The Determinats Of The Demand For Money In Kuwait

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Introduction

The demand for money and its determinants has received an extensive debate in economic literature. The importance of this subject stems from the impact of the demand for money on the effectiveness of monetary policy and the way monetary policy should be conducted. In this context the stability and predictability of the publics demand for money is at the centre of debate. The argument here is that if the demand for money is stable and predictable then monetary authority should set the actual money supply equals to the level of money demand, however, if the demand for money is unstable and unpredictable then monetary authority should shift its policy to stabilise the domestic interset rate. In addition, the sensitivity of the demand for money to changes in the interest rate is another issue of debate. The monetarists argue that demand for money is less sensitive to changes in interest rate relative to the interest rate sensitivity of the demand for real assets while Keynes argues the opposite. This issue of sensitivity has its implication for the relative effectiveness of Fiscal and Monetary policies. The argument is that the more sen-

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sitive is the demand for money to changes in the interest rate the more effective is the Fiscal policy.

This article attempts to study the money demand in a small-open economy taking Kuwait as an example in order to analyse the factors affecting the public's holding of cash balances in this economy and their relative influence. Accordingly, the article will be divided into four parts, part one discusses the main determinants of the demand for money, part two discusses the functional form of the demand for money, part three is an empirical analysis, and finally part four provides a conclusion.

The determinants of the demand for money

Money is regarded as both a medium of exchange, and a store of value (an asset). Therefore, the level money balances held by the public is affected by the level of transactions in the economy and the opportunity cost of holding money measured by the rates of return on the close substitutes for money. This summarises the views of the various theories introduced to explain the motive for holding cash balances. On the subject of money substitutes different views has been introduced where both financial and physical assets are regarded as close substitutes for money. Short-term as well as long-term bonds have been considered as relevant financial substitues, accordingly short-term and long-term interest rates are used as measures for opportunity cost for holding cash balances. Inflation hedges such as land and percious metals are considered as relevant real (physical) substitutes for money, therefore the rate of inflation is used as another measure of the opportunity cost for holding money which serves as a proxy for the rate of

return on non-financial substitutes. Changes in both the interest rate and the rate of inflation will stimulate agents to adjust their portfolio by increasing (decreasing) the level of cash balances as interest rate and inflation decreases (increases). Although the inclusion of long-term interest rate and inflation has been debated on the bases that they are redundant since changes in the short-term interest rates will reflect changes in those two variables, however the relation between these three variables may not be close enough to exclude inflation, at least, as a determinant of the public's demand for money. In fact various recent studies have found a signficant effect of inflation on the demand for money. Accordingly, the money demand function is formulated in the following general form:

$$M=f(R.Y,P) \qquad f_R<0; f_y>0; f_p<0 \qquad (1)$$

Where:

M = Real money balances[1].

R = Nominal interest rate.

Y = Real income (transactions).

P = The rate of inflation.

Modelling the demand for money

There has been a great deal of debate on the appropriate functional

(1) In the literature money demand function is usually cased in real terms on the assumption that agents are free of money illusion which means that the price elasticity of nominal money is unity. Some economists argue this is true in the long-run, in the short-run, however, price elasticity may not be necessarily equals to one since agents may not fully consider the effects of inflation. On the other hand using nominal money and income will result in biased coefficient of income if the income elasticity of the demand for money is not unitary. See Boorman (1980) and Emery, k. (1991).

form to estimate long-run and short-run demand for real money balances(2). The literature introduced three major models for the demand for money namely: the partial adjustment model, the adaptive expectation model and the error-correction model. The first is based on the assumption that agents do not adjust their actual holding of cash balances instantaneously but rather through a partial adjustment process, the adaptive expectation model on the other hand is based on the argument that agents determine their actual holding of cash balances on the bases of their expectations regarding the level of the variables affecting their decision to hold money. The two models yield the same functional form that can be represented by the following equation:

$$M_t = \kappa\mu_0 + \kappa\mu_1 X_t + (1-\kappa) M_{t-1} \qquad (2)$$

Where k represents the coefficient of adjustment or the coefficient of expectations respectively and is assumed to take a value greater than zero and less or equal to one.

The error-correction model is a more general case of the partial adjustment model were agents are assumed to adjust the level of their actual holding of cash balances to both the difference between last period actual and desired levels and to current changes in their desired level of cash balances, therefor, the model takes the following form:

$$M_t - M_{t-1} = \alpha(M^*_t - M^*_{t-1}) + \kappa(M^*_{t-1} - M_{t-1}) \qquad (3)$$

Where:

Mt-Mt-1 = change in actual level of the variable.

M*t-M*t-1 = change in the desired level of the variable.

M*t-M*t-1 = last period disequilibrium.

This model is considred as a general form of the partial adjustment

(2) See for instance Carlson, J. (1989), and Chowdhury, A. (1992).

model since it will collapse to partial adjustment representation if a=k. Now if the desired level of cash balances is determined by the following equation:

$$M^*_t = \mu_0 + \mu_1 R_t + \mu_2 Y_t + \mu_3 P_t \quad (4)$$

Then,

$$M^*_{t-1} = \mu_0 + \mu_1 R_{t-1} + \mu_2 Y_{t-1} + \mu_3 P_{t-1} \quad (5)$$

Substituting (4) and (5) for M*t and M*t-1 respectively into (3) yields:

$$\begin{aligned} M_t - M_{t-1} &= \alpha(\mu_0 + \mu_1 R_t + \mu_2 Y_t + \mu_3 P_t - \mu_0 - \mu_1 R_{t-1} - \mu_2 Y_{t-1} - \mu_3 P_{t-1}) + \\ &\quad \kappa\{\mu_0 + \mu_1 R_{t-1} + \mu_2 Y_{t-1} + \mu_3 P_{t-1} - M_{t-1}\} \\ &= \kappa\mu_0 + \alpha(\mu_1 R_t - \mu_1 R_{t-1}) + \alpha(\mu_2 Y_t - \mu_2 Y_{t-1}) + \alpha(\mu_3 P_t - \mu_3 P_{t-1}) + \\ &\quad \kappa\mu_1 R_{t-1} + \kappa\mu_2 Y_{t-1} + \kappa\mu_3 P_{t-1} - \kappa M_{t-1} \quad (6) \\ &= \kappa\mu_0 + \alpha\mu_1(R_t - R_{t-1}) + \alpha\mu_2(Y_t - Y_{t-1}) + \alpha\mu_3(P_t - P_{t-1}) + \\ &\quad \kappa\mu_1 R_{t-1} + \kappa\mu_2 Y_{t-1} + \kappa\mu_3 P_{t-1} - \kappa M_{t-1} \quad (7) \end{aligned}$$

Equation (6) expresses the change in the actual level of money held by the public as a function of observed values of the three independent variables. The equation can be written in th following form:

$$\Delta M_t = \beta_0 + \beta_1 \Delta R_t + \beta_2 \Delta Y_t + \beta_3 \Delta P_t + \beta_4 R_{t-1} + \beta_5 Y_{t-1} + \beta_6 P_{t-1} - \kappa M_{t-1} \quad (8)$$

Where

$\beta_0 = \kappa\mu_0$, $\beta_1 = \alpha\mu_1$, $\beta_2 = \alpha\mu_2$, $\beta_3 = \alpha\mu_3$, $\beta_4 = \kappa\mu_1$, $\beta_5 = \kappa\mu_2$, and $\beta_6 = \kappa\mu_3$.

This equation captures the dynamics of short-run adjustment of cash balances toward their desired level by taking into account also the changes in the desired level of cash balances. Different versions of this model has been experimented with in the literature in an attempt to reach at a stable demand for money function that can adequately explain the data within the sample period and has a reliable forecasting capability(3).

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(3) See For Example Gordon (1984), Hendry (1985), Fase and Winder (1990), and Chowdhury (1992).

The coefficients معادلة, measure the short-run effect of transactions, the interest rate, and the rate of inflation respectively on the publics demand for money, while the long-run coefficients are obtained by dividing the previous coefficients by the coefficient of Mt-1. The relevant money demand elasticities are obtained, from the linear model, by multiplying the previous coefficients by the ratio of the mean of the relevant independent variable to the mean of the relevant money stock measure.

The Money Stock In Kuwait

During the period from 1973:I to 1990:II, the stock of broad money has witnessed significant changes in both its level and structure. The stock increased from KD 510 million in 1973 I to KD 5453 million in 1990:II, by ten folds, within this stock non-interest bearing components have increased from KD 171 million to KD 924million, but despite this upward trend the growth of non-interest bearing components have declined significantly since 1984 to a degree that its stock has relatively levelled off. In addition, there has been a shift from currency to demand deposits as indicated by the increasing vertical distance between the two graphs in figure (1), however this shift seems to reach a half starting from 1985 as the distance stopped growing. The figure also shows a shap increase in the stock of demand deposits during 1982, this increase was mainly due to the upsurge in stock market activities in that year. On the other hand, the stock of interest-bearing components has increased from KD 339 million in 1973 I to KD 5453 million in 1990:II, however, the stock continues to increase during this period unlike the behaviour of non-interest com-

ponents. In addition, figure (2) indicates a gradual shift from saving deposits to time deposits as the distance between the two graphs continue to widen over time. A close inspection of the behaviour of three definitions of money, M 1 (currency + demand deposits), M2 (M1 + saving deposits), and M3 (M2 + time deposits) reveals, as shown in figure (3), two distinctive trends, the first is that the behaviour of both M1 and M2 are almost identical, with a slight increase in the vertical distance between the two indicating an increase in the share of saving deposits in M2. The two graphs show an increase during the seventies and early eighties, however, the two measures of money have become stationary since 1984.

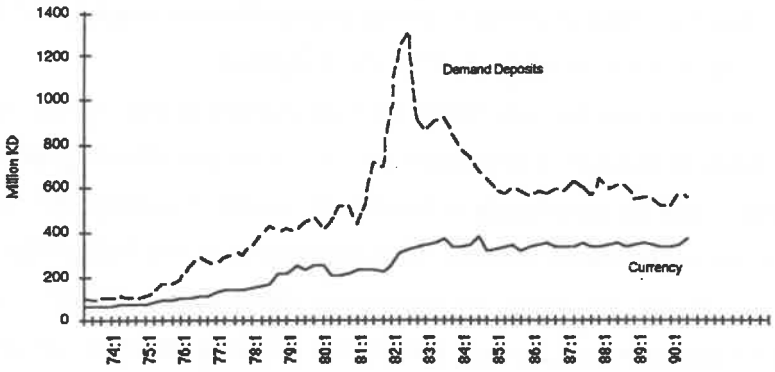


Figure (1): currency and Demand Deposits

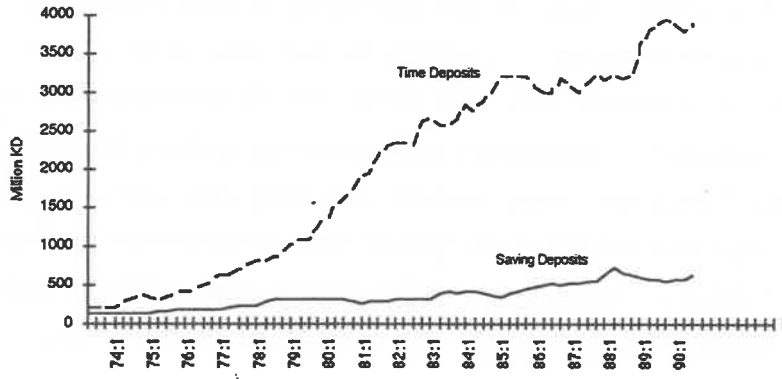


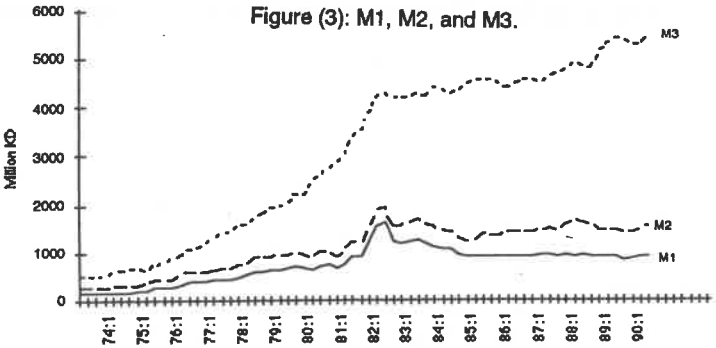
Figure (2): Saving and Time Deposits

The second distinctive trend is that of M3 which continues to increase during the whole period, through the pace of increase has slowed down since 1983. In addition there seems to be a gradual shift to time deposits as indicated by the increasing vertical distance between M3 and the other two measures. These trends are reflected in the behaviour of the share of these components in the broad money stock. The share of currency in circulation and demand deposits has declined from an average of 11% and 21% respectively during the seventies to 7% and 16% during the eighties. On the other hand the share of saving deposits has declined from 19% to 10%, while the share of time deposits has increased from 49% to 77%. Accordingly the share of interest-bearing deposits has increased on average from 68% in the seventies to 77% in the eighties.

These developments may reflect the development in the banking sector, in terms of number of institutions and branches and the geographical dispersion, and banking habits in the society, as individual become more acquainted with banking services. More importantly in the implications of these trends for the choice of appropriate measure for money stock. From the previous discussion it seems that currency, demand deposits, and saving deposits (M2) may be regarded as relevant measure of money stock as they, apparently, are held mainly for transactions purposes. This argument may be supported by the behaviour of M2 in figure (3) which has levelled off since 1984 as the level of transaction in the economy, measured by government expenditrue has relatively becomes stationary. Concerning saving deposits, individuals may hold part of their temporary excess funds in this type of deposits to use them for their future transactions either by converting them to cash or transfer them to their checking accounts to fulfil their transactions needs instead of hold-

ing them idle especially since saving deposits has no time constraint on withdrawals compared with time deposits. Accordingly, individuals may maintain a minimum of their transactions funds, for instance to cover their daily (frequent) transactions, in the form of either cash or demand deposits and the rest is held in saving accounts.

Figure (3): M1, M2, and M3.



Empirical analysis

In this section the demand for money in Kuwait is estimated using the error-correction model (8). The estimation is performed on three definitions of money the M1, M2, and M3. Two estimations have been conducted: the first assuming a linear relation and the other assuming a non-linear relation. The data used in the regression are obtained from the quarterly bulletins of the Central Bank of Kuwait for the period from 1973 I to 1990:II. Concerning the independent variables, the domestic three-month inter-bank offer rate is used as the relevant interest rate variable, for inflation the percentage change in the consumer price index is used, while for transactions government domestic expenditure is used as a proxy due to the lack of quarterly data on national income. In addition, government expenditure is the main stimuli for domestic economic activities in Kuwait since the goverment sector is the dominant sector in the

economy with a share exceeding 70% of the gross domestic product, accordingly, government expenditure is regared as a good proxy for domestic transactions. The regression is performed using OLS method. A dummy variable (D) is introduced to capture the impact of the upsurge in the domestic stock market activities in 1982 on the level of real cash balances held by the public. The results are provided in tables (1) and (2).

Table(1): The Results using linear model

$$\Delta M1 = 91.7 - 14.6\,\Delta R_t + 0.37\,\Delta Y_t - 29.3\,\Delta P_t - 10.2\,R_{t-1} + 0.45\,Y_{t-1} - 13.9\,P_{t-1} + 328\,D - 0.29\,M1_{t-1}$$

(5.3)* (3.7)* (6.8)* (2.6)* (4.1)* (7.1)* (2.8)* (9.4)* (6.7)*

R^2	F	DW	LM	ARCH	BP
0.77	30*	1.96	2.06	0.02	7.9

$$\Delta M2 = 180 - 20.1\,\Delta R_t + 0.42\,\Delta Y_t - 36.3\,\Delta P_t - 15.2\,R_{t-1} + 0.49\,Y_{t-1} - 20\,P_{t-1} + 333\,D - 0.26\,M2_{t-1}$$

(8.1)* (4.5)* (6.9)* (2.8)* (5.5)* (6.6)* (3.8)* (8.6)* (5.9)*

R^2	F	DW	LM	ARCH	BP
0.76	28*	1.94	3.1	0.2	6.5

$$\Delta M3 = 130 - 6.4\,\Delta R_t + 0.31\,\Delta Y_t - 3.2\,\Delta P_t + 8.1\,R_{t-1} + 0.46\,Y_{t-1} - 42\,P_{t-1} + 143\,D - 0.11\,M3_{t-1}$$

(3.7)* (0.9) (3.1)* (0.4)* (1.3) (4.9)* (5.4)* (2.0)** (4.9)*

R^2	F	DW	LM	ARCH	BP
0.54	11*	2.15	2.6	0.04	13.1

Numbers in parentheses are the t-statistics.
*Significant at 1% level of significance., **Significant at 5% level of significance.,
LM = godfrey & Breusch test for higher order autocorrelation.
ARCH = Engle test for heterosedasticity.
BP = Breusch-Pagan test for heteroscedasticity.

Table (2) : Estimated Mean Elasticities

	Short-Run			Long-Run		
	ε_R	ε_Y	ε_P	ε_R	ε_Y	ε_P
RM1	0.12	0.29	0.05	0.42	1	0.17
RM2	0.12	0.21	0.05	0.48	0.83	0.19
RM3	0.02	0.08	0.03	0.23	0.71	0.35

Table(3): The Results using log- linear model

$$GM1 = 0.29 - 0.16\,GR_t + 0.19\,GY_t - 0.03\,\Delta P_t - 0.11\,LR_{t-1} + 0.23\,LY_{t-1} - 0.02\,P_{t-1} + 0.32\,D - 0.22\,LM1_{t-1}$$

(1.9)** (3.0)* (4.9)* (2.1)** (3.7)* (4.9)* (2.9)* (5.9)* (4.7)*

R^2	F	DW	LM	ARCH	BP
0.58	12.7*	1.84	3.2	0.21	3.3

$$GM2 = 0.65 - 0.17\,GR_t + 0.16\,GY_t - 0.03\,\Delta P_t - 0.11\,LR_{t-1} + 0.18\,LY_{t-1} - 0.02\,P_{t-1} + 0.26\,D - 0.22\,LM2_{t-1}$$

(3.6)* (4.2)* (5.5)* (2.5)* (5.0)* (5.2)* (3.9)* (6.5)* (4.7)*

R^2	F	DW	LM	ARCH	BP
0.65	16.6*	1.87	3.0	0.4	2.6

$$GM3 = 0.48 - 0.01\,GR_t + 0.04\,GY_t - 0.001\,\Delta P_t - 0.02\,LR_{t-1} + 0.06\,LY_{t-1} - 0.01\,P_{t-1} + 0.03\,D - 0.11\,LM3_{t-1}$$

(3.3)* (0.5) (2.1)** (0.1) (1.07) (3.3)* (3.7)* (1.1) (4.4)*

R^2	F	DW	LM	ARCH	BP
0.39	6.3*	2.0	0.7	9.1	18.4

Numbers in parentheses are the t-statistics.
*significant at 1% level of significance., **significant at 5% level of significance.,
LM = godfrey & breusch test for higher order autocorrelation.
ARCH = engle test for heterosedasticity.
BP = breusch-pagan test for heteroscedasticity.

Table(4) : Estimated Elasticities from the log-linear model

	Short-Run			Long-Run		
	ε_R	ε_Y	ε_P	ε_R	ε_Y	ε_P
RM1	0.11	0.23	0.02	0.5	1	0.1
RM2	0.11	0.18	0.02	0.5	0.81	0.09
RM3	0.02	0.06	0.01	0.23	0.56	0.13

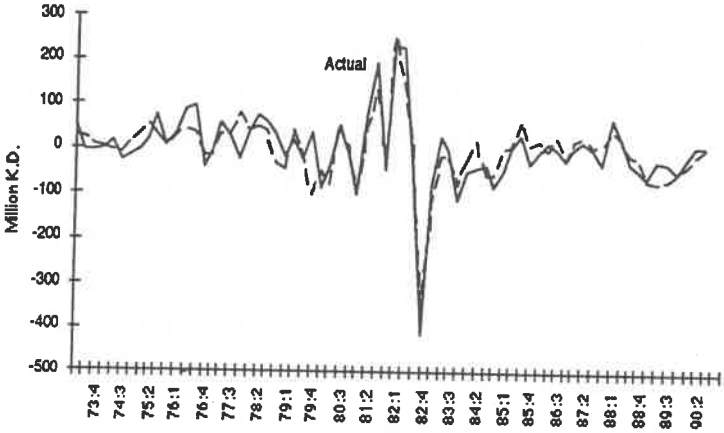


Figure (4) : Actual and Fitted RM 1

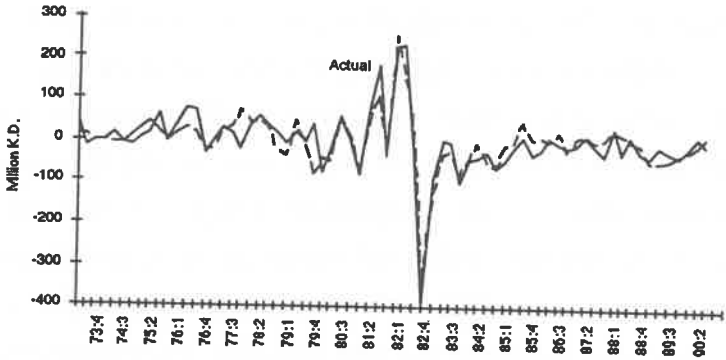


Figure (5) : Actual and Fitted RM 2

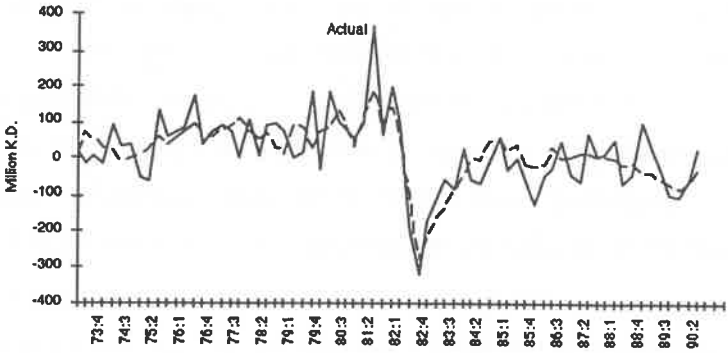


Figure (6) : Actual and Fitted RM 3

The results suggest that the regessions are free of autocorrelation and heteroscedasticity, except for M3 in the log-linear form, as indicated by the insignificance of the relevant diagnostic tests at the 5% level. Concerning the goodness of fit of the estimated money demand functions, the results show that the variation in the three independent variables explains more than 75% of the variation in M1 and M2 balances, and 54% of the variation in M3 as specified by the error-correction model in the case of the linear regression, however, the results of the non-linear regression show a much lower R_2. The coefficients of the three explanatory variables, in the two regressions, have the theoretically expected signs, and are statistically significant of both M1 and M2, however, for M3 the interest rate variable becomes insignificant and the sign of its lagged value become positive. One possible explanation for this is that time deposits are positively related to changes in interest rate, so that changes in (R) has a neutral effect on M3 as individuals simply shift from M2 components to time deposits leaving M3 unaffected by these changes. The stock market activities in 1982 seem to have a significant impact in stimulating the public's holding of real cash balances, which were used to finance stocks purchases, as indicated by the significant positive coefficient of the dummy variable in the three equations. This result is supported by the unusual jump in demand deposits in figure(1).

Concerning the elasticity of the money demand, the calculated mean elasticities of the three definition of money shows that M1 and M2 have very close elasticities(4) with respect to the three independent variables with values that falls within the range found in most empirical studies in the

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(4) The mean values of M1, M2, M3, Y, R, and P are: 592, 873, 2261, 389, 7.3, and2.2 respectively.

literature[5]. In addition the results show no significant difference between the elasticities obtained from the linear model and the non-linear one.

The graphical inspection, figures 4,5, and 6, indicates that the fitted values for both M1 and M2 coincides with actual data satisfactorily while for M3 the graph shows significant discrepancy. In addition, M1 and M2 show a relatively higher volatility during the period from 1973 to 1982 compared with its behaviour during the period from 1983 to 1990. One possible explanation of this volatility is the impact of the increase in oil prices on the domestic economy which experienced a sudden remarkable boom which subjected the economy to turbulent economic conditions characterised by volatile speculative activities especially in real estate and securities which reach a damaging peak during 1982 that lead to the crash of the market. The boom, however, began to subside starting from 1983, as a result of the decline in oil prices and the consequent decline in oil revenues, and so does the volatility in the demand for money as defined by M1 and M2 which experienced relatively smaller variations as both figure 4 and 5 show, in contrast with M 3 which continues to fluctuate in almost the same level.

Despite this volatility, the demand for money seems to be stable in its response to changes in the three variables. A test for stability is performed where the sample is divided into two sub-samples one for the period 1973:I. to 1982: IV and the other is for the period 1983: I to 1990 Chow stability test was then performed using the residuals sum of squares from the two unrestricted regressions and the errors sum of

(5) Income elasticity of the demand for money is expected to have a value less than or equal to one, while interest rate elasticity is expected to be (in absolute value) between zero and (0.5).

squares from performing a regression on the whole sample (the restricted regression). The null hypothesis of this test is that there is no structural change in the demand for money as a result of the decline in oil revenue. The following F-Statistic is constructed:

$$F^{K}_{(n_1+n_2-2k)} = \frac{(RSS_R - RSS_U)/K}{RSS_U/(n_1+n_2-2k)}$$

Where:

RSS r = Restricted Residuals Sum of Squares.

RSS u = Unrestricted Residuals Sum of Sqares.

K = Number of Restrictions.

n1, n2 = Number of Observations for each of the unrestricted regressions.

The calculated F-Statistic of this test is 1.73 for M1 1.66 for M2, and 1.45 for M3, the tabulated F(8,54) = 2.10 at 5% level of significance. Therefore it might be concluded that no significant structural change has taken place and that the demand for money is stable in its relation with the three variables.

From the previous discussion it may be argued that for Kuwait M2 is a more relevant measure of money compared with the broad definition M3. This measure of money is found to be stable and significantly sensitive to changes in the interest rate, inflation, and the level of transactions (income).

Conclusion

This article is an attempt to study the demand for money in Kuwait

with two objectives. The first is to reach at an appropriate measure of money, and the second is to determine the factors affecting the public demand for money. Accordingly, three definitions of money has been used in this study. The results indicate that M1 and M2 are more significantly related to the level of transactions and opportunity cost measures than M3. In addition, to behaviour of the two is almost identical, thus it is argued that M2 may constitute an appropriate measure of money for the case of Kuwait. Therefore the previous results may provide useful information for policy makers that can be utilised to design appropriate monetary measures to control the domestic demand for money.

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