Abstract: It is estimated the Iranian demand for money for period (1971-2005) by using the autoregressive distributed lag (ARDL) method. We also use the error correction model for short-run dynamic analysis. Accordingly, we obtained the short-run coefficients and surveyed the error correction model among variables. According to our findings, the Error Correction Model (ECM) is about 50 %, which indicates amount deviation of equilibrium. In addition, we tested the null hypothesis of no cointegration for well determinate of equation.

Key words: Money Demand · Error Correction Model · Estimation

INTRODUCTION

Estimation of demand for money performs a key role due to its importance in determining the effects of monetary policy in regulating the economic system. The stability of the demand for money is one of the most important and recurring issues in macroeconomic policy analysis. The issue at stake here is the set of necessary conditions for money to exert predicable influence on the economy so that the central bank, s control of money supply can be a useful instrument of economic policy [1-5].

A monetary policy that seeks to limit the supply of money to its demand facilitates the tasks of demand management and contributes to the achievement of price stability. The rate of growth in money supply should be in conformity with the desired rate of growth in output and thus constrain the price increases to an acceptable level. A stable demand for money implies a stable money multiplier and, therefore, stability makes it easier to predict the effect of given money supply on the aggregate money income [5-9].

Several studies have used cointegrating technique in examining the short-run relation between the demand for money and it determinates [7-12]. The main result from most of the studies is that money supply broadly defined (M_2) is cointegrated with income, exchange rate and inflation rate. The objectives of this paper are two-fold. One, to shed light on the cointegrating properties of M_2,

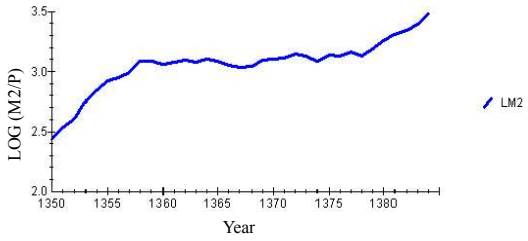

Fig. 1: Plot of the logarithm or real broad money

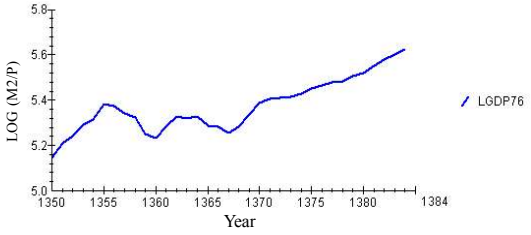

Fig. 2: Plot of the logarithm of gross domestic product at constant 1998 prices

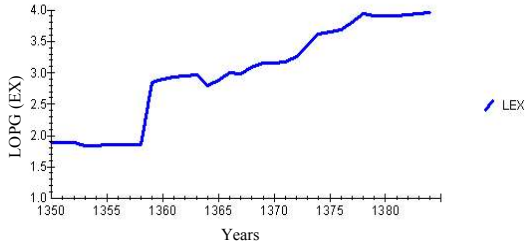

Fig. 3: Plot of the logarithm of foreign exchange rate

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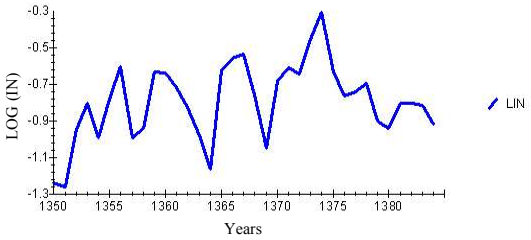

Fig. 4: Plot of the logarithm of inflation rate

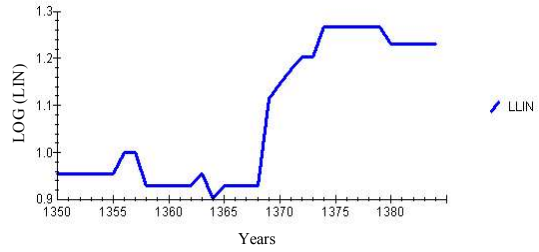

Fig. 5: Plot of the logarithm of long-run interest rate

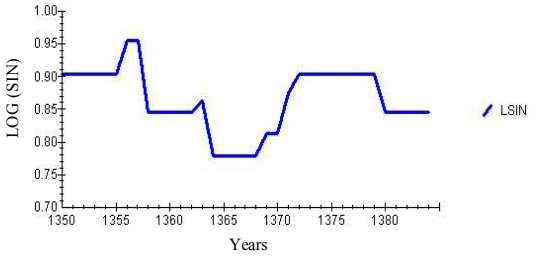

Fig. 6: Plot of the logarithm of short-run interest rate

Gross Domestic Product(GDP), Inflation Rate(IN), Foreign Exchange Rate(EX), Short-Run and Long-Run Interest Rates(LSIN, LLIN) using the cointegrating technique known as ARDL approach. The behavior of variables has been shown in Figures 1-6.

This is important because as has been demonstrated in the literature, cointegration may not imply stable relationship among se of variables. The paper is divided into four sections. Section 1 introduction, section 2 materials and methods, section 3 result and discussion and Section 4 provides the conclusion.

MATERIALS AND METHODS

There is a diverse spectrum of money demand theories emphasizing the transactions speculative, precautionary or utility considerations. Essentially, these theories tend to address a board rang of hypotheses. However, one thing about diverse theories is that share common important variables their analysis. In general, examine the relationship between the quantity of money demand and a set of few important economic variables linking money to real sector of the economy. The general specification takes following functional relationship for the short-run demand for money accordingly (1):

$$M / P=LM2= (LGDP, LEX, LIN, LISN, LINN, D57, D59 \quad (1)$$

Where, LM_2 or M / P is the logarithm or real broad money, LGDP is the logarithm of gross domestic product at constant 1998 prices, LEX is the logarithm of foreign exchange rate, LIN is the logarithm of inflation rate, LLIN and LSIN is the logarithm of short-run and long-run interests rate, D57 and D59 is the dummy variables for war and revolution happened in Iran. In apply the cointegration technique; we need to determine the order of cointegration of each variable. However, as noted in the literature, depending on the power of the unit root tests, different tests yield different results.

RESULTS AND DISCUSSION

In this paper, Augmented Dicky-Fuller (ADF) and Philips-Peron (PP) applied. The results presented in Table 1.

In view of this problem by used, introduce a new method of testing for cointegration. This approach is known as the ARDL approach [4]. The main advantage of this approach lies in the fact that it obviates the need to classify variables in to me (1) or me (0). Moreover, as compared to standard cointegration, there is no need for unit root pre-testing. The paper used annual data from central Bank of the Islamic Republic of Iran for period 1971-2005. We were used the four lag selection criterion namely and Schwarz Bayesian criterion (SBC).

The short-run coefficient estimate is reported in Table 2 the coefficient represent long-run elasticity. Note that the estimated coefficient obtained from model and all regressors are highly significant. As expected, the coefficient of the income (GDP) variables is positive and that of interest rates not significant. The negative coefficient obtained for the exchange rate and inflation rate. According to our finding, LEX and LIN have significant negative effect on the demand for money in Iran. Exchange rate depreciation induces currency substitution in favor of foreign and raises the demand for domestic money for inflation rate. The positive coefficient obtained for the gross domestic product, the depreciation induces and reduces the demand for money. Income elasticity are plausible is very high and the interest rate coefficient are insignificant.

Table 1: Results of unit root test

	Intercept		Trend and Intercept	
Variables name	ADF	PP	ADF	PP
LM_2	$I(°)$	$I(1)$	$I(2)$	$I(2)$
LEX	$I(1)$	$I(1)$	$I(1)$	$I(1)$
LIN	$I(°)$	$I(°)$	$I(°)$	$I(1)$
LGDP	$I(1)$	$I(1)$	$I(1)$	$I(1)$
LSIN	$I(1)$	$I(1)$	$I(1)$	$I(1)$
LLIN	$I(1)$	$I(1)$	$I(1)$	$I(1)$

Table 2: Short-run coefficient estimates lm2 money demand

Variables	Coefficient	Standard Error	T-Ratio	T-[Prob]
LGDP76	0.61198	0.76542	1.7815	0.179
LEX	0.3781-	0.12830	1.6880-	0.131
LLIN	1.1425-	0.6345	1.9956-	0.146
LSIN	1.8771	0.81288	2.2771	0.045
C	0.89861-	2.0381	0.33069-	0.781
LIN	0.25856-	0.15564	1.4625-	0.187
D57	0.042314	0.14438	3.1699	0.008
D59	0.14587	0.06877	2.2878	0.044

Table 3: Error correction representation of ARDL model

Variables	Coefficient	Standard Error	T-Ratio	T-[Prob]
ECM	-0.50082	0.1767	-3.842	0.004

The estimation of the error correction representation selected by SBC is presented in table 3. The error correction models fit the data reasonably well. Importantly the error correction coefficients carry the expected negative sign and are highly significant in case. The result of our ECM model indicated that about 50% of error deviation of the demand for money from its equilibrium path is corrected each in period. The coefficient can be interpreted as the yearly speed of adjustment respect to short-run disequilibria: we can read the data as if the sot. Of any disequilibrium inherited from the last period is eliminated in the next period.

$$\frac{\text{Sum of short-run dependent variable coefficients-1}}{\text{Sum of short-run dependent variable standard errors}} = \frac{0.4791}{0.176} = -2.94 \qquad (2)$$

A t-test on the error correction mechanism is performed giving a value of -3.51, Being the none standard critical values -3.48 at 90% (sample size=31, k=5) we reject the null hypothesis of no cointegration therefor equation is well-determinate.

CONCLUSION

The elasticity values emerging form the presented econometric exercise directly involve a strong and clear support for the presence of cointegration between the variables. While, the relationship in the short-run seems to be confirmed by the data, it has been consisted the short-run correlation between money balances. A final test was presented in order to test the goodness of our specification. The paper in investigated the cointegrating property of the demand for money function in Iran. The results show that LM_2 is cointegrated with income, exchange rate, inflation rate and interest rates insignificant. The question, the, is what the implications of these finding on policy formulation in Iran. The result shows that there is cointegration among LM_2, LGDP, LEX, LIN and D57, D59. A major implication is that using elasticity estimates from LM_2 function will help to provide more reliable estimates of future money balances in the country.

This means that more stable short-run money demand incorporate real LM_2, real GDP, exchange rate, inflation rate as argument. The income elasticity is positive .The income elasticity of LM_2 seems to support the view of the monetary economist who would advocate that the money supply should be allowed to grow at the same rate that output grows. The inflation rate and exchange rate has a negative sign as expected. This means that these variables can be used to influence money policy in Iran. However, the exchange and inflation rate elasticity estimate is small in absolute magnitude inelastic. The implication of this is that if LM_2 is used as the monetary target, it will take quite a large change in LEX and LIN to induce a desired change in the demand for money than as previously thought. This simply suggests that there is a limit to which monetary authorities can use the exchange and inflation rate to reduce demand for money [9-12].

It is indicative o the fact that monetary policy may not necessarily achieve the maximum effectiveness, thus, policies to stabilize the economy must go beyond monetary policy alone. Finally the coefficient of gross domestic product (LGDP) and dummy variables (D57, D59) has appositive sign, the coefficient of exchange rate (LEX) and inflation rate (LIN) has a negative sign,the coefficient of interest rate are insignificant. Therefore, macro policies in Iran must focus not only at stabilizing the economy but also at achieving equilibrium exchange and inflation rate of the domestic currency.

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