CHAPTER - IV

DEMAND FOR MONEY

4.0   Introduction

This chapter deals with the factors influencing the demand for money in Jordan. Section I deals with the theoretical foundations of demand for money, a brief sketch of the conceptual improvisation of demand for money is presented.   Section II presents empirical evidence on this theme taking cross country analysis (e g. Jordan, India, USA, UK) Section III presents the detailed analysis of demand for money in Jordan. The study analyses the factors explaining the demand for money. In this section the theoretical under pinning of the working of the Jordanian economy is put to test   The researcher tries to understand through the explanatory variables for various time periods with the help of various estimated money demand equations.

4.1   Demand for Money : Theoretical Foundations

A stable demand function for money has long been recognised as an essential condition for any meaningful conduct of monetary policy in any monetary system. The quantity theory of money has its genesis in the 'classical' economists, I.Fisher, A. Marshall and A.C. Pigou   The latter two economists are associated with the so called Cambridge view of the quantity theory.   Both Fisher and Cambridge economists were concerned primarily with money as a means of exchange and therefore provided models of the

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transaction demand for money. Although the routes through which Fisher and the Cambridge economists reached their conclusions are different, however, both theories state, a proportionate relationship between the amount of money in circulation and the price level.

The classical economists view that, since money has no inherent utility, the only rational motive for holding cash balances is to facilitate transactions According to the classical economists, money not needed for transaction should be converted into income yielding assets, such as bonds The classical view of the demand for money is conveniently summarised by Patinten as follows .

"In the cash balance version - neo-classical theory assumed that, for their convenience, individuals wish to hold a certain proportion, K, of the real volume of their planned transactions, T, is the form of real money balances The demand for these balances thus equal KT, correspondingly, the demand for nominal money balances is KPT, where P is the price level of the commodities transacted. The equating of this demand to the supply of money, M, then produced the famous Cambridge equation. M=KPT In the transaction version - associated primarily with the name of Newcomb and Fisher - the velocity of circulation, V, replaced its reciprocal, K, to produce the equally famous equation of exchange, MV=PT These equations were the parade grounds on which neo-classical economists then put the classical quantity theory of money through its paces[1]

Keynes found the classical transaction approach to the demand for money to be incomplete because it overlooked the possibility that people may choose to hold money as an asset instead of other liquid assets particularly bonds - when their prices are expected to

fall. Though money is 'sterile' in the sense that it pays no return or yields no utility till

people will convert their bond holdings into money if the prices of bonds were expected to

fall. This gives rise to asset demand for money or the speculative demand for money in

addition to transactions and precautionary demand[2]

Keynes expressed the demand for money of an individual as the sum of the

transaction demands (which include a precautionary component) and an asset demand as

follows·

$$MD = M_1 (Y_2) + M_2 (\gamma)$$

Here MD is the individuals total demand for money, M_1 is the transactions demand

component, assumed to be positive function of the individuals income. and M_2 is the

relationship expressing the individual choice between money and bonds (the asset demand

function), with the demand for money as an asset supposed to be inversely related to the

rate of interest · Keynes suggested that there may exist a floor below which interest rate

could not be driven. The interest elasticity of demand for money would be infinite at that

level of interest rate. This situation has been labelled the 'liquidity trap'. since new

addition of money would be absorbed into idle balances without any effect on rate of

interest Although Keynes formulation was intended only to approximate the behaviour of

an individual, it formed the basis for some early macroeconomic studies.

The modern quantity theory of money has its genesis in the work of Freidman

(1956)[3] Freidman does not ask what the motives for holding money are but given that

money yields utility, Freidman asks, what factors determine, how much money people

desire to hold. although Freidman gives no detailed analysis of the motives for holding

money; he does suggest that the services from money derive from the fact that money is a 'readily available source of purchasing power'. Therefore, the transactions motives plays an important role in Friedman's demand for money

According to Friedman the demand for money depends upon the stock of wealth, which itself is made up of net financial wealth, physical wealth and human wealth. In principle, wealth should include human wealth but social conventions and the existence of uncertainty concerning the future, limit the extent to which the individual may exchange future labour income for increased money holdings He asserts that the demand for money should depend upon total wealth (that is non human wealth plus human wealth) but because of the illiquidity of human wealth he also includes the ratio of human to non human wealth. "h" as a determinant of demand for money. Another important factor influencing the demand for money is the yield on alternative assets. Yet another factor which influences the demand for money is the rate of inflation. It not only influences the demand for all financial assets but it also influences the demand for real assets such as housing, consumer's durable, stock of finished goods, and capital equipment, a high rate of inflation increases the returns to be obtained from these assets. A higher rate of inflation encourages a substitution into real assets but it is by no means certain that there will be a substitution out of money, substitution could be from bonds to real assets, rather than from money to real assets. However, Friedman did assume a substitution from money to real assets at higher rate of inflation.

Finally the demand for money as per Friedman is in real terms i e. real money balances held We may represent Friedman's demand for money function as .

$$(M/P)_d = f(Y^p, h, f^e, r)$$

$$fy^p, fh > 0, ff^e < 0$$

$(M/P)_d$ is demand for real money balances where Y^r is a measure of total wealth (as permanant income). h is ratio of human to non-human wealth. f^e is the expected rate of inflation, and r is the vector of interest rates. Friedman recognised that yields on certain assets, namely those that are close substitutes for each other may well move together in such a case the number of interest rates and yields in the demand for money function may be reduced somewhat.

In general, the traditional and modern quantity theory approach indicates that the demand for money should depend upon some measures of transactions, some measure of wealth and a vector of assets yields. "Apart from positing a positive (and possibly a proportionate relationship between transactions and money, a unit price level elasticity (homogeneity) and a positive 'own yield', the quantity theory leaves the signs on the other variables to be determined by the data"[4]

On the whole, the search for stable and steady money demand function in developed countries has evolved through two distinct phases first phase up to the early 1970s where in, empirical research efforts were mainly in the direction to arrive at a broadly acceptable form for the money demand function, and the second phase thereafter dominated by the failure of the standardised money demand function and its after effect. In the following section empirical studies across countries is presented.

4.2   The Empirical Studies

Early empirical work on the demand for money faced data and definitional problems Due to this reason the earlier theories of the demand for money do not give an unambiguous indication of what constitutes "money" The transactions and precautionary models perhaps gave the clearest indication. suggesting the use of "cash plus demand deposits" as the appropriate definition Since these are universally recognised as the means of exchange in most industrialised countries, cash plus balances were used to define money in the early studies However, even here recent innovation in financial markets have rendered this distinction less clear than earlier

In earlier research works on money (demand or supply) has treated money as consisting of various components of the liabilities of banking system. M_1, the narrow definition, mainly include cash and current account balances held by the non-bank private sector M_2 consist of M_1 and certain interest bearing bank deposits. For the United States M_2 is mainly referred to as broad money In case of United Kingdom it is M_3 which is the broad monetary aggregates and consist of M_1 plus time deposits plus certain large denomination fixed term deposits some of which are marketable Earlier studies found such definitions useful for two reasons. first, it was generally the case that all these measures gave similar conclusion concerning the appropriate form for the demand for money function, as well as the stability of such a function Second. the monetary authorities could attempt to control such aggregates as per the nature of the policy

Some early studies imposed untested income and price elasticities which render their result doubtful, one of the first studies to avoid these limitation is that of Meltzer[5]

using U S data 1900-58 for various definitions of money and other scale variables. Laidler[6] refined this work for the U S and Barrat and Walter[7] and D E.W Laidler[8] conducted separate analysis for the U.K. In these studies it has been generally found that the results obtained are fairly invariant to the definition of money chosen The demand for money appears to be related to a representative interest rate and to the permanent income Permanent income performed better than current income but only marginally better than financial wealth. The results supported a unit price elasticity of demand for money. Further in terms of stability of the money demand function, according to Laidler the interest elasticity of the short-run with respect to M_2 between 1932-1960 in the U S varies roughly between -0 12 and 0 15 and with respect to the long run between -0 2 and -0 6 Artis and Lewis[9] studies using U.K. data on old M_2 for the period 1880-1960 give an income elasticity of about unity and an interest elasticity with respect to long run between -0 3 and -0 8

So it is to be noted that studies for this early period using annual data suggest a well determined and fairly stable demand for money function Broadly speaking stability applies under different definitions of money, for different rates of interest and over different time periods.

In the post 1970 period various empirical studies on demand for money faced the money demand functions stability problem and monetary authority faced money quantity regulation problems The latter researchers devoted their work on the lines so that money was to be defined as that financial asset which had a stable demand function and which

could be controlled by the authorities. In recent years, the research efforts appear to have been directed mainly in two areas

(1)   To provide an appropriate money measures

(2)   To provide explanation for the new approach to money adjustment process

Based on these propositions a new line of research has emerged in 1980's. Barnett[10], Husted and Rush[11] and Pindt[12] are some valuable contributions in this regard The Federal Reserve Bank of New York have started constructing new monetary aggregates based on weighting of the various components of money

Apart from weighted monetary aggregates, the dynamics of short-run adjustment process has also been receiving much attention lately, leading to the emergence of a new approach called buffer stock or disequilibrium approach to money.

In the Indian context, money demand function has been subject to many empirical investigations In the early studies, Biswas[13] found that, for the period 1935 to 1955, non farm income turnout to be a better explanatory variable than national income and that the influence of short-term interest ràte has less significant influence in explaining the demand for money in India.

Gujarati[14] applied the partial adjustment model for Indian data covering the period between 1948-64, and deduced that demand for money was highly influenced by income with long run income elasticity placed at 1 5 The long-term interest rate turnout to be insignificant.

Suraj Gupta's[15] study for the period 1950-74, concluded that money demand in India was a proportional function of income but short-term interest rate were statistically insignificant Rangarajan[16] estimated the demand function for broad money covering the period 1961-62 to 1986-87, this study found the real income elasticity of demand for broad money was of the order 1.9.

So most of the studies on demand for money in India have revealed that for a developing country like India demand for money is mainly influenced by the level of income and its distribution, rate of interest turned out to be insignificant. The major reason given for rate of interest being a non significant explanatory factor in the demand for money function is that in case of India, the interest rate is not market determined and is fixed by the central authority Similar results were produced by a recent study conducted by Arif[17] for the period 1961-86 According to his findings demand for money in India is influenced mainly by the transaction motive and real income. Influence of interest rate was found to be very negligible

Jordan is a developing economy and is very similar to the Indian economy in many a character Not many studies on the demand for money in Jordan have been under taken whatever little investigations that have been made by different researchers such as Walid Al-Maani[18], Al-Khateep[19], Abu Rashid Amir[20], Hadded & Adeeb[21] from time to time is either in the form of trend analysis or a relative analysis. Very little effort has gone into the explanation of money demand function estimation keeping this limitation in mind, based on advanced countries experiences and the experience of the Indian economy in

particular in this direction, the researcher makes a moderate attempt to estimate the

demand for money function for the Jordanian Economy

In the context of developed countries demand for money are readily available, S.J.

Judd and T Scadding[22] (1982) is a noticeable work in this direction This studies was

based on annual data and the following log-linear relation was adopted

Log (Real Money) = f (Log Real Income, Interest rate)

$Log (M/P) = a_o + a_1 log (YR) + a_2 (R)$

where, M = Money stock
 P = Price level
 YR = Real income and
 R = Interest Rate.

From the late 1950s onwards many studies were carried out on the functional form given

above.

At a later stage, a number of studies used quarterly rather than annual data and

there was also a greater recognition of dynamic aspects of the specification Typically this

was accomplished simply by incorporating a lagged dependent variable in the money

demand equation One justification for this simple approach is provided by the practical

adjustment mechanism. Thus the money demand equation was modified as follow·

$Log (M/P)_t = a_o + a_1 Log (YR) + a_2 (R) + a_3 Log (M/P)_{t-1}$

The early research effort is said to have culminated in Goldfeld's[23] comprehensive

study Indeed his preferred specification became the standard formulation of the short run

money demand function

The success over the formulation of a stable quarterly money demand function, however, did not last long. The estimated equation, overestimated real money balances in the U S economy during 1974-76. The Goldfeld's standard money demand equation failed to predict the real money balances in U S accurately hence it was concluded that the function have become unstable. In fact, over prediction by the standard money demand equation suggested that the money demand function might have shifted downward. Similar cases of instability were detected in money demand functions for many other developed countries too. As a result, the research effort in the second phase was directed primarily at salvaging the money demand function. The later research was directed to find out the main causes of instability and to reformulate the money demand function to incorporate these changes.

With financial innovations and deregulation, the distinction between transaction and other motives for holding money has become practically meaningless. Financial innovation lowers cost of converting other assets into money, thus lower transaction cost, in turn, allow money holders to keep smaller money balances. They can meet their transaction requirements by transferring funds from higher interest earning assets. Under such situation it is well accepted that the demand for money will shift downward. These deduction are consistent with inventory - theoretic approaches to money demand by W.J. Baumol and J. Tobin. That is why now a days the broad money measures are simple-sum, aggregates derived by adding together quantities of different monetary assets without any allowance for the degree of liquidity of various assets.

4.3 Demand for Money - Jordanian Experience

In the Jordanian context, there is very limited investigation as regard the money demand function Keeping in mind the importance of stable money demand functions from the monetary point of view, researcher has tried to estimate the money demand function for Jordan on the basis of annual data. As most of the money demand studies have relied on the partial adjustment mechanism, though they are subject to some short-comings, still to begin with, this study also used only the partial adjustment analysis method to investigate into the money demand function for Jordan

In order to provide a lucid and comprehensive picture of money demand in Jordan, firstly an attempt is made to present the picture of the growth of money stock in Jordan during 1964-95. The various money stock components are presented in their absolute and relative terms. Their relative contribution in total money stock reflecting a change in the public's preference in Jordan

Having done this, subsequently the attention will be focused on the analysis of the determinants of money demand and their relative contribution in determining the total demand for money in Jordan. The study also tries to evaluate the accuracy of the estimated relations. Jordan is still in the early stage of monetary development, in terms of financial institutions, instruments and policies Even the preference of the public in terms of the use of financial instruments is in transitionary phase, it will take some more time to attain stability At this stage of financial development in Jordan, it is still very difficult to assertion which measure of money supply will be more appropriate hence to avoid this

limitation, this study analyses the demand for money in Jordan in terms of narrow (M_1) as well as broad money measure (M_2)

During the course of this study, to meet internal requirement and to adjust external balances, the stock of money in Jordan have shown relatively higher growth rate In terms of M_1 the trend growth during 1964-95 was 13.36% where as in terms of M_2 it was 16.15% for the same period (Table 3.1) The most liquid component of money, that is currency have shown relatively low growth, it was 13 80% on an annual trend basis where as demand deposits exhibit slightly higher growth rate of 14 12%, where as in case of savings and time deposits (Quasi money) the trend growth rate was highest which is 20 28%

The present analysis of demand for money in Jordan begins with a desegregated approach Demand functions have been estimated separately for currency, demand deposits, narrow money, Quasi money and broad money. All dependent variables are in real rather than in nominal terms highlighting that money demand is free from money illusion impact The rational is that, public demands money not for its own sake but for the real services it yields to its holder and the value of these services per unit of money depends upon the general price level. Thus, in standard monetary theory, where as the monetary authority is supposed to control the nominal stock of money, the public is seen as determining the stock of real money it wishes to hold. It is the discrepancy between the two at the going price level and the values of other determinants of the real demand for money which lead to portfolio adjustments and the consequent changes in asset prices, and to changes in expenditure flows Then, these are tasks for which the real and not the

nominal demand function for money is of the essence One such case is monetary planning

for price stability. For policy purposes, researcher wishes to know how the demand for

real money is likely to behave overtime, so that changes in the nominal stock of money are

adopted to match the growing real demand at constant prices

4.4   Demand for Real Money Balances in Jordan

Though the trend growth rate of M_1 and M_2 during our study period was double

digit, (13 36% and 16 15% respectively) in terms of real money balances it was relatively

very low The real narrow money balance (M_1) grew at the rate of 4.92% during 1964-95

on average annual basis, while the same in case of real broad money (M_2) was 7 59% only.

Though between 1964-84 M_1 in real terms grew at a consistent rate, 7 15% between

1964-74 and 7 76% between 1975-84 During the period 1985-95 the growth of narrow

money demand became very low 0 30% It can be attributed mainly to the restrictive

monetary policy followed by CBJ during late 1980's and a major shift in the Jordanian

public preference for illiquid assets from the liquid assets As well, the sound development

of banking and financial system in Jordan during this period is also responsible for it.

However the real broad money (M_2) demand in Jordan have shown a greater degree of

inconsistency, though on an average it has grown at 7 59%, but it's growth was 6.49%

during 1964-74, during 1975-84 the average growth rate was highest 12.67%, though

during 1985-95 real M_2's growth rate fell to sizeable extent but it remained positive 3 96%

on an average. No doubt by the year 1988 the CBJ foreign assets reserves fell to such a

low level that not only it had adversely affected the growth of money balances in Jordan

but the CBJ was also forced to go for a major devaluation of JD in the year 1989. The real M_2 growth which was negative for the year 1989 and 1990 (10.64% and 9 56% respectively) started improving after 1991 and remained low but positive growth in terms of real M_2

To have a detailed study of the demand for money in Jordan initially the money components have been analysed separately with respect to real income, inflation rate, and the interest rate With the help of partial analysis it has been tried to study the relative influence of the various variables on demand for money in Jordan. Though we have made a moderate attempt to analyse the monetary data of Jordanian economy, it seems that due to various reasons the economy has lacked in terms of consistency in its operation and performance, hence it gets reflected in its data. Therefore at times the results are not as per expectations and they lack in terms of their statistical properties. Still the exercise is worth undertaking because only after it one will understand the system and its operation in a better way.

4.4.1 Demand for Currency (CU)

Currency notes constitute a larger proportion in the total money in Jordan even as on today Although the relative share is on decline year after year still in 1995 it is 60% of narrow money while its share in broad money was 20%. Between 1964-95 the real currency balance (CU) have grown at the rate of 5.37% on an average Here also, the annual growth in real currency balances was not consistent. Between 1964-74 it grew at a relatively faster pace of 9 59%, while between 1975-84, it grew at 6 59% A very

significant feature of real currency balances in Jordan was experienced during 1985-95 period, between 1990-95 the CBJ did not allow the currency to expand much while the price level kept on rising at a high rate, leaving the real currency balance to go down. Hence, Jordan experienced a negligible growth in real currency balances of 0 41% during 1985-95.

Of the three explanatory variables, real income, inflation rate, and interest rate, it is the real income which is capable of explaining the changes in real currency balances in a better and significant manner. Estimated equation with respect to the demand for currency for the period 1964-95 are presented below

(i) $Log (CU) = -2.177 + 1 \ 12 \ Log (YR)$
                              $(6 \ 935)^{**}$

        $R^2 = 0.616$ F-Ratio = 48.09   DW = 0.285

(ii) $Log (CU) = 5.781 - 0.011 (F)$
                              (0.701)

        $R^2 = 0 \ 016$ F-Ratio = 0.492   DW = 0.063

(iii) $Log (CU) = 4.095 + 0 \ 254 \ DR$
                              $(5.079)^{**}$

        $R^2 = 0.469$ F-Ratio = 25.798   DW = 0.202

Where CU   = Currency

      P   = Price level

      YR   = Real GNP

      F   = Rate of Inflation

      DR   = Discount rate (Proxy for interest rate)

      **   = Significant at 1% level.

The above estimated equations clearly reveals that income elasticity of demand for currency is positive and greater than one   In case of inflation rate the coefficient has the expected sign but the equation is not statistically significant as it has very low R^2, t-value and corresponding F-ratio is not statistically significant

Regarding interest rate, Jordan being an Islamic country interest earnings were prohibited by the religion Though of late the induction of foreign banks and because of the opening up of the economy now banks do pay interest on deposits and they do charge interest on loans and advances   However, the prevailing interest rates are not market determined, rather they are highly regulated one Under such a situation to have a correct picture of interest rate structure in Jordan it is very difficult, so for this study discount rate has been taken as a proxy for interest rates in Jordan, as it is the basis for all interest rates prevailing in the market

The estimated equation of demand for currency in terms of interest rate is not satisfactory, not only the coefficient have unexpected sign but the statistical properties are poor Hence, we find that real income is one of the stronger factor that influence the demand for currency as expected, and to some extent the inflation rate can also be useful for the same but interest rate fails to explain even the directional movement in the demand for currency balances in Jordan as it has its own limitations as mentioned above.

A more detailed investigation regarding the real demand for currency in Jordan reveals that between 1964-74 and then 1985-95 either we get a distorted picture or very poor statistical inferences from the various estimated equations It was only during 1975-85 Jordan have shown a consistent interaction between real and monetary sector hence the

estimated equations for the period are not only satisfactory in terms of statistical

properties but they turnout to be good in terms of their overall explanatory power.

For the period 1975-85 .

$$\text{Log (CU)} = -0.383 + 0.872 \text{ Log (YR)}$$
$$(19.985)^{**}$$

$R^2 = 0.978$ F-Ratio = 399.437   DW = 1.504

The coefficient has the expected sign and is statistically significant at one percent

level of significance. The overall explanatory power as measured by R^2 (98 percent) is

very good and there is no evidence of autocorrelation problem According to this

equation, the real income elasticity of demand for currency is 0.87 which is near to unity.

Similarly, with respect to inflation the real currency demand equation for the period 1975-

85 is better than the overall period (1964-95) in terms of statistical properties and fit.

$$\text{Log (CU)} = 6.232 - 0.047 \text{ F}$$
$$(3.394)^{**}$$

$R^2 = 0.589$ F-Ratio = 11.454   DW = 1.301

** - significant at 1% level

4.4.2 Demand for Demand Deposits (DD)

Although, relatively demand deposits have shown the least growth in terms of

various money components in Jordan during 1964-95, still its relative importance in total

money volume is significant Demand deposits constituted 44% of M_1 stock and 15% of

M_2 in Jordan in the year 1995 The real demand deposits (DD/P) growth was also subject

to wide fluctuations during the course of this study. Between 1964-74 it grew at an

average annual rate of 5 00% while during 1975-84 real demand deposits grew at 9 98% per annum on an average. During 1985-95 due to the strict actions taken by the CBJ the growth of DD fell to a low of 2 04% per annum on an average Leaving overall average growth rate between 1964-95 to be 5 55%

Estimated equations with respect to the demand for demand deposits for the period 1964-95 are presented below

1. $$\text{Log DD/P} = -5\ 552 - 1\ 523\ \text{Log (YR)}$$
    $$(12.657)^{**}$$

    $R^2 = 0\ 842$ F-Ratio = 160.208   DW = 0 382

2. $$\text{Log DD/P} = 5\ 201 - 0.011\ F$$
    $$(0\ 630)$$

    $R^2 = 0.013$ F-Ratio = 0 405   DW = 0 057

3. $$\text{Log DD/P} = 3\ 128 - 0\ 314\ \text{DR}$$
    $$(5.799)^{**}$$

    $R^2 = 0.528$ F-Ratio = 33 635   DW = 0.209

** - Significant at 1% level

In case of demand deposits too, it is the real income which turns out to be a better explanatory variable with satisfactory statistical properties. In case of inflation the coefficient has expected sign but lacks in terms of its statistical properties. Once again discount rate (interest rate) fails to impress because of its unexpected value.

Further, 1975-85 period is more consistent even in case of demand deposits as was observed in case of currency demand.

Log DD/P = 0.121 + 0 776 Log (YR)
           $(11.759)^{**}$

$R^2 = 0\ 939$ F-Ratio = 138.989   DW = 1.248

Log DD/P = 5 473 - 0.042 F
           $(2\ 921)^{**}$

$R^2 = 0.516$ F-Ratio = 8.534   DW = 1.301

** - Significant at 1% level.

Though, overall income elasticity of demand for real demand deposits was 1 523, the same for 1975-85 period falls to 0.78 but with improved statistical properties. For inflation during this period not only the coefficient have expected sign but the results have better statistical properties as compared to overall and other subperiods The DW value too has improved for both the equations.

By combining the currency and demand deposits balances the total narrow money balances in Jordan is arrived at.. Therefore, the relative behaviour of currency and demand deposits balances will determine the behaviour of total narrow money in Jordan Because currency and demand deposits are perfect substitutes for each other, so at times the combined effect may be quite different Hence, an attempt has been made to analyse the demand for real M_1 balances once again in terms of real income, inflation rate and interest rate.

4.4.3 Demand for Narrow Money (M_1/P)

The estimated real narrow money (M_1/P) demand equations are as follows ·

(i) $Log (M_1/P) = -4.120 + 1\ 468\ Log\ (YR)$
             $(5\ 668)^{**}$

   $R^2 = 0\ 508$ F-Ratio = 31 000   DW = 1.896

(ii) $Log (M_1/P) = 6\ 131 - 0.006\ F$
                     (0.295)

   $R^2 = 0\ 003$ F-Ratio = 0.087   DW = 0.745

(iii) $Log\ M_1/P = 0\ 652 + 0\ 828\ DR$
                     $(6.643)^{**}$

   $R^2 = 0.595$ F-Ratio = 44.132   DW = 0.597

(iv) $Log (M_1/P) = 6.116 - 0.021\ RR$
                     $(1\ 009)$

   $R^2 = 0.033$ F-Ratio = 1.0187   DW = 0 760

(v) $Log (M_1/P) = -4.645 + 1.470\ Log\ YR + 0.019\ RR + 0.069\ Log\ (M_1/P)_{t-1}$
                 $(2.999)^{**}$ (1.080) (0.322)

   $R^2 = 0.532$ F-Ratio = 10.211   DW = 2.394

** - Significant at 1% level.

In case of the demand for real narrow money balances, the real income as expected turnout to be the better explanatory variable with much improved statistical properties. Inflation as expected has some impact but the estimated equations are not statistically significant Where as the interest rate due to its own practical limitations does not provide expected results. The more appropriate way to study the demand for money

with respect to rate of interest would be to study it from real rate of interest point of view

i.e. rate of interest minus rate of inflation on annual basis For academic reasons the same

exercise was carried out for Jordan, but the result were not very satisfactory like in the

case of simple interest. The short run semi-elasticities with respect to real rate of interest

in terms of M_1 demand turnout to be negative though statistically the results are not

satisfactory but still the sign of the outcome is significant. Estimated equations for narrow

money (M_1) corresponding to three specifications namely, real income, real rate of interest

and the lagged dependent variable for the period between (1965-95) is presented in

equation (v)

Once again, the period between 1975-85 turnout to be a sound period in terms of

statistical analysis as the real narrow money demand equation for this period exhibits more

sound statistical results for real income and inflation. The estimated equations are as

follows·

(i)   Log (M_1/P) = 0 353 + 0.842 Log (YR)
                          (21 828)**

$R^2 = 0\ 981$ F-Ratio = 476 475   DW = 1 333

(ii)   Log (M_1/P) = 6 733 - 0.045 F
                          (3.083)**

$R^2 = 0\ 543$ F-Ratio = 9.506   DW = 1 238

(iii) Log (M_1/P) = -0 5254 + 0 3169 DR
                          (4.0089)**

$R^2 = 0\ 3488$ F-Ratio = 16 0712   DW = 1 2159

** - Significant at 1% level.

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For the overall period the income elasticity demand for narrow money was 1.468 with $R^2 = 0\,508$, where as, the same for the period 1975-85 it is 0.842 with a very high $R^2 = 0\,981$ Even in case of inflation the 1975-85 estimated equations shows better statistical properties as well the responsiveness of have improved from 0.006 to $0\,045$ which is certainly significant in character

4.4.4 Demand for Quasi Money (QM)

In Jordan Quasi money comprises of saving and time deposits As it is expected, with the development of banking system, the public in general prefer saving and time deposits as compared to currency and demand deposits The volume of quasi money increased manifold between 1964-95 The QM amount was 13 8 million JD in 1964, it increased to 63 8 million JD in 1975 and further to 1026.6 million by 1985 finally it touched the 3414 2 million JD figure by 1995 (Table 4 1)

Even the real QM volume increased continuously during the period of our study Between 1964-95 its annual average growth rate was 11 46%, which is the highest among different components of money in Jordan. The QM in real terms initially grew at a slower rate 4 93 percent on an average during 1964-74 but attained an accelerated pace during 1975-84 with 23 10% on annual average basis. This is attribute to factors such as higher real growth achieved by the economy, expansion of bank branches and households strong preference for bank deposits as a saving medium

Although during 1985-95 period the real QM growth was restricted due to restrictive monetary policy followed by the CBJ to take care of inflationary situation in Jordan, still its relative growth was highest among all other components. During this period it grew at an average rate of 6 83% which is much higher than the total money demand growth rate.

The estimated equations in respect of demand for quasi money with respect to real national income. inflation rate and the interest rate as the explanatory variables for the period 1964-95 is presented below

i)   Log (QM/P) = -17 563 + 3.319 Log (YR)
                        $(15.40)^{**}$

     $R^2 = 0\ 887$ F Ratio = 237 184   DW = 0 424

ii) Log (QM/P) = 5 981 - 0.040 F
                        (1.070)

     $R^2 = 0\ 037$ F Ratio = 1 145   DW = 0 041

iii) Log (QM/P) = 0.903 + 0.755 DR
                        $(7.919)^{**}$

     $R^2 = 0.676$ F Ratio = 62 721   DW = 0 262

** - Significant at 1% level.

The income elasticity of demand for QM was as high as 3 319 between 1964-95 having satisfactory statistical properties makes one believe that the growth of QM is highly responsive to changes in real income level, while the sign of the coefficient of inflation equation is expected one but the statistical properties are very weak, so it can not be considered as a vital explanatory variable. Even in case of interest rate, though the

equation has acceptable statistical properties the sign of the coefficient is also expected one because QM compromises of saving and time deposits so certainly people would like to opt for less liquid financial assets provided they are rewarded adequately for. Though in terms of real rate of interest the association between real Quasi money and real rate of interest turnout to be negative as shown in the above equation.

As expected even in case of QM, the 1975-85 period provides more statistically sound relationship in terms of all the explanatory variables. The estimated equations for the period 1975-85 are as follows :-

i) $\text{Log (QM/P)} = -11\ 425 + 2.438\ \text{Log (YR)}$
                          $(13.866)^{**}$

        $R^2 = 0.955$ F Ratio = 192.261   DW = 1 125

ii) $\text{Log (QM/P)} = 6.953 - 0.124\ \text{F}$
                          $(3.126)^{**}$

        $R^2 = 0.550$ F Ratio = 9.770   DW = 0 982

iii) $\text{Log (QM/P)} = -0\ 753 + 1.107\ \text{DR}$
                        $(6\ 188)^{**}$

        $R^2 = 0.827$ F Ratio = 38.299   -   DW = 1 517

** - Significant at 1% level.

Certainly in terms of all the explanatory variables used to analyse the demand of QM have shown better and more statistically sound results for the period 1975-85. No doubt the income elasticity of demand for QM went down to 2 438 as against 3.317 for the whole period in question, but it is with much improved power to explain the variation

as measured by R^2 at 0 96 and at the same time there is no indication of the autocorrelation problem The same is true for inflation and the interest rate In fact during this period the regression results say that the interest elasticity of the demand for QM was around on (1.107) by any standard it was a very healthy responsiveness

4.4.5 Demand for Broad Money (M_3/P)

The demand for broad money in any economic system will depend on the level of economic activity, banking business in the country, and the nature of monetary policy of the central bank of the country In case of Jordanian economy, as already highlighted, the level of economic activity was subject to wide fluctuations due to various internal and external factors. The development of the banking system in the country had its own limitations and the central bank being an agency to look after the limited monetary operations of the country, its role was mainly restricted to be more of regulation rather than promotional. All these factors resulted into an inconsistent growth in broad money demand along with sizeable change in the composition of broad money itself, over the years, the composition of broad money in Jordan have shown a shift in the preference of the public from highly liquid assets (currency and demand deposits) to less liquid asset (saving and time deposit)

During 1964-74 broad money grew at an average rate of 6 49% per annum, but during 1975-85 the growth rate touched the highest level of 12 67% While 1985-1995 the growth was restricted to only 3 96% on annual average basis

85

To analyse the statistical relation for the demand for money (M_2) various

determinants of demand are taken into consideration   The estimated broad money

equations are presented below -

i) $\text{Log} (M_2 / P) = -7\ 537 + 2\ 032\ \text{Log} (YR)$

   $(12\ 422)^{**}$

   $R^2 = 0\ 837$ F Ratio = 154 303   DW = 0 339

ii) $\text{Log} (M_2 / P) = 6\ 880 - 0.024\ F$

   $(1\ 010)$

   $R^2 = 0\ 033$ F Ratio = 1.019   DW = 0 038

iii) $\text{Log} (M_2 / P) = 0\ 336 + 0.975\ DR$

   $(8\ 318)^{**}$

   $R^2 = 0\ 698$ F Ratio = 69.194   DW = 0 226

iv) $\text{Log} (M_2 / P) = 6.769 - 0.044\ RR$

   $(2\ 055)^{**}$

   $R^2 = 0.123$ F Ratio = 4 225   DW = 0 118

v) $\text{Log} (M_2 / P) = -0.498 + 0\ 186\ \text{Log}\ YR - 0\ 002\ RR + 0\ 890\ \text{Log}\ (M_2 / P)_{t-1}$

   $(2\ 162)^{**}$ $(1\ 073)$ $(23\ 938)^{**}$

   $R^2 = 0\ 992$ F Ratio = 1494 116   DW = 1 51

** - Significant at 1% level

As per the above equations the real income and interest happen to be the better

explanatory variable to determine the demand for broad money in Jordan, though inflation

influence the same as per the expectation but their relative strength to explain it is poor.

The income elasticity of demand for broad money in Jordan for the period 1964-95 is estimated to be 2 032, which is significantly very high. Inflation affects broad money demand as per expectations but the interest rate influences it positively, the reason may be due to a high share of QM and interest rate are bound to have positive relationship. The estimated broad money equation in terms of real income, real rate of interest and lagged dependent variable for the period between 1965-95 presented in equation (V) The above estimated broad money demand equations is a better fit as compared to narrow money equation The broad money equation is more satisfactory in terms of statistical criteria. The overall explanatory power (R^2) is very good and there is no sign of autocorrelation. While in case of narrow money demand equation the explanatory power is only 53 per cent As per the broad money demand equation the short term real income, elasticity of demand for broad money is 0 126 and the corresponding long term elasticity is 1 7.

Finally, the semi elasticity with respect to the real rate of interest variables turnout to be -0 002 for short run and -0 018 for long run.

Further, in case of broad money too 1975-85 period was highly consistent and so provided better estimation of the broad money demand.

i) $\quad$ Log (M$_2$ / P) = -3 299 + 1.429 Log (YR)
$$(22\ 650)^{**}$$

$R^2 = 0.983$ $\qquad$ F Ratio = 513 017 $\qquad$ DW = 1 413

ii) $\quad$ Log (M$_2$ / P) = 7 493 - 0.074 F
$$(3\ 33)^{**}$$

$R^2 = 0\ 581$ $\qquad$ F Ratio = 11 091 $\qquad$ DW = 1 182

iii) $\text{Log}(M_2 / P) = 0\ 191 + 1.166\ \text{DR}$
              $(7\ 044)^{**}$

$R^2 = 0\ 861$ F Ratio = 49 612   DW = 1 544

** - Significant at 1% level

For 1975-85 period not only the estimated equation have better statistical properties but it explains that during this period along with real income even the interest rate was equally important as an explanatory variable During this period the income elasticity of demand for broad money was 1.43 while the interest elasticity of demand for broad money was 1 17 with satisfactory statistical properties.

So in general one can say that demand for money in Jordan is highly income elastic where as inflation does play some role but it is not significant while interest lacks the basic relationship in terms of narrow money but in case of broad money determination it also proves to be an important and significant force. The empirical results of demand for money in Jordan are more satisfactory in terms of broad money rather than narrow money. The broad money demand results are satisfactory in terms of a priory theoretical explanations, economic institution[20] and statistical properties.

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Table 4.1 : Broad Money and its Components (JD Million)

Year	Currency in Circulation (CU)	Demand Deposits (DD)	M1	Quasi Money (QM)	M2
1964	23.00	16.80	39.80	13.80	53.60
1965	26.40	20.80	47.20	17.00	64.20
1966	30.30	25.70	56.00	19.80	75.80
1967	51.50	23.70	75.20	18.80	94.00
1968	63.50	24.50	88.00	20.90	108.90
1969	71.30	25.00	96.30	22.70	119.00
1970	82.40	23.00	105.40	23.70	129.10
1971	83.00	25.00	108.00	27.10	135.10
1972	81.50	33.50	115.10	31.50	146.60
1973	97.50	40.90	139.30	36.80	176.10
1974	115.50	55.80	172.10	47.80	219.90
1975	139.00	84.50	224.60	63.80	288.40
1976	161.40	114.00	276.90	101.50	378.40
1977	188.00	139.80	331.00	136.60	467.60
1978	219.50	150.00	375.40	231.30	606.70
1979	275.40	182.00	472.70	300.40	773.10
1980	351.60	225.20	594.80	390.00	984.80
1981	412.30	280.10	701.70	478.20	1179.90
1982	470.00	305.10	787.50	615.80	1403.30
1983	516.00	338.70	869.40	745.80	1615.20
1984	530.50	336.80	878.40	879.30	1757.70
1985	531.80	308.40	848.20	1026.60	1874.80
1986	583.90	310.70	897.10	1175.30	2072.40
1987	655.80	322.90	979.80	1392.40	2372.20
1988	811.20	353.70	1181.40	1465.40	2646.80
1989	871.10	425.40	1326.50	1644.60	2971.10
1990	1006.20	413.90	1432.80	1689.80	3122.60
1991	992.40	583.80	1600.40	2117.10	3717.50
1992	1003.90	685.90	1716.10	2476.90	4193.00
1993	1047.90	762.30	1730.10	2748.70	4481.80
1994	1072.60	764.50	1746.20	3095.30	4841.50
1995	1050.90	772.90	1745.60	3414.20	5159.80

Trend Growth

1964-95	13.80	14.12	13.36	20.28	16.15
1964-74	18.77	13.82	16.11	13.61	15.36
1975-84	16.67	20.51	18.01	34.66	23.32
1985-95	6.68	8.58	6.64	13.28	10.36

Source : Yearly Statistical Series, 1996
        Central Bank of Jordan.

Table 4.2: Demand for Real Money Balances and their growth in Jordan (JD Million)

Year	CU/PI (CU1)	DD/PI (DD1)	M1/PI (M11)	QM/PI (QM1)	M2/PI (M21)	Annual Growth Rate (CU1)	(DD1)	(M11)	(QM1)	(M21)
1964	98.54	71.98	170.52	59.13	229.65					
1965	104.35	82.21	186.56	67.19	253.75	5.89	14.22	9.41	13.64	10.50
1966	110.46	93.69	204.16	72.18	276.34	5.86	13.96	9.43	7.43	8.90
1967	167.86	77.25	245.11	61.28	306.39	51.96	-17.55	20.06	-15.11	10.87
1968	206.98	79.86	286.83	68.12	354.95	23.30	3.38	17.02	11.17	15.85
1969	217.84	76.38	294.23	69.36	363.58	5.25	-4.35	2.58	1.81	2.43
1970	235.43	65.71	301.14	67.71	368.86	8.07	-13.97	2.35	-2.37	1.45
1971	226.84	68.32	295.16	74.06	369.23	-3.65	3.97	-1.99	9.38	0.10
1972	210.65	86.59	297.49	81.42	378.91	-7.14	26.73	0.79	9.93	2.62
1973	225.80	94.72	322.60	85.22	407.83	7.19	9.39	8.44	4.68	7.63
1974	223.88	109.16	333.59	92.65	426.25	-0.85	14.19	3.41	8.72	4.52
1975	240.78	146.37	389.05	110.51	499.57	7.55	35.33	16.63	19.28	17.20
1976	250.93	177.24	430.50	157.80	588.31	4.22	21.09	10.65	42.79	17.76
1977	255.30	189.84	449.48	185.50	634.98	1.74	7.11	4.41	17.55	7.93
1978	278.34	190.21	476.03	293.30	769.34	9.03	0.19	5.91	58.12	21.16
1979	306.00	202.22	525.22	333.78	859.00	9.94	6.31	10.33	13.80	11.65
1980	351.60	225.20	594.80	390.00	984.80	14.90	11.36	13.25	16.84	14.64
1981	382.72	260.30	651.35	443.89	1095.24	8.85	15.45	9.51	13.82	11.21
1982	406.29	263.74	680.76	532.33	1213.09	6.16	1.44	4.51	19.92	10.76
1983	424.38	278.56	715.03	613.37	1328.40	4.45	5.62	5.03	15.22	9.51
1984	420.56	267.00	696.37	697.08	1393.45	-0.90	-4.15	-2.61	13.65	4.90
1985	409.08	237.23	652.46	789.69	1442.15	-2.73	-11.15	-6.31	13.29	3.50
1986	449.15	239.00	690.08	904.08	1594.15	9.80	0.75	5.77	14.48	10.54
1987	505.36	248.32	755.03	1072.98	1828.00	12.51	4.11	9.41	18.68	14.67
1988	586.08	255.55	853.55	1058.74	1912.29	15.97	2.70	13.05	-1.33	4.61
1989	501.04	244.66	762.97	945.93	1708.90	-14.51	-4.25	-10.61	-10.65	-10.64
1990	498.00	204.35	709.13	836.33	1545.46	-0.61	-16.28	-7.06	-11.59	-9.56
1991	453.90	267.01	731.98	968.30	1700.28	-8.86	30.35	3.22	15.78	10.02
1992	441.72	301.60	755.09	1089.85	1844.94	-2.68	13.03	3.16	12.55	8.51
1993	446.35	324.70	736.93	1170.81	1909.02	1.05	7.59	-2.40	7.43	3.47
1994	441.07	314.38	718.07	1272.84	1990.91	-1.18	-3.18	-2.56	8.72	4.29
1995	422.29	310.58	701.44	1371.94	2073.37	-4.26	-1.21	-2.32	7.79	4.14

	Trend Growth					Average Annual Growth Rate				
1964-95	4.68	5.42	5.75	12.18	7.75	5.37	5.55	4.92	11.46	7.59
1964-74	8.96	1.75	6.45	3.57	5.77	9.59	5.00	7.15	4.93	6.49
1975-84	7.34	6.63	7.23	19.85	11.74	6.59	9.98	7.76	23.10	12.67
1985-95	-0.86	3.33	0.15	4.07	2.51	0.41	2.04	0.30	6.83	3.96