RECENT DEVELOPMENTS IN DEMAND FOR MONEY ISSUES: SURVEY OF THEORY & EVIDENCE WITH REFERENCE TO ARAB COUNTRIES

Jamil Tahir

Working Paper 9530

Please address correspondence to: Dr. Jamil Tahir, Senior Economist, Arab Planning Institute, P.O.Box 5834, Safat 13059, Kuwait. Fax: (965) 484 2935.

Recent Developments in Demand for Money Issues: Survey of Theory and Evidence with Reference to Arab Countries*

Jamil Tahir**

Abstract

Demand for money is considered an important function of stabilization and structural adjustment policies where such policies depend on the ability to adjust money supply to its demand in order to prevent monetary disturbances from affecting real output. Due to the vital role demand for money plays in macroeconomic analysis, i.e. formation and transmission of monetary policy, the past several decades have witnessed considerable empirical research on this factor in both developed and developing countries. The purpose of the paper is to survey, describe and analyze the theoretical as well as empirical developments that have taken place in demand for money issues in developing as well as Arab countries, in reference to stabilization and structural adjustment policies. The structure of the paper is as follows: The first section briefly surveys the theories of the demand for money. The second focuses on the variables in the demand for money function, and the third discusses the stability of the function.

ملخص

يعتبر الطلب على النقود دالة هامة في سياسات التثبيت والاصلاح الهيكلي، حيث تسعى هذه السياسات إلى خلق تناسب بين عرض النقود والطلب عليها وذلك في إطار الحد من الاضطرابات النقدية وتأثيرها السلبي على الناتج الحقيقي. ونظراً لما لعامل الطلب على النقود من دور حيوي في التحليل الاقتصادي الكلي وفي تحديد وتحريك السياسة النقدية، فإن كثيراً من الأبحاث وجهت لدراسة هذا العامل خلال العقود الماضية في كثير من الدول المتقدمة والنامية. وتهدف هذه الورقة إلى دراسة ووصف وتحليل التطورات النظرية والعملية التي طرأت على الموضوعات المتعلقة بالطلب على النقود في الدول النامية والعربية، كجزء من الدراسات المتعلقة بسياسات التثبيت والاصلاح الهيكلي. وتتكون هذه الورقة من ثلاثة أجزاء: الأول يستعرض باختصار نظريات الطلب على النقود، والثاني يركز على متغيرات دالة الطلب على النقود، والثالث يناقش مدى ثبات الدالة.

CONTENTS

INTRODUCTION :

The growth of knowledge in monetary economics over the last twenty years or so has been enormous and recent literature is embarrassingly thick in surveys of that knowledge.[1] To write another survey paper needs a good reason, and mine is this. Over the past three decades a large number of stabilization and structural adjustment programs have been undertaken, based to a great extent on the macroeconomic theory of open economies developed during the 1950s and 1960s.[2]

In the period since that time, however, the scope and methods of stabilization and structural adjustment policies have gradually evolved and expanded, so that programs implemented today often differ from those of earlier years. Modifications in thinking have arisen from major institutional and structural developments in developing economies. This, in turn, requires the expansion of our understanding of the economic theory behind such policies. A survey of developments in monetary theory is part of the expansion of our understanding of economic theory as such.

The past several decades have witnessed considerable empirical research on the money demand function due to the vital role this function plays in macroeconomic analysis, especially with regard to the formation and transmission of monetary policy. Consequently, money demand functions have been empirically estimated by many researchers for a number of developed and developing countries.[3]

The history of research into demand for money is a major element in the development of monetary economics in general. There are numerous theories and applied studies. Because it is impossible to give an exhaustive account of work in this area; we plan to concentrate on the interaction between theory and applied work mainly in reference to developing countries. "An analysis of the demand for money provides an excellent example whereby our knowledge has progressed because of the

---

[1] Among those surveys, for example, Charles Goodhart, "The Conduct of Monetary Policy", in Christopher Green and David Llewellyn (eds.) Survey in Monetary Economics, Vol. 1 : Monetary Theory and Policy. Basil Blackwell Ltd., Oxford, 1991; John Boorman, "The Evidence on the Demand for Money; Theoretical Formulations and Empirical Results" in Thomas Havrilesky and John Boorman (eds.), Current Issues in Monetary Theory and Policy, AHM Publishing Corporation, Illinois, 1976; D. Laidler, "The Influence of Money on Economic Activity: A survey of Some Current Problems" in G. Clayton, J. Gilbert, and R. Sidgewick (eds.), Monetary Theory and Monetary Policy in the 1970s, Oxford University Press, New York, 1971; Robert Clower, "Theoretical Foundations of Monetary Policy" in Clayton, Gilbert and sidgewick (eds.), Monetary Theory and Monetary Policy in the 1970s, Oxford University Press, New York, 1971, and J. Judd and J. Scadding, "The Search for a Stable Money Demand Function", Journal of Economic Literature, Vol. XX, No. 3 (September, 1982).

[2] There is, of course, no unique strand of thought underlying stabilization and structural adjustment programs. Elements of the theory can be found in the workings of Fleming (1962) and Mundell (1968), among many others; work done at the IMF (1977); and developments in the "Chicago Version" of the monetary approach to the balance of payments (Frenkel and Johnson, 1976).

[3] For developed countries, see for example, Laidler & Parkin (1970); Goldfield (1973); Melitz (1976); Boughton (1979); Butter and Fase (1981); Laidler and Bentley (1983); Davidson (1987); Davidson and Ireland (1987); Cuthberston (1988); and Muscatelli (1988). For developing countries, see for example, Wong (1977); Trivedi (1980); Crockett and Evans (1980), Pereira (1984); Darrat (1985); Moosa (1986); Darrat (1987); Ghamdi (1989); Hemaya (1990); Ghamdi (1991), and Nyong (1993).

interaction between theory and evidence".[4]

Demand for money is considered an important function of stabilization policies where stabilization depends on the ability to adjust money supply to its demand in order to prevent monetary disturbances from affecting real output. It is argued that the relationship between money supply on one hand and prices, income, and balance of payments on the other is determined by the demand for money, and such relationship plays an important role in macroeconomic theory.[5]

Several important factors have influenced and shaped the evolution of empirical research on the demand for money. " First, there is the evolving nature of theories of the demand for money ... , Second, is the growing arsenal of econometric techniques that has permitted more sophisticated examinations of dynamics, functional forms, and expectations ... Third, and most importantly, research has been spurred by the apparent breakdown of existing empirical models in the face of newly emerging data ..." [6]

Because money plays an important role in determining the design of stabilization and structural adjustment programs, the purpose of the paper is to survey, describe and analyze the theoretical as well as empirical developments that have taken place in monetary theory, i.e. demand for money in developing countries in recent years. It is to give an account of monetary theory to indicate its developments for analysis of monetary policy. The paper is divided into three sections. The first briefly surveys the theories of the demand for money. The second focuses on the argument or the variables in the demand function for money, and the third discusses the stability of the demand function for money.

1.   THEORIES OF THE DEMAND FOR MONEY :

One of the earliest theories of the demand for money is the quantity theory of money which usually starts by the equation of exchange MV = PT where M is the quantity of money; V is velocity; P is the price level, and T is the volume of transactions. Quantity of money is determined independently of any of the three other variables and can be taken as given. When the assumption that velocity is constant is added, the equation of exchange is transformed into quantity theory of money and MV = PT is recast as a demand function for money where price levels move in strict proportion to the quantity of money and demand for real balance is proportional to the volume of transactions. Because Cambridge economists were interested in what determines the amount of

---

[4] Keith Cuthbertson, "Modelling the Demand for Money", in Christopher Green and David Llewellyn (eds.), Surveys in Monetary Economics, Vol. 1, Basil Blackwell Ltd., Oxford, U.K., 1991 : 3.

[5] See, for example, R. Gordon, The Short-Run Demand for Money : A Reconsideration", Journal of Money, Credit, and Banking, Vol. 16, No. 4, November, 1984.

[6] Stephen Goldfeld, "Demand for Money : Empirical Studies", in John Eatwell, Murray Milgate, and Peter Newman (eds.), The New Palgrave : A Dictionary of Economics, Vol. 1, The Macmillan Press Ltd., London, 1987 : 770.

money individuals wish to hold rather than the amount of money an economy needs to carry, they changed the emphasis from have to hold to want to hold.

Keynes (1936), however, modified this function when he introduced the speculative demand for money along with the transactions motive. The speculative demand for money depends on interest rate and views money and bonds as alternative assets where bond holding depends on the rate of return in such bonds, namely, rate of interest. Once the interest rate is introduced, the assumption that velocity is constant is not valid any more. By introducing the rate of interest into the money demand function, Keynes "..... became one of the founders of the Portfolio Balance Approach to Monetary Analysis".[7] However, Hicks (1935) should also be recognized for his contribution to this portfolio balance approach when he suggested that money demand be treated as a problem of balance sheet equilibrium that need to be analyzed based on commodity demand theory.[8]

However, Post Keynesian developments of demand for money moved in several directions. One is represented by Baumol (1951) and Tobin (1956) who applied inventory management analysis to the transaction demand for money where the optimum inventory of transactions balance should be expressed in terms of square root law. This means that even transactions demand for money is influenced by the rate of interest in addition to the transaction cost and the level of transaction.[9] At a later stage, Karni assumed that the transaction cost depends on the value of time where when it rises in proportion to real income, the Baumol model yields an income elasticity of unity, ½ from transaction and ½ from transaction cost.[10] Following a suggestion by Clower (1970), Feige and Parkin and Santamero have introduced commodity stock as a store-of-value as an alternative to money and earning assets.[11] To Grossman and Policano, commodity inventories and money are always substitutes because the commodities are purchased less frequently than income is received.[12] In their sense expected rate of inflation would become an important factor in the demand for money function. However, the sign of expected rate of inflation remains unclear. Miller (1966) extended the transaction demand for money analysis to allow for uncertainty in cash flows.[13]

In addition to the expansion in Keynes transactions demand for money motive, his speculative

---

[7] William Hosek and Frank Zohn, Monetary Theory, Policy and Financial Markets, McGraw-Hill Book Company, New York, 1977: 12.

[8] Hosek and Zohn : 12; see J. Hicks, "A Suggestion for Simplifying the Theory of Demand", Economica, February, 1935 : 1-19.

[9] The average money holding given by : $M = (2b\ T/r)^{\frac{1}{2}}$ where r is the interest rate on bonds and b is the transaction cost of converting bonds into cash.

[10] K. Cuthbertson, "Modelling the Demand for Money", in Surveys in Monetary Economics, Vol. 2, See also, E. Karni, "The Value of Time and the Demand for Money", Journal of Money, Credit, and Banking, 6, 1974 : 45-64.

[11] E. Feige and M. Parkin, "The Optimal Quantity of Money, Bonds, Commodity Inventories, and Capital", American Economic Review, 61, June 1971 : 335-49. See also, A. Santamero, "A Model of the Demand for Money by Households", Journal of Finance, 29 March, 1974 : 89-102.

[12] H. Grossman and A. Policano, "Money Balances, Commodity, Inventories and Inflationary Expectations", Journal of Political Economy, 83 (6), 1975 : 1093-112.

[13] See, K. Cuthbertson, op. cit.

demand for money motive has also been expanded by others such as Tobin (1958) in terms of Portfolio Theory which adopts a portfolio approach to monetary analysis.[14] This also originated in the works by Hicks who considered the money demand factor should include total wealth from expected rate of return on other assets. Introduction of wealth by Hicks departs from Keynes and, to certain extent, classical economists who used income, instead, in the demand for money function.

Gurley and Shaw (1960) introduced the influence of financial intermediation in the demand for money function.[15] People hold money because of the risk involved in holding other assets, on one hand, and because the assets are not perfect substitutes for money and involve a substitution cost, on the other. As a result of interest rate, which is the rate of return on the asset, exceeding the cost of converting assets to money, demand for money will be low and vice versa. So, rate of interest is inversely related to the quantity demand for money.

The other direction of post-Keynesians, in addition to the portfolio and the inventory management analysis, is represented by Milton Friedman (1956) who treated money like any other asset that yields a flow of service.[16] Friedman introduced the level of wealth into the demand function for money. Moreover, he suggested several opportunity cost variables that affect demand for money such as expected rate of inflation. Even though Brunner and Meltzer (1963, 1972) modified Friedman's approach, they believed that wealth along with interest rates are the main determinants of demand for money function.[17]

As a part of the precautionary demand for money, there is a revived interest in the role of money as a buffer stock where it acts as a shock absorber to enable individuals to postpone costly adjustment to various economic problems such as unemployment.[18] Several economists tried to analyze the buffer stock approach where buffer money is held for precautionary purposes at unchanged interest rates.[19] Then if there is an anticipated change in net receipts, agents will adjust their balances of

---

[14] J. Tobin, "Liquidity Preference on Behavior Towards Risk", Review of Economic Studies, 25, February 1958 : 65-86.

[15] Hosek and Zahn : 122. See also J. Gurley and E. Shaw, "Money in a Theory of Finance", The Brookings Institute, Washington, D.C., 1960.

[16] M. Friedman, "The Quantity Theory of Money : A Restatement", in M. Friedman (ed.), Studies in the Quantity Theory of Money, University of Chicago Press, 1957 : 3-21.

[17] K. Brunner and A. Meltzer, "The Place of Financial Intermediaries and the Transmission of Monetary Policy", American Economic Review, May 1963 : 372-382; K. Brunner and A. Meltzer, "Money, Debt, and Economic Activity", Journal of Political Economy, Sept./Oct. 1972 : 951-977; and Brunner and Meltzer, "Mr. Hicks and the Monetarists", Econometrica, Feb., 1973 : 44-59.

[18] Cuthbertson, op. cit. : 17.

[19] Cuthbertson, op. cit. : 21. See, for example, M. Miller and D. Orr, "A Model of the Demand for Money by Firms", Quarterly Journal of Economics, 109 (1966) : 68-72; G. Akerlof and R. Milbourne, "The Short-Run Demand for Money", Economic Journal, 90 (360), 53, 1980 : 885-900; E. Milbourne, "Price Expectations and the Demand for Money : Resolution of a Paradox", Review of Economics and Statistics, 65, (4) 1983 : 633-8; R. Milbourne, "Re-examining the Buffer Stock Model of Money," Economic Journal, 97 (1987): 130-42; and G. Smith, "A Dynamic Baumol-Tobin Model of Money Demand", Review of Economic Studies, 53 (1986) : 465-9.

buffer holdings according to such anticipation.[20]

The number of empirical studies on the demand for money in developing countries has grown as a result of the increasing interest and importance of the issue in monetary economics, on the one hand, and as more reliable data of variables in demand for money functions have become available in these countries, on the other.[21] Understanding demand for money is a necessary, important and significant prerequisite for the formulation of stabilization and economic adjustment programs in developing countries where limits are set on expansion of domestic credit to be consistent with the growth in demand for money. However, this is based on the assumption that there is a stable demand function for money.[22]

2. VARIABLES IN THE DEMAND FUNCTION FOR MONEY :

Demand for money refers to the functional relationship between the quantity of money demanded and its determining factors. The standard demand for money function includes the level of transaction, a scale variable represented by income or wealth, the opportunity cost of holding money, and some kind of expectations framework. We turn now to discussing each of these variables.

2.1 Income :

There has been extensive research on the appropriate variable and whether it is current income, permanent income or wealth.[23] However, the choice between income and wealth depends on the way money is viewed whether it is a medium of exchange or an asset that has returns in a diversified portfolio. The level of transactions is typically measured by the level of income or gross national product (GNP). The choice between permanent income and current income is rooted in the distribution between money as a medium of exchange (transactions), which suggests the inclusion of both permanent and transitory (expected and unexpected) income in the demand function for money[24], and money as a "purchasing power" (wealth asset).

Most of the empirical studies show that real income is the most important determinant of the demand for real cash balances, although the available evidence is rather conflicting on the magnitude of real income elasticity of the demand for money. In the Gujarati (1968) study for India and Chow study (1966) for the United States, income proved to be the most significant determinant of the demand for real cash balances,[25] while interest rate was a statistically insignificant variable.[26] This supported

---

[20] See, for example, Cuthbertson: 21.

[21] See footnote # 3.

[22] Crocket and Evans, op. cit. : 543.

[23] Laidler (1969) survey, among others, was in favor of wealth while Goldfeld (1973) favored income.

[24] Coates and Khatkhate, 1980, op. cit. : 14.

[25] Subrata Ghatak, Monetary Economics in Developing Countries, St. Martin's Press, New York, 1981 : 29.

[26] See D. Gujarati, "The Demand for Money in India", Journal of Development Studies, 5, 1 (1968) : 59-64; and G. Chow, "On the Long-Run and Short-Run Demand for Money", Journal of Political Economy, 74, (1966), 111-31.

the Kaufman and Latta (1966) contention that the interest elasticity of the demand for money function would be more significant in countries with well-developed money markets.[27]

A more extensive analysis concerning eight developing Asian countries in addition to Japan[28] was undertaken by Fau and Liu (1971) and results indicated very low interest elasticities (except for Taiwan) while all income elasticities were significantly different from zero, and nearly all were inelastic. Burma provided a high income elasticity.[29] A study by Akhtar (1974), by Abe and others (1978) for the demand for money function in Pakistan showed also that income was the primary determinant of the demand for money. When a narrow definition of money was employed, the rate of interest appeared as a statistically significant variable as well.[30] A study by Hynes for Chile found that the evidence on the long run income elasticity surprising in the sense that a narrow definition of money had a higher elasticity than a broader definition.[31] This reverses the pattern found for several developed countries (e.g. Fisher, 1968; Meltzer, 1963 ...).[32] Deaver (1970) investigated demand for money in Chile too and found that higher income elasticities were obtained when permanent income (a weighted sum of past incomes) was used rather than measured income.[33]

Within the Arab countries, several studies for Egypt have specified demand for money in terms of real current values of income, interest rates and inflation rates.[34] In general the income variable is found to be significant with the expected signs. To Hemaya (1990) income is the main determinant of the demand for money in Egypt.[35] Crocket and Evans and Mckenzie estimated the demand for money as a function of current income only because of the insignificance of the opportunity cost

---

[27] G. Kaufman and C. Latta, "The Demand for Money; Preliminary Evidence from Industrial Countries", Journal of Financial Quantitative Analysis, 1 (1966) : 75-89.

[28] The countries are: Japan, Taiwan, Korea, India, Pakistan, Burma, Sri Lanka, Philippines, and Thailand.

[29] L. Fau and Z. Liu, "Demand for Money in Asian Countries : Empirical Evidence", Indian Economic Journal, 18 (1971) : 475-81.

[30] See S. Abe and others, "The Demand For Money in Pakistan : Some Alternative Estimates", Pakistan Development Review, 14 (1978) : 249-57; and M. Akhtar, "The Demand for Money in Pakistan", Pakistan Development Review, 13 (1974) : 40-45.

[31] A. Hynes, "The Demand for Money and Monetary Adjustment in Chile", Review of Economic Studies, 34 (1967) : 285-93.

[32] See D. Fisher, "The Demand for Money in Britain : Quarterly Results 1951-67", Manchester School, 36 (1968) : 329-44; and A. Meltzer, "The Demand for Money : The Evidence from Time Series", Journal of Political Economy, 171 (1963) : 1-34.

[33] J. Deaver, "The Chilean Inflation and the Demand for Money", in D.M. Meiselman (ed.), Varieties of Monetary Experience, University of Chicago Press, Chicago, 1970 : 9-67.

[34] See, for example, M. Sewelim, A Quantitative Study of Egypt's Monetary Sector", Unpublished Ph.D. Thesis, Lancaster University, 1974; G. Mackenzie, "The Demand for Money in Egypt", Mimeographed, IMF, September, 1979; A. Crockett and Evans, "The Demand for Money in Middle Eastern Countries", IMF Staff Papers, Vol. 27, 1980: 543-577; S. El-Sheikh, "An Econometric Analysis of the Demand for Money in Egypt: 1940/50 - 1967/68", Journal of the Social Sciences, Vol. 1, 1982: 92-119; M. Teleb, An Econometric Analysis of Inflation in Egypt, Unpublished Ph.D. Thesis, University of Salford, 1985; and El-Tahra Hemaya, An Empirical Investigation of the I.M.F. Approach Towards Macroeconomic Adjustment in Egypt. Unpublished Ph.D. Thesis, University of Salford, 1990.

[35] El-Tahra Hemaya : 219.

variables.[36] In Teleb's study, the income variable, whether current or expected real income, has the right sign, and is significant[37] (Table 1).

Moosa (1986) indicated that demand for money in Kuwait is influenced by non-oil GDP which confirms the applicability of the quantity theory with respect to demand for money held for transactions purposes.[38] Income elasticity of demand for currency was 0.97 while the demand for demand deposits with respect to permanent income is more elastic than the M_2. An earlier study by Moosa (1983) indicated that government expenditure as a proxy for economic activity was significant.[39] Amr and Al Mahmeed (1987) found that the income variable is significant and has the right signs in the demand for money function in Kuwait[40], Table (1). Basha (1984) reached the same conclusion regarding the effect of government expenditure where it has a significant positive effect on demand for money in Kuwait.[41] Income elasticity of M_2 was found to be much larger (3 times) than income elasticities of M_1.

Darrat (1984) found that permanent real income is a significant factor explaining real money holdings in Saudi Arabia.[42] Ghamdi (1989) estimated the demand for money in Saudi Arabia to be determined by income, among other variables.[43] He concluded that income elasticities of the demand for money has been found to be greater than unity for both M_1 and M_2 definitions. Yet the value of such elasticities were close to each other. El-Hage (1991) also found that non-oil income is a determinant factor in demand for money in Saudi Arabia.[44] In a study of the demand for money function in Jordan, Ghamdi (1991) found that real income has a significant positive effect on demand for money. The long run elasticity of the demand for money, with respect to income has been found to exceed unity for M_1 and M_2 as well.[45]

---

[36] Hemaya : 219.

[37] Hemaya : 219.

[38] Imad Moosa, An Econometric Model of Kuwait's Monetary Sector, 1986: op. cit. : 85.

[39] Imad Moosa, Liquidity Factors in the Kuwait Economy, 1983: op. cit: 22-23.

[40] R. Amr and M. Al Mahmeed, "Monetary Trends and Demand for Money in Kuwait", The Egyptian Statistical Journal, 1987.

[41] Zakariya Basha, "Demand for Money Function in Kuwait", Journal of the Gulf and Arabian Peninsula Studies, Vol. X, No. 39, July, 1984 : 73-97.

[42] Ali Darrat, "The Money Demand Relationship in Saudi Arabia : an Empirical Investigation", Journal of Economic Studies, Vol. 11, No. 3, 1984 : 43-50.

[43] Ahmad Ghamdi, "Interest Rate and the Money Demand Function in Developing Countries : The Case of Saudi Arabia," Pakistan Journal of Applied Economics, Vol. VIII, No. 2, (1989) : 167-177.

[44] Mohammed El Hage, Monetary Policy and the Financial Sector's Role in Economic Development : A Case Study of Saudi Arabia. Unpublished Ph.D. Thesis, The Johns Hopkins University, 1991 : 98.

[45] Ahmad Ghamdi, "Foreign Aid, Foreign Interest Rates, and the Demand for Money in Developing Countries : The Case of Jordan", Rivista Internazionale di Scienze Economiche e Commerciali, Vol. 38, No. 10-11, 1991 : 1015-1023.

Table (1)

Summary of Estimates of Demand For Money Function in Selected Arab Countries

Author / Year	Country	Variables that Significantly Determine the Demand For Money
(1) Sewelem (1974)	Egypt	Real income; interest rate and inflation rate
(2) Crockett & Evans (1980)	19 developing countries*	Current income is the main determinant
(3) El-Sheikh (1982)	Egypt (1950-68)	Real income; and lagged money balances
(5) Moosa (1983)	Kuwait	Government expenditure; interest rate and expected inflation rate (smallest influence)
(6) Darrat (1984)	Saudi Arabia (1962-82)	Permanent income; inflationary expectations; and external developments (foreign interest rate and exchange rate)
(7) Teleb (1985)	Egypt	Income; interest rate; and expected rate of inflation
(8) Moosa (1986)	Kuwait (1975-82)	Non-oil GDP; foreign interest rate
(9) Darrat (1986)	Saudi Arabia; Libya & Nigeria	Income; and foreign interest rate
(10) Dorowitz & El Badawi (1987)	Sudan	Income; and foreign interest rate
(11) Amer & Al Mahmeed (1987)	Kuwait	Income
(12) Ghamdi (1989)	Saudi Arabia	Income; expected rate of inflation; foreign interest rate and exchange rate variables
(13) Hemaya (1990)	Egypt (1952-86)	Expected income and current interest rate (income is main determinant)
(14) Ghamdi (1991)	Jordan (1960-88)	Real income; expected rate of inflation; foreign interest rate; and inflow of foreign aid
(15) Bahmani-Oskooee and Malixi (1991)	13 developing countries, including Egypt (1975-85)	Economic activity (income); real effective exchange rate; and inflation rate
(16) El-Hage (1991)	Saudi Arabia	Non-oil income; foreign interest rate; expected rate of inflation; and financial development measured by number of bank branches/per million population
(17) Diabi (1993)	Algeria (1964-85)	Real income is the main determinant

*Include the following Arab countries : Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Qatar, Saudi Arabia, Sudan, Syria, UAE, and Yemen.

Source: The table is constructed by the author based on the studies mentioned in the table.

Diabi (1993) found that there is a significant and positive relationship between real balances and the level of real income in Algeria.[46] Income elasticity of demand for money is found to exceed one - from 1.18 to 4.53 - which means that demand for money increased by a larger percentage than the increase in real income.[47] In a study of 19 developing countries, 15 of which are Arab countries, Crockett and Evans (1980) indicated that current income - including remittance receipts - has a significant effect on the demand for money in such countries.[48] Elasticity of demand for money with respect to income in most of the countries of the study has been found to be in the range of 1.00 to 1.50.

Such statistical evidence regarding, let's say, income elasticity may lead to generlaizations where income elasticities of M_1 tend to be lower than that of M_2 . Also income elasticity in developing countries ranges between 1.00 and 1.50 which is lower than income elasticity in developed economies.[49] Most studies of Arab countries surveyed by the author showed that income elasticity for M_1 is almost close to unity and that of M_2 is larger than M_1.

As it appeared, real GDP is used in several studies to represent the scale variable. Even though it is considered a good measure of real income, it may not be the best proxy for domestic expenditure because of the effect of domestic currency value of both exports and imports.[50] Moreover, it may not be the best measure of transactions in some of the oil producing countries. Oil sector accounts form more than 50% of total GDP in such countries and decisions on value of production and price do not have a significant effect, nor are affected by money creation.[51]

Treatment of remittances is another issue that affects the accuracy of GDP as a measure of income in the demand function for money. Generally, earnings of expatriates are a part of the GDP of the countries in which they work and reside and not of their home countries. However, deciding whether this is an appropriate definition of income that may influence the demand function for money depends, to a certain extent, on the motives of holding money. If it is for transaction purposes in the domestic economy, then income available to residents is considered the determining factor for demand for money.[52] So, because expatriate remittances in most oil producing countries are transferred to their countries of origin and become part of income receipts,[53] it may be more appropriate toconsider national income that includes remittance receipts in the demand function for money.

---

[46] See Al Diabi, "The Demand for Money in Algeria : an Empirical Study", Journal of King Saud University : Administrative Sciences, Vol. 5, 1993 : 163-179.

[47] This is an indication of the absence of economics of scale.

[48] Crockett and Evans.

[49] Crockett and Evans, 1980, op. cit.

[50] Coats and Khatkhate, 1980 : op. cit., 14.

[51] Crocket and Evans, 1980 : op. cit.

[52] Crocket and Evans : 548.

[53] Remittances of workers constituted 17% of GDP in Egypt and 11% in Jordan in 1991.

2.2   Interest Rate :

In addition to income, there are other variables that need to be considered in the demand for money function. One important controversial variable is the interest rate. The traditional money demand models postulate that the demand for real cash balances is negatively related to the yield on financial assets (interest rate). The domestic interest rate represents the opportunity cost of holding money; thus the public would prefer to hold more financial assets such as treasury bills, bonds, etc., during times of high interest rate. In the money demand function for the financially developed industrial countries, this is beyond controversy.[54] However, the role of interest rate in developing economies deserves some attention.

The standard demand for money model which requires a well-developed financial market, has been corroborated by many theoretical and empirical studies. Keynes was the first to realize the importance of the speculative demand for money in the presence of capital markets.[55] But whereas Keynes' analysis is based on risk, others emphasized the importance of interest rate using other approaches. While Tobin's analysis is founded on uncertainty and Baumol's on some kind of inventory model,[56] Friedman used a variety of interest rates as the yields on financial assets.[57] However, despite the different approaches or explanations, theoretical reasoning and empirical investigation have indicated the importance of interest rate for the demand for money.

Because of colinearity in interest rates, an important empirical simplification in asset money demand functions has been the introduction of only one interest rate to represent the entire measure opportunity cost of holding money.[58] One of the earliest attempts was by Hamburger (1977), who specified the demand for real M_1 as a function of real income, lagged M_1, and three rates of return - the commercial bank savings deposit rate, the U.S. government bond rate, and the dividend-price ratio on equities.[59] Robert Heller and Khan (1979) and Khan (1980) expanded the range of the opportunity cost of money in their equation to include the entire term structure of interest rates.[60]

Among developing countries, it is quite widely accepted that interest rate is in practice an

---

[54] See for example, Milton Friedman, Post-War Trends in Monetary Theory : Policy and Institutions. John Wiley & Sons, New York, 1959; and S. Goldfeld, The Demand for Money Revisited, Brookings Paper on Economic Activity, No. 3, 1973 : 577-646.

[55] M. Taslim, "On Rate of Interest and Demand for Money in LDCs : the Case of Bangladesh", The Bangladesh Development Studies, 2 (13), 1984 : 19-35.

[56] See James Tobin, "Liquidity Preference on Behavior Towards Risk", Review of Economic Studies, Vol. 25, Feb., 1958; and W. Baumol, "The Transactions Demand on Cash : an Inventory Theoretic Approach", Quarterly Journal of Economics, Vol. 66, Nov. 1952.

[57] M. Friedman, "The Quantity Theory of Money : A Restatement", Chicago University Press, 1956.

[58] John Judd and John Scadding, "The Search for a Stable Money Demand Function", Journal of Economic Literature, Vol. XX, No. 3 (Sept. 1982).

[59] See Michael Hamburger, "Behavior of the Money Stock : Is There a Puzzle?" Journal of Monetary Economics, 3 (3) July, 1977 : 265-88.

[60] See Robert Heller and M. Khan, "The Demand for Money and the Term Structure of Interest Rates," Journal of Political Economy, 87 (1), Feb. 1979 : 109-29; and M. Khan, "The Term Structure of Interest Rates in Money Demand Models: A Further Analysis", Economic Letters, 6 (3), 1980 : 261-66.

unsatisfactory measure of the opportunity cost of holding money. In the first place, financial markets outside the banking system are not well developed, so that the possibilities of substitution between money and other financial assets are limited. Second, a more practical objection is that observed interest rates are often centrally determined and remain unchanged for long periods. So, there is insufficient variation in this interest rate to enable its influence on the demand for money to be estimated with confidence.

Many studies that include interest rate as an argument in the money demand function for developing countries, have shown the existence of a negative relationship between the domestic interest rate and the demand for money.[61] Of the Arab countries, for example, Swelem's (1974), Teleb's (1985) and Hemaya's (1990) studies indicated that the interest rate as an opportunity cost for holding money has a highly significant negative effect on the demand for money in Egypt.[62] Moosa's (1983), Basha's (1984) and Amr and Al Mahmeed's (1987) studies found out that inter-bank interest rate has a significant effect on the demand for money function in Kuwait.

However, most of the studies do not give theoretical justification to their findings. Correct signs of coefficients are not enough to rationalize such negative relationships in the developing countries.[63] Despite the openness of the world economy today, the institutional environment in most of the developing economies is similar to that of the industrialized world in the early twentieth century. In most of these countries, financial markets outside the commercial banks are non-existent. At the same time, there exists very little substitutability between money and other financial assets. Governments in most developing countries set interest rates according to national policy, and make adjustments on these rates very infrequently.[64] Furthermore, there are other developing countries that are governed by a set of complicated religious and institutional guidelines which prohibit the payment or receipt of a predetermined interest rate.[65]

In the context of developing countries, interest rates are more often viewed as instruments of development strategy rather than stabilization policy. It is common in such countries for interest rates on financial assets to be "set" below market clearing levels in the hope of stimulating

---

[61] See, for example, A. Khan, "Permanent Income, Inflation Expectation and the Money Demand Function in Developing Countries," Pakistan Development Review, 21 (4), 1982 : 259-273; V.K. Sastry, "Demand for and Supply of Money in India," The Indian Economic Journal, Vol. X (July, 1962) : 29-38; K. Gupta, "The Demand for Money in India : Further Evidence," The Journal of Development Studies, Vol. 6 (January, 1970) : 159-68; K. Iman, "A Structural Model of Pakistan's Monetary Sector," The Pakistan Development Review, Vol. X (1970) : 359-80, M. Swellem, "A Quantitative study of Egypt's Monetary Sector", Unpublished Ph.D. Thesis, Lancaster University, 1974; M. Teleb, An Econometric Analysis of Inflation in Egypt, Unpublished Ph.D. Thesis, Salford University, 1985 and El-Tahra Hemaya, An Empirical Investigation of the IMF Approach Towards Macroeconomic Adjustment in Egypt, Unpublished Ph.D. Thesis, Salford University, 1990; and Amer and alMahmeed (1987).

[62] Hemaya's (1990) study concluded that interest rate elasticity is significant at 10 percent level for M_1 only. However, M_2 variables were not significant.

[63] There are other studies that have shown the absence of such relationship where the demand for money is not sensitive to interest rates. See, for example, [Crockett and Evans (1980); Adekunle (1968); Ghamdi (1989); and Fau and Liu (1971)]. and G. Mckenzie (1979).

[64] Ahmad Ghamdi, "Interest Rate and the Money Demand Function in Developing Countries : the Case of Saudi Arabia", Pakistan Journal of Applied Economics, Vol. VIII, No. 2, 1989 : 168.

[65] The Holy book of Islam prohibits interest and the practice of collecting interest is also condemned.

investment and growth.[66] Unfortunately, this move often has the opposite effect by diverting foreign capital to other countries; reducing the mobilization of savings into economically productive forms; and reducing efficiency in the allocation of such savings as are made available.

2.3 Expected Rate of Inflation :

On the basis of the results of several studies as well as the theoretical understanding of interest rate, one can't determine that the rate of interest affects the demand for money in developing countries. So, in developing countries, due to the scarcity of interest rate data, the underdeveloped nature of money and capital markets, and the failure of government regulated interest rates to reflect actual alternative yields available, it seems appropriate to estimate the demand for money function using a measure of expected inflation as the opportunity cost of holding money.

As far as the influence of opportunity cost variables is concerned, theory suggests that an increase in the expected rate of inflation would reduce the attractiveness of money balances. This effect should be more pronounced for narrow money, which conventionally has a zero nominal yield, than for broad money, which includes time and savings deposits, whose yield can be adjusted to offset inflationary expectations.

The expected rate of inflation was introduced in the demand for money function by Friedman (1956). He argued that the demand for real balances is universally related to the expected rate of inflation. So, an increase in the general price level erodes the real value of money and induces a portfolio shift. Friedman treats the rate of inflation as the rate of return on real assets just as the rate of interest is the rate of return on financial assets. Therefore, higher inflation rates lead people to shift part of their wealth from money and financial assets to real assets which, in turn, means that higher inflation rates are associated with lower demand for money. However, because the effect of inflation rate on the demand for money was relatively neglected except in cases of hyper inflation, it was concluded that moderate rates of inflation do not affect the demand for money.

Empirical work on developing countries has been less successful in discovering significant and stable coefficients for inflation elasticities than for income elasticities. Galbis (1979) found only sporadic evidence of significant negative inflation elasticities in some Latin American countries.[67] Morgan (1979), despite experiments with various specifications of the expected price change variables, was unable to discover any significant relationship with the appropriate sign.[68] Mackenzi (1979) has employed the adaptive expectations hypothesis in order to generate the expected rate of inflation to examine its ability to measure the opportunity cost of holding money in Egypt. The expected rate of inflation was rejected because of its insignificant role as explanatory variable in the

---

[66] W. Coates, "The Efficacy of Monetary Rules for LDCs", in Coates and Khatkhate (eds.) Money and Monetary Policy in LDC: a Survey of Issues and Evidence, 1970.

[67] Vicente Galbis, "Money, Investment, and Growth in Latin America, 1961-73", Economic Development and Cultural Change, Vol. 27 (April, 1979) : 423-43.

[68] David Morgan, "Fiscal Policy in Oil Exporting Countries, 1972-78", IMF Staff Papers, Vol. 26 (March, 1979) : 55-86.

demand for money functions.[69] El-Sheikh (1982) also rejected the hypothesis due to the low level and absent trend for inflation rate during the jumble period.[70] To Hemaya (1990) inflation appears not to have any influence on the demand for money in the stock adjustment expectation model. On the contrary, estimates of the error correction model indicate that inflation has significantly affected the demand for the three definitions of money, M_1, M_2 and M_3.[71] Also, Diabi (1993) found that inflation has no significant effect on the demand for money (M_1 or M_2) in Algeria. He concluded that there is no relationship between demand for money and the opportunity cost of holding money as measured by prices. His explanation rests on the assumption that the GDP deflator in Algeria is not a good measure for opportunity cost because it includes changes in oil prices, on one hand, and because speculative demand for money in Algeria is relatively weak, on the other.[72]

However, there are several other studies that indicate the significant role of inflation in the demand for money. Akhtar (1974) and Abe, et al., (1975) found a significant role for price expectations in the demand for money function in Pakistan.[73] The role of price expectations has also been central to the studies of Chile by Hynes (1967) and Deaver (1970).[74] Ghosh and Kazi (1977) use a model for Nigeria and like Hynes found evidence in favor of the demand for money in nominal forms being homogeneous of degree one in the price level.[75] Many researchers have solely used the expected rate of inflation to capture the foregone yield on real assets.[76]

Nyong (1993) found out that the inclusion of inflationary expectation in the demand for money in South Africa enhanced the functional fit of the model and the inflationary expectation coefficient was statistically significant and of the right sign.[77] This implied that money holders view real goods as an important substitute to holding money balances. The Bahmani-Oskooee and Molixi (1991) study of the demand function for money in 13 developing countries indicated that the inflation rate (or its expectation in some cases) is one of the major determinants of the demand for money in

---

[69] See Mackenzi (1979), op. cit.

[70] See El-Sheikh (1982), op. cit.

[71] See Hemaya 1990, op. cit. : 219-220.

[72] Diabi, 1993, op. cit. : 172.

[73] See, M. Akhtar, "The Demand for Money in Pakistan", Pakistan Development Review, 3 (1974) : 40-45; ed. S. Abe and others, "The Demand for Money in Pakistan : Some Alternative Estimates", Pakistan Development Review, 14 (1978) : 249-57.

[74] A. Hynes, "The Demand for Money and Monetary Adjustments in Chile", Review of Economic Studies, 34 (1967) : 285-93; and J. Deaver, "The Chilean Inflation and the Demand for Money", in Meiselman (ed.), Varieties of Monetary Experience, University of Chicago Press : 9-67.

[75] Subrata Ghatak, Monetary Economics in Developing Countries. St. Martin's Press, New York, 1981 : 32.

[76] See, for example, A. Darrat, "The Demand for Money in Some Major OPEC Members : Regression Estimates and Stability Results," Applied Economics, 18 (1986) : 127-142; A. Darrat, "The Islamic Interest-free Banking System : Some Empirical Evidence," Applied Economics, 20, 3 (1988) : 417-25; and C. Wong, "Demand for Money in Developing Countries : Some Theoretical and Empirical Results", Journal of Monetary Economics, 7, 3 (1977) : 59-86; and M. Teleb An Econometric Analysis of Inflation in Egypt, Unpublished Ph.D. Thesis, University of Salford, 1985.

[77] Michael Nyong, "Income and Interest Rate Elasticities of the Demand for Money in South Africa : Comments and Extension", The Indian Economic Journal, Vol. 41, No. 1, July-September, 1993: 83-89.

developing countries.[78] A study by Perera (1988) where partial adjustment mechanism (nominal and real) and adoptive expectation mechanism were incorporated to specify the demand for money function for Sri Lanka indicated that current real income and expected rate of inflation are the major determinants of such a function.[79]

Of the Arab countries, Swelem's (1974), and Teleb's (1985) studies showed that inflation rate has a relatively significant effect on the demand for money in Egypt. Moosa's (1983) and Basha's (1984) studies indicated the effect of inflationary expectations in the demand for money in Kuwait. However, Moosa's study showed that inflation has the smallest effect. The effect of inflationary expectations on demand for money in Saudi Arabia was also clear in Darrat's (1984) study, Ghamdi's (1989) study and El Hage's (1991) study. The same applies to Ghamdi's (1991) study of Jordan where expected rate of inflation has a significant effect on the demand function for money.

It is argued, however, that this practice of considering the expected rate of inflation as the sole relevant measure of the opportunity cost of holding money in developing countries may entail a significant mis-specification in money demand functions because it assumes a closed economy.[80] In contemporary open economies with at least some international capital mobility, international opportunity cost of holding money balances can be as important as the domestic counterpart. This argument appears especially relevant for developing countries due to the lack of adequate domestic financial assets in which to hold wealth.[81] So, the influence of international monetary developments as summarized in movements of interest rates is taken into account in money demand equations.[82] The studies based on monetary experience in several developing countries that have experienced rapid inflation, such as Argentina, Brazil, Chile, and Korea, have shown conclusively that the demand for real cash balances is sensitive to the expected rate of inflation, which, in the absence of any meaningful interest rates, is used as a proxy measure for the cost of holding money.

The appropriate measure of inflation is an issue that needs to be considered. Even though it is accepted as a better measure than the price index,[83] the GDP deflator has its own flaws especially when it is used in developing countries, in general, and in oil producing countries, in particular.

---

[78] Mohsin Bahmani-Oskooee and M. Malexi, "Exchange Rate Sensitivity of the Demand for Money in Developing Countries", Applied Economics, No. 23, 1991 : 1377-1384.

[79] Nelson Perera, "Demand for Money in Sri Lanka 1960-1984", The Indian Economic Journal, Vol. 36, No. 1, July-September, 1988 : 18-32.

[80] This closed-economy nature has also characterized most of the money demand studies in developed countries.

[81] A. Darrat, "The Demand for Money in some Major OPEC Members ....," op. cit. : 129.

[82] There is no consensus among researchers on the appropriate measure of interest rates. Some studies approximated the foreign rates by means of an arithmetic average of the short-term interest rates of major OECD countries. See, for example, Arango and Nadiri, "Demand for Money in Open Economies", Journal of Monetary Economics, 7, 1981 : 69-83; A. Darrat, "The Demand for Money in Some Major OPEC Members ...," Applied Economics, 18, 1986 : 127-142; and A. Ghamdi, "Interest Rate and the Money Demand Function in Developing Countries : the Case of Saudi Arabia", Pakistan Journal of Applied Economics, Vol. VIII, No. 2, Winter, 1989: 167-177.

[83] See Coates and Khatkhate, 1980, op. cit. : 15.

Since it reflects changes in the price level of domestic output only while prices of imported goods are not included, it may not be a good measure of inflation, which opens the door to the use of consumer price index.[84] However, the CPI has its own flaws. Because several developing countries, mainly the oil producing ones, subsidize, to a large extent, the purchase of several commodities that are important in the CPI, its use as a measure of inflation rate is somewhat questionable. Also the data needed to generate the index in such countries is both not available and is of poor quality. "...So there is no universally acceptable solution to the problem of measuring expected inflation, and an important aspect of judging any study with regards to the influence of expected inflation on the demand for money must include an assessment of the adequacy of the measure of expected inflation used."[85] Thus, both GDP deflator and CPI can be used while the empirical results would determine their relevance. This suggests that in estimating the demand for money, interest rate is not as important as the expected rate of inflation in measuring the opportunity cost of holding money, while income seems to be the major determinant of money holdings.

2.4   Exchange Rate :

Given the openness of most contemporary economies, money demand functions should include the effect of external monetary and financial factors approximated by movements in foreign rate and exchange rate. An increase in (expected) foreign interest rates would induce domestic residents to increase their holdings of foreign assets which would be financed by drawing down domestic money holdings. Also a change in exchange rate would affect portfolio decisions between domestic assets and foreign assets.[86] So, if, for example, domestic currency is expected to depreciate, domestic portfolio holders would adjust their portfolio in favor of foreign assets and vise versa. It can be postulated from such effect of external factors that foreign interest rate and exchange rate expectations may have a negative effect on the demand for money.

Bahmani-Oskooee and Malixi (1991) assessed whether a change in real effective exchange rate has any impact on the demand for money in 13 developing countries using quarterly data over 1983-1985.[87] Estimates of the short-run elasticities indicated that there are positive as well as negative effects. However, in the long run a change in real effective exchange rate has a significant negative effect on demand for money function in nine out of eleven cases.[88] This indicates that where the currency of each of these countries depreciates, the public holds less domestic currency and more foreign currency which means demand for money increases. This means that there is some kind of substitutability between the domestic currency and some foreign currencies.

---

[84] Crocket and Evans, 1980, op. cit. : 549.

[85] David Laidler, The Demand for Money : Theories, Evidence and Problems (4th ed.), Harper Collins College Publishers, New York, 1993 : 109-110.

[86] Ali Darrat, "The Money Demand Relationship in Saudi Arabia, 1984, op. cit.; and Ali Darrat, "Inflation in Saudi Arabia ... ", 1985, op. cit.

[87] Mohsin Bahmani-Oskooee and Margaret Malixi, "Exchange Rate Sensitivity of the Demand for Money in Developing Countries", Applied Economics, 23, 1991 : 1377-1384.

[88] The nine countries are: Brazil, Greece, Mexico, Pakistan, Peru, Philippines, Portugal, Thailand, and Turkey.

Empirical results of studies of some of the Arab countries lend strong support to the hypothesis that external developments represented by exchange rate, and in some cases, foreign interest rates, influence domestic currency holdings. Domowitz and El Badawi (1987) study indicated that there is a strong effect of the exchange rate variable - defined as a number of units of the country's currency per unit of U.S. dollar - on the demand for money function in Sudan.[89] Darrat's (1984, 1985), and Ghamdi (1989) studies found that exchange rate along with foreign interest rate have significant negative effect on the demand for money function in Saudi Arabia.[90] Also, Darrat's (1986) study showed that foreign interest rates play a major role in explaining money demand in the open economies of Saudi Arabia, Libya and Nigeria. Without such a variable, all of the estimated money demand functions appear seriously mis-specified and structurally unstable.[91] Ghamdi's (1991) study tested the effect of the openness of the Jordanian economy on the demand for money function by including foreign interest rate as well as the inflow of foreign aid as major determining factors which were found to have significant effects.[92] The inflow of foreign aid has a significant positive effect on demand for money while low foreign interest rate tends to lower it.

So, when exchange rate is identified as one of the determinants of demand for money function in some developing countries, it means that external monetary and financial factors have significant influence on such economies. This implies that the role of fiscal and monetary policy should be changed to reflect such results. It also indicates that there is some degree of substitution between domestic and foreign assets. Monetary policy, which is designed to counteract the effect of external factors on macroeconomic variables such as inflation, for example, must consider the effect of such factors on the demand for money function.

3 STABILITY OF THE DEMAND FUNCTION FOR MONEY :

A third issue that empirical studies on the demand for money in developing countries attempted to resolve is the statistical stability of the demand function for money over time.

The question of whether the demand function is "stable" is one of the most important recurring issues in the theory and application of macroeconomic policy. What is being sought in a stable demand function is a set of necessary conditions for money to exert a predictable influence on the economy so that the central bank's control of the money supply can be a useful instrument of economic policy.

---

[89] I. Domowitz and I. El Badawi, "An Error-Correction Approach to Money Demand : the Case of Sudan", Journal of Development Economics, 26, 1987 : 257-75.

[90] Ali Darrat, "The Money Demand Relationship in Saudi Arabia ...", Journal of Economic Studies, Vol. 11, No. 3, 1984 : 43-50; "Inflation in Saudi Arabia : An Econometric Investigation", Journal of Economic Studies, Vol. 12, No. 4, 1985 : 41-51; and Ahmad Ghamdi, "Interest Rate and the Money Demand Function in Developing Countries : the Case of Saudi Arbaia", Pakistan Journal of Applied Economics, Vol. VIII, No. 2, Winter, 1989 : 167-177.

[91] Ali Darrat, "The Demand for Money in Some Major OPEC Members ... ", op. cit., 139.

[92] Ahmad Ghamdi, "Foreign Aid, Foreign Interest Rates, and the Demand for Money in Developing Countries : the Case of Jordan", Rivista Internazionale di Scienze Economiche & Commericali, Vol. 38, No. 10-11, 1991 : 1015-1023.

The notion of a stable demand function appears to involve three key elements.[93] First, the demand for money relation should be highly predictable in a statistical sense as measured by the goodness-of-fit statistics, precision of estimated coefficients and its ability to forecast accurately out of sample. Second, a stable demand function for money has relatively few arguments (variables). Finally, the variables in the function should represent significant links to spending on economic activity in the real section.[94]

The IMF adjustment programs usually involve performance criteria that put limits on aggregate domestic credit expansion. The formulation of targets in such programs is based on the assumption that there is a stable demand for money function. The stability of the money demand function is important for drawing meaningful policy references from the estimated parameters. As Thornton (1983) pointed out, demand for money is the link between monetary policy and the rest of the economy. In order to adequately predict the impact of a given change in money supply on other macroeconomic variables such as prices or interest rates, the money demand function should remain stable.[95]

Prior to 1970, the evidence that had accumulated from the large body of research done over the post-war period was interpreted as showing that a stable demand function for money in developed countries did, in fact, exist. The work by Brunner and Meltzer; Meltzer, Laidler; Khan and others supports this stability.[96] However, several writings on the demand for money have cast doubt on the existence of a stable demand for money function in developed economies.[97]

Empirical evidence suggests that stable demand for money functions in developing countries can be estimated based on the lines as for developed economies. However, many economists have argued that there are some major differences where interest rates in developing countries are either fixed or

---

[93] See John Boorman, "The Evidence on the Demand for Money : Theoretical Formulations and Empirical Results", in Thomas Havrilesky and John Boorman (eds.), Current Issues in Monetary Theory and Policy, AHM Publishing Corporation, Arlington, Illinois, 1976 : 353.

[94] John Judd and John Scadding, 1980, op. cit.

[95] D.Thornton, "Why Does Velocity Matter?" Federal Reserve Bank of St.Louis Review, 65, 1983 : 5-13.

[96] See Karl Brunner and Allan Meltzer, "Comment on the Long-Run and Short-Run Demand for Money", Journal of Political Economy, 76 (Nov./Dec. 1968) : 1234-1239; Allan Meltzer, "The Demand for Money : the Evidence from the Time Series," Journal of Political Economy, 71 (June, 1963) : 219-246; David Laidler, "The Influence of Money on Economic Activity: A Survey of Some Current Problems", in G. Clayton, J. Gilbert, and R. Sidgewick (eds.), Monetary Theory and Monetary Policy in the 1970's, Oxford University Press, New York, 1971 : 75-135; and M. Khan, "The Stability of the Demand for Money Function in the United States 1901-1965", IMF Staff Papers, July 1974.

[97] See, among others, David Laidler, "The Demand for Money in the United States - Yet Again", in K. Brunner and A. Meltzer (eds.), "the Carnegie-Rochester Conference Series on Public Policy", Vol. 12, 1980; David Laidler, "Monetarism : An Interpretation and Assessment", Economic Journal, March, 1981; Judd and Scadding, "The Search for a Stable Money Demand Function : A Survey of the Post-1973 Literature", Journal of Economic Literature, Vol. 20, September 1982; Hetzel, "Estimating Money Demand Functions", Journal of Money, Credit and Banking, Vol. 16, No. 2, May 1984; and David Laidler, The Demand for Money : Theories, Evidence and Problems, Harper Collins College Publishers, New York, 1993.

a ceiling is set which doesn't reflect the financial markets in such countries. Also money is mainly held for transaction purposes where speculative demand for money is very limited as a result of underdeveloped financial markets.[98] Thus, real assets in such economies are a close substitute for money which causes demand for money to be influenced by the nominal rate of return on real assets.[99] A rapidly increasing quantity of empirical research in developing countries confirm the evidence of the stability of the demand for money functions in such countries.[100]

Testing the stability of the demand for money function in developing countries is of crucial importance to the effectiveness of monetary policy. The stability test refers to the testing for constancy of the regression over a sample period where instability of the demand for money function is usually caused by fundamental changes in the economy. Such concept of stability may be formally tested through several available statistical tests where each stability test addresses a somewhat different aspect of stability.[101] Among others, there are the Chow test (1960),[102] the Gujarati test (1970), and the Farley-Hinien test (1970)[103] and the Goldfeld test (1973). Based on a battery of stability tests, the estimated money demand equations for some developing countries are found to be structurally stable over time.[104] This suggests that the regression results can be used for policy analysis in developing countries with good reliability.

---

[98] Imad Moosa, "An Econometric Model of Kuwait's Monetary Sector", 1986 : 45.

[99] Y. Park, "The Role of Money in Stabilization Policies in Developing Countries", IMF Staff Papers, Vol. 20, No. 2, July, 1973.

[100] For a sampling of the extended literature on money demand function in developing countries, see J. Adekunle, "The Demand for Money : Evidence from Developed and Less Developed Economies", IMF, Staff Papers, Vol. XV, No. 2 (July 1968) : 225-278; B. Aghevli and M. Khan, "Government Deficits and the Inflationary Process in Developing Countries", IMF, Staff Papers, Vol. 25, No. 3 (Sept. 1978); J. Fau and Z. Liu, "Demand for Money in Asian Countries : Empirical Evidence", Indian Economic Journal, (April-June 1971); A. Crockett and O. Evans, "Demand for Money in Middle Eastern Countries", IMF, Staff Papers, Vol. 27 (3), (Sept. 1980) : 343-77; and A. Ghamdi, "Interest Rate and the Money Demand Function in Developing Countries : the Case of Saudi Arabia", Pakistan Journal of Applied Economics, Vol. VIII, No. 2, Winter 1989 : 167-177; El-Tahra Hewaya, An Empirical Investigation of the IMF Approach Towards Macroeconomic Adjustment in Egypt, Unpublished Ph.D. Thesis, University of Salford, 1990.

[101] J. Boughton, "Recent Instability of the Demand for Money : An International Perspective", Southern Economic Journal, Vol. 47 (January, 1981) : 579-597.

[102] Chow test apppears to be quite sensitive to the presence of serial correlation and to high degree of multicollinearity among the regressors (Madalla, 1977). It is also questionable in the presence of moderate heterosedasticity (Schmidt and Sickles, 1977).

[103] See A. Darrat, "The Demand for Money in a Developing Economy : the Case of Kenya", World Development, Vol. 13, No. 10/11 (Oct./Nov. 1985) : 1163-1170. Also, A. Ghamdi, "Interest Rates and the Money Demand Function in Developing Countries : the Case of Saudi Arabia", Pakistan Journal of Applied Economics, Vol. VIII, No. 2 (1989) : 167-177; and A. Darrat, "The Demand for Money in Some Major OPEC Members...", Applied Economics, 18, 1986: 127-142.

[104] See, for example, Studies by Darrat (1985), who used the three tests for Demand for Money in Kenya. In addition to these three tests, Darrat (1986) employed the test procedure employed by Gupta (1978) and Goldfeld (1973). Ghamdi (1989) used only the Chow test to test the stability of Demand for Money Function in Saudi Arabia. Hemaya (1990) used Chow-test for the Demand for Money Function in Egypt for the stock adjustment and expectations model and error correction model.

CONCLUSION :

Over the past twenty years or so a large number of stabilization and structural adjustment programs have been undertaken, mainly, in developing countries, based on the macroeconomic theory of open economies developed during the 1950s and 1960s. Since then such programs and policies have expanded which, in turn, requires the expansion of our understanding of the economic theory behind such policies. Developments in theoretical and empirical monetary issues, i.e. demand for money reflect such an expansion and, at the same time, are considered one of the main elements of stabilization and structural adjustment policies.

The purpose of this study has been to survey and analyze theoretical as well as empirical developments in demand for money issues in developing countries in reference to stablization and structural adjustment policies. Such theoretical and empirical investigation has led to the following conclusions.

Where stabilization depends on the ability to adjust money supply to its demand to prevent monetary disturbances from affecting real output, the demand for money function in developing countries is sensitive to the nominal rate of return on real assets. Because financial markets outside the commercial banks are non-existent in some developing as well as Arab countries, and/or controlled in the others, real income rather than interest rate is the main variable in the demand for money function. Because foreign interest rates and exchange rates - as a proxy for external monetary developments - exert a significant effect on dometic demand for money in such countries, neglect of such variables may produce biased results.

Knowing that the formulation of targets in stabilization and structural adjustment programs is based on the assumption that there is a stable demand for money function, stability tests found that the function is relatively stable over time. Such stability indicates that the impact of changes in money supply on other macro variables is adequately predictable. Empirical studies on the demand for money in developing countries support this conclusion.

BIBLIOGRAPHY

Abe, S. and others. "The Demand for Money in Pakistan : Some Alternative Estimates", Pakistan Development Review, 14, 1978.

Adekunle, J. "The Demand for Money : Evidence from Developed and Less Developed Economies", IMF, Staff Papers, Vol. XV, No. 2, July 1968.

Aghevli, B. and M. Khan. "Government Deficits and the Inflationary Process in Developing Countries", IMF, Staff Papers, Vol. 25, No. 3, Sept. 1978.

Akerlof, G. and R. Milbourne. "The Short-Run Demand for Money", Economic Journal, 90 (360), 53, 1980.

Akhtar, M. "The Demand for Money in Pakistan", Pakistan Development Review, 3, 1974.

Al Diabi, "The Demand for Money in Algeria : An Empirical Study", Journal of King Saud University : Administrative Sciences, Vol. 5, 1993.

Amr, R. and M. Al Mahmeed. "Monetary Trends and Demand for Money in Kuwait", The Egyptian Statistical Journal, 1987.

Arango and Nadiri. "Demand for Money in Open Economies", Journal of Monetary Economics, 7, 1981.

Bahmani-Oskooee, Mohsin and Margaret Malixi. "Exchange Rate Sensitivity of the Demand for Money in Developing Countries", Applied Economics, 23, 1991.

Basha, Zakariya. "Demand for Money Function In Kuwait", Journal of the Gulf and Arabian Peninsula Studies, Vol. X, No. 39, July, 1984.

Baumol, W. "The Transactions Demand on Cash : an Inventory Theoretic Approach", Quarterly Journal of Economics, Vol. 66, November 1952.

Boorman, John. "The Evidence on the Demand for Money : Theoretical Formulations and Empirical Results", in Thomas Havrilesky and John Boorman (eds.), Current Issues in Monetary Theory and Policy, AHM Publishing Corporation, Arlington, Illinois, 1976.

Boughton, J. "Recent Instability of the Demand for Money : An International Perspective", Southern Economic Journal, Vol. 47, January 1981.

Brunner, Karl and A. Meltzer. "Money, Debt, and Economic Activity", Journal of Political Economy, September/October 1972.

Brunner, Karl and Allan Meltzer. "Mr. Hicks and the Monetarists", Econometrica, February 1973.

_____. "The Place of Financial Intermediaries and the Transmission of Monetary Policy", American Economic Review, May 1963.

_____. "Comment on the Long-Run and Short-Run Demand for Money", Journal of Political Economy, 76, Nov./Dec. 1968.

Chow, G. "On the Long-Run and Short-Run Demand for Money", Journal of Political Economy, 74, 1966.

Clower, Robert. "Theoretical foundations of Monetary policy" in clayton, Gilbert and sidgewick (eds.), Monetary Theory and Monetary Policy in the 1970s, Oxford University press, New York, 1971.

Coates, W. "The Efficacy of Monetary Rules for LDCs", in Coates and Khatkhate (eds.) Money and Monetary Policy in LDC: a Survey of Issues and Evidence, 1970.

Crockett, A. and O. Evans. "Demand for Money in Middle Eastern Countries", IMF, Staff Papers, Vol. 27 (3), Sept. 1980.

Cuthbertson, Keith. "Modelling the Demand for Money", in Christopher Green and David Llewellyn (eds.), Surveys in Monetary Economics. Vols. 1 & 2, Basil Blackwell Ltd., Oxford, U.K., 1991.

Darrat, Ali. "The Money Demand Relationship in Saudi Arabia : an Empirical Investigation", Journal of Economic Studies, Vol. 11, No. 3, 1984.

_____. "Inflation in Saudi Arabia : an Econometric Investigation", Journal of Economic Studies, Vol. 12, No. 4, 1985.

_____. "The Demand for Money in a Developing Economy : the Case of Kenya", World Development, Vol. 13, No. 10/11, Oct./Nov. 1985.

_____. "The Demand for Money in Some Major OPEC Members : Regression Estimates and Stability Results," Applied Economics, 18, 1986.

_____. "The Islamic Interest-free Banking System : Some Empirical Evidence," Applied Economics, 20, 3, 1988.

Deaver, J. "The Chilean Inflation and the Demand for Money", in D.M. Meiselman (ed.), Varieties of Monetary Experience, Univ. of Chicago Press, Chicago, 1970.

Domowitz, I. and I. El Badawi. "An Error-Correction Approach to Money Demand : the Case of Sudan", Journal of Development Economics, 26, 1987.

El-Hage, Mohammed. Monetary Policy and the Financial Sector's Role in Economic Development : a Case Study of Saudi Arabia. Unpublished Ph.D. Thesis, The Johns Hopkins University, 1991.

El-Sheikh, S. "An Econometric Analysis of the Demand for Money in Egypt: 1940/50 - 1967/68", Journal of the Social Sciences, Vol. 1, 1982.

Fau, J. and Z. Liu. "Demand for Money in Asian Countries : Empirical Evidence", Indian Economic Journal, April-June 1971.

Feige, E. and M. Parkin. "The Optimal Quantity of Money, Bonds, Commodity Inventories, and Capital", American Economic Review, 61, June 1971.

Fisher, D. "The Demand for Money in Britain : Quarterly Results 1951-67", Manchester School, 36, 1968.

Friedman, M. "The Quantity Theory of Money : A Restatement", Chicago University Press, 1956.

_____. "The Quantity Theory of Money : A Restatement", in M. Friedman (ed.), Studies in the Quantity Theory of Money, University of Chicago Press, 1957.

_____. "Post-War Trends in Monetary Theory : Policy and Institutions". John Wiley & Sons, New York, 1959.

Galbis, Vicente. "Money, Investment, and Growth in Latin America, 1961-73", Economic Development and Cultural Change, Vol. 27, April 1979.

Ghamdi, Ahmad. "Interest Rate and the Money Demand Function in Developing Countries : the Case of Saudi Arabia", Pakistan Journal of Applied Economics, Vol. VIII, No. 2, Winter 1989.

_____. "Foreign Aid, Foreign Interest Rates, and the Demand for Money in Developing Countries : the Case of Jordan", Rivista Internazionale di Scienze Economiche & Commericali, Vol. 38, No. 10-11, 1991.

Ghatak, Subrata. Monetary Economics in Developing Countries, St. Martin's Press, New York, 1981.

Goldfeld, Stephen. The Demand for Money Revisited, Brookings Paper on Economic Activity, No. 3, 1973.

_____. "Demand for Money : Empirical Studies", in John Eatwell, Murray Milgate, and Peter Newman (eds.), The New Palgrave : a Dictionary of Economics, Vol. 1,

The Macmillan Press Ltd., London, 1987.

Goodhart, Charles. "The conduct of Monetary Policy", in Christopher Green and David Llewellyn (eds.) Survey in Monetary Economics, Vol. 1: Monetary Theory and Policy. Basil Blackwell Ltd., Oxford, 1991.

Gordon, R. The Short-Run Demand for Money : A Reconsideration", Journal of Money, Credit, and Banking, Vol. 16, No. 4, November, 1984.

Grossman, H. and A. Policano. "Money Balances, Commodity, Inventories and Inflationary Expectations", Journal of Political Economy, 83 (6), 1975.

Gujarati, D. "The Demand for Money in India", Journal of Development Studies, Vol. 5, No. 1, 1968.

Gupta, K. "The Demand for Money in India : Further Evidence," The Journal of Development Studies, Vol. 6, January 1970.

Gurley, J. and E. Shaw, "Money in a Theory of Finance", The Brookings Institute, Washington, D.C., 1960.

Hamburger, Michael. "Behavior of the Money Stock : is there a Puzzle?" Journal of Monetary Economics, 3 (3) July 1977.

Heller, Robert and M. Khan. "The Demand for Money and the Term Structure of Interest Rates," Journal of Political Economy, 87 (1), February 1979.

Hemaya, El-Tahra. An Empirical Investigation of the IMF Approach Towards Macroeconomic Adjustment in Egypt, Unpublished Ph.D. Thesis, Salford University, 1990.

Hetzel, "Estimating Money Demand Functions", Journal of Money, Credit and Banking, Vol. 16, No. 2, May 1984.

Hicks, J. "A Suggestion For Simplifying The Theory of Demand", Economica, February, 1935.

Hynes, A. "The Demand for Money and Monetary Adjustments in Chile", Review of Economic Studies, 34, 1967.

Iman, K. "A Structural Model of Pakistan's Monetary Sector," The Pakistan Development Review, Vol. X, 1970.

Judd, J. and J. Scadding. "The Search for a stable Money Demand Function", journal of Economic Literature, vol. XX, No. 3, September 1982.

Karni, E. "The Value of Time and The Demand for Money", Journal of Money, Credit, and Banking, 6, 1974.

Kaufman, G. and C. Latta. "The Demand for Money; Preliminary Evidence from Industrial Countries", Journal of Financial Quantitative Analysis, 1, 1966.

Khan, A. "Permanent Income, Inflation Expectation and the Money Demand Function in Developing Countries," Pakistan Development Review, 21 (4), 1982.

Khan, M. "The Stability of the Demand for Money Function in the United States 1901-1965", IMF Staff Papers, July 1974.

_____. "The Term Structure of Interest Rates in Money Demand Models: A Further Analysis", Economic Letters, 6 (3), 1980.

Laidler, David. "The Influence of Money on Economic Activity: A Survey of Some Current Problems" in G. Clayton, J. Gilbert, and R. Sidgewick (eds.), Monetary Theory and Monetary Policy in the 1970s, Oxford University press, New York, 1971.

_____. "The Demand for Money in the United States - Yet Again", in K. Brunner and A. Meltzer (eds.), "the Carnegie-Rochester Conference Series on Public Policy", Vol. 12, 1980.

_____. "Monetarism : An Interpretation and Assessment", Economic Journal, March, 1981.

_____. The Demand for Money : Theories, Evidence and Problems, Harper Collins College, Publishers, New York, 1993.

Mackenzie, G. "The Demand for Money in Egypt", Mimeographed, IMF, September, 1979.

Meltzer, Allan. "The Demand for Money : The Evidence from the Time Series," Journal of Political Economy, 71, June 1963.

Milbourne, E. "Price Expectations and the Demand for Money : Resolution of a Paradox", Review of Economics and Statistics, 65, (4) 1983.

Milbourne, R. "Re-examining the Buffer Stock Model of Money," Economic Journal, 97, 1987.

Miller, M. and D. Orr. "A Model of the Demand for Money by Firms", Quarterly Journal of Economics, 109, 1966.

Moosa, Imad. "Liquidity Factors in the Kuwait Economy", 1983.

_____. "An Econometric Model of Kuwait's Monetary Sector", 1986.

Morgan, David. "Fiscal Policy in Oil Exporting Countries, 1972-78", IMF Staff Papers, Vol. 26, March 1979.

Nyong, Michael. "Income and Interest Rate Elasticities of the Demand for Money in South Africa : Comments and Extension", The Indian Economic Journal, Vol. 41, No. 1, July-September 1993.

Park, Y. "The Role of Money in Stabilization Policies in Developing Countries", IMF Staff Papers, Vol. 20, No. 2, July 1973.

Perera, Nelson. "Demand for Money in Sri Lanka 1960-1984", The Indian Economic Journal, Vol. 36, No. 1, July-September 1988.

Santamero, A. "A Model of the Demand for Money by Households", Journal of Finance, 29 March, 1974.

Sastry, V.K. "Demand for and Supply of Money in India," The Indian Economic Journal, Vol. X, July 1962.

Swellem, M. A Quantitative Study of Egypt's Monetary Sector", Unpublished Ph.D. Thesis, Lancaster University, 1974.

Smith, G. "A Dynamic Baumol-Tobin Model of Money Demand", Review of Economic Studies, 53, 1986.

Taslim, M. "On Rate of Interest and Demand for Money in LDCs : the Case of Bangladesh", The Bangladesh Development Studies, 2 (13), 1984.

Teleb, M. An Econometric Analysis of Inflation in Egypt, Unpublished Ph.D. Thesis, University of Salford, 1985.

Thornton, D. "Why Does Velocity Matter?" Federal Reserve Bank of St. Louis Review, 65, 1983.

Tobin, James. "Liquidity Preference on Behavior Towards Risk", Review of Economic Studies, Vol. 25, February 1958.

William Hosek, and Frank Zohn. Monetary Theory, Policy and Financial Markets, McGraw-Hill Book Company, New York, 1977.

Wong, C. "Demand for Money in Developing Countries : Some Theoretical and Empirical Results", Journal of Monetary Economics, 7, 3, 1977.

The Economic Research Forum for the Arab Countries, Iran and Turkey (ERF) was established in June 1993 as an independent, non-profitmaking regional networking organization. Its mission is to promote policy-relevant economic research with a broad representation of views, and to help activate the policy-formulation debate in the region - by encouraging and funding quality research, and disseminating results of research activities to economists and policy-makers.

The ERF *Working Papers Series* disseminates the findings of research work in progress to promote the exchange of ideas, and encourage discussion and comment among researchers for timely revision and application by the author(s).

The *Working Papers* are a prepublication outlet intended to make preliminary research results available with the least possible delay. They are therefore subject to light editing *only* when strictly necessary, and ERF accepts no responsibility for errors.

The views expressed in the *Working Papers* are those of the author(s) and not those of ERF. Requests for permission to quote their contents should be addressed directly to the author(s). ERF retains the rights to first publication unless mutually agreed to the contrary.