EMPIRICAL ANALYSIS OF MONEY DEMAND AND MONETARY POLICY UNDER ISLAMIC BANKING

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INTRODUCTION

Islamic banking has become an increasingly popular source of innovation in international financial markets. Several prominent and financially strong Islamic banks have been established since the mid-Seventies and almost all have grown since the time of their origin. In Malaysia for example, the number of financial institutions which provide Islamic Banking products in addition to conventional banking has increased from 17 in 1993 to 55 in 1995. Currently there are approximately 45 countries with some form of Islamic banking or financial institutions and Islamic banking firms are located in countries ranging from Saudi Arabia, Bahrain, Turkey, and Bangladesh, to Switzerland, Denmark, and Luxembourg.

There is no universally agreed-upon definition of Islamic Banking. Some experts regard an Islamic bank as a financial intermediary which, acting as an attorney to depositors, channels their funds towards profitable ventures by using various Islamic interest-free contracts. As such, it should end its intermediation as soon as possible, after the expiration of the contract.

Others regard an Islamic bank as a financial institution that directly employs investors' funds either in real product- or in capital market, under one or more of the Islamic modes of contract. Thus, an Islamic bank may enter into joint partnership agreements with the client to finance joint-ventures and to establish factories or workshops (direct investment), or alternatively, it may act as a mutual fund or unit trust to buy shares and securities in on-going or newly established companies.

Still, other scholars consider both functions as legitimate areas of operation for Islamic banks. From this perspective, Islamic Banks are multi-functional institutions, offering all the services rendered by commercial, merchant, investment and development banks, but on interest-free basis, the constraints laid down by the Islamic Law.[1]

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Payment of a *predetermined interest* is clearly forbidden and Muslim scholars have provided various reasons for this. On theoretical grounds, most major contemporary western theories attempting to explain this phenomenon have been examined and refuted, including Bohem-Bowerks' Time-Preference (Uzair, 1976), and Abstinence Theories (Mawdudi, 1961), Samuelson's treatment of interest as "rent for the use of money" (Abu Saud, 1976)], Patinkin's handling of interest as "a form of income from property" (*ibid*), Bain's view of interest as "payment for services of invested money" (*ibid*), and Keynes's Liquidity Preference Theory (Uzair, 1976). Other Muslim scholars have criticised the rate of interest in relation to internal and external national debt (Mannan, 1970), the Business Cycle (Uzair, 1955), the demand for consumption loans (Hassanuzzaman, 1964), and the saving-investment processes (Mawdudi, 1961).

Philosophically, it is thought that interest creates an idle class of people who receive their income from accumulated wealth, thus depriving the society of their labor, skills and, enterprises. Furthermore, interest leads to exploitation of one class of people by another and is viewed to transfer wealth from the poor to the rich. For consumption loans, the prohibition of interest is mainly for humane reasons, while in the case of loans for productive purposes, it is deemed socially unjust for lenders of capital funds to be assured of receiving a rate of return while users of such funds (the entrepreneurs) have no assurance of the direction and magnitude of returns.[1]

The Western system is very much based on the institution of interest, and it goes without saying that Western economists, e.g. Pryor (1985), have questioned the viability of an Islamic banking system. Khan (1986), however, demonstrated that an interest-free banking system is quite compatible with both Keynesian and classical economic theories. Moreover, an interest-free banking system is not totally alien to western economic thoughts. For example, Simon (1948) and Kindleberger (1985) have proposed certain banking reforms which, in effect, yield a banking system resembling an Islamic system, in particular on the deposit side. Weitzman (1984) has rigorously advocated the principle of profit loss sharing (in contrast to predetermined wage rates) as the cure for the stagflation problem.

Khan (1986) has also argued that the traditional banking practice of paying depositors a predetermine interest, regardless of whether or not the bank is doing well, prevents banks from instantaneously adjusting to potential asset shocks. He concluded that such rigidity could lead to possible financial instability. In contrast, he showed why the alternative banking system could provide immunity against bank failure and financial instability. Habibi (1987) also reached a similar conclusion on the basis of a Keynesian-type macroeconomic model.

These interesting conclusions, however, are based on purely theoretical grounds. Khan (1986) suggested that empirical evidence generated from actual data might be the only way to resolve these issues. It is the goal of this paper to test empirically the effects that the absence of interest-bearing financial assets would have on the *efficiency* of the financial and banking systems of Pakistan, Sudan and the Islamic Republic of Iran. We define efficiency in terms of the stability of the velocity of money - the ratio of national income to money supply (Thornton, 1983), the stability of the demand for cash balances (Darrat, 1986), policy controllability of monetary aggregates (Batten and Thornton, 1983), and the monetary aggregate-ultimate policy goal linkages (*ibid.*)

To achieve this purpose, we will first analyse the historical record of the velocity of interest-bearing and non-interest-bearing money over a 30 years period in the three above-mentioned countries with an extensive Islamic financial system. We will, then, estimate the public's demand for interest- and non-interest bearing financial assets and will subject the resulting demand equation to structural stability tests. Finally, we will examine and compare the relative usefulness and effectiveness of both financial aggregates for policy purposes.

This is an extension of empirical work by Darrat (1988) in which time-series data from Tunisia were employed to test similar hypothesis. In addition to using more recent data over a longer period of time, here we use not only time-series, but also cross-section data through selection of Iran, Pakistan, and Sudan as model countries. We thus hope to examine whether internal conditions of a country as well as the method and speed of conversion between the two systems would influence the success of interest-free banking.

METHODOLOGY

Our model is similar to the one developed by Ali F. Darrat in 1988 where relative stability of the Islamic and traditional financial systems comprise the basic hypothesis under study. In developing countries, there are only two forms of financial assets: non-interest-bearing such as currency and demand deposits, and interest-bearing like time and saving deposits. Hence the terms financial and banking system may be used interchangeably. We empirically examine whether the absence of interest-bearing financial assets from the economy would enhance or hamper stability of the financial system in Iran, Pakistan, and Sudan.

We focus on historical record on interest and non-interest velocity of money, estimate the public's demand for interest- and non-interest-bearing assets and test for the structural stability of their functions, and examine and compare the relative usefulness and effectiveness of both financial aggregates for policy purposes.[1] Each of the above empirical issues is discussed next.

Velocity of money

The velocity of money, defined as the average number of times per year that a dollar is spent on goods and services, plays a fundamental role in macroeconomics analysis. For example, in Fisher's Quantity Theory of Money, the demand for money is purely a function of income without any influences from the rate of interest. In his equation of exchange, $MV = Y = py$, M denotes the supply of money, V is the velocity of M, and Y is the Gross Domestic Product or the aggregate nominal income (itself equal to the real income, y, multiplies by p, the price level).

We assume that a primary goal of monetary authorities is to stabilise aggregate nominal income, that is, to make the GDP high enough to promote full employment, but not so high as to cause inflation (Darrat, 1988). With M under the control of the monetary authorities, stability of V is essential in the effectiveness of policy actions in controlling economic activities. Temporal changes in the velocity of money will weaken or eliminate the link between economic policies and macroeconomic activities. An unstable velocity could lead to overall financial and economic instability as the potential for erroneous monetary action increases, making monetary policy itself a major source of financial and economic disruption.

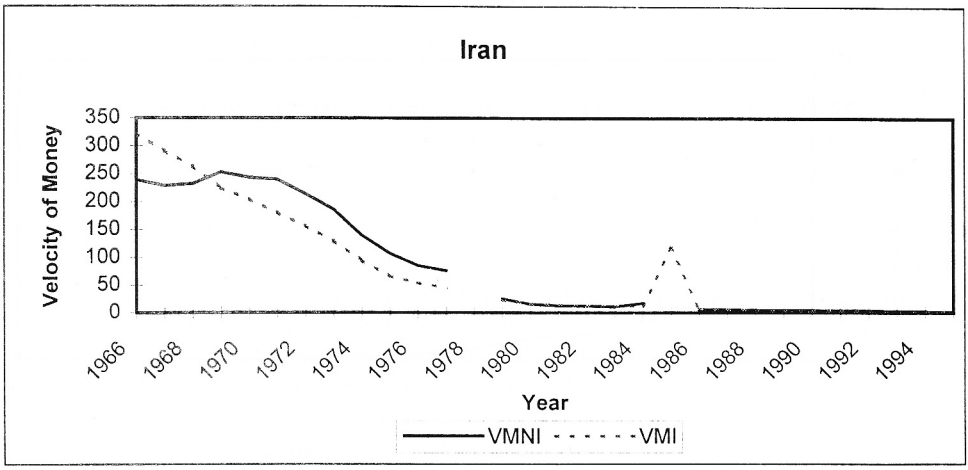
Figure 1 represents the velocity of money in the three countries and reports the standard deviation of the velocity of interest-bearing and non-interest-bearing money in each country. Sudan and Pakistan show similar patterns: the velocity of interest-bearing money is greater than that of interest-free money. Velocities of interest-free money (MNI) in Pakistan and Sudan, 8.14 and 3.90 respectively, are much more stable as compared to the velocity of the interest-bearing money (MI), 15.82 and 18.72. The results indicate that the removal of interest may lead to better implementation of monetary policies.

In this respect, Iran shows mixed results over the years. The difference of .004 between the standard deviation of the two money velocities, (VMNI = 99.83, VMI = 99.79), however, is statistically negligible. This issue warrants further discussion in the remainder of the paper.

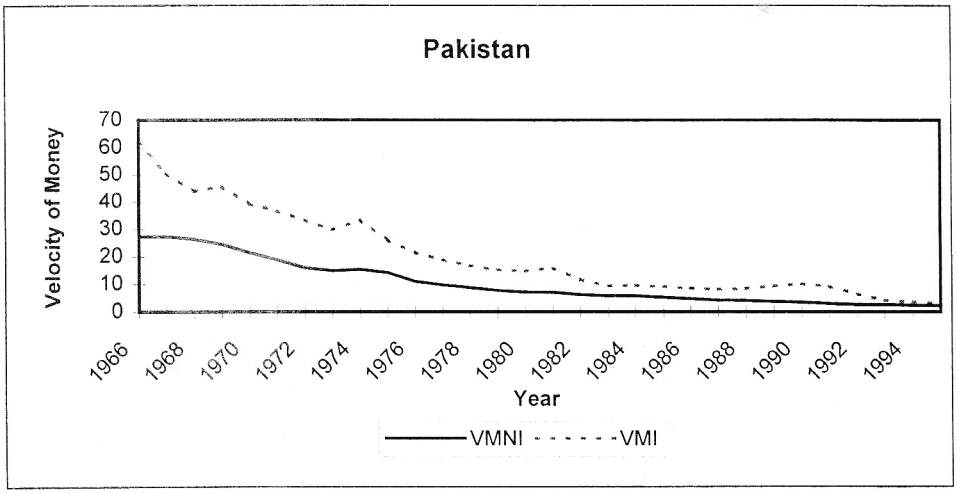
Money demand

Since the velocity of money is simply the inverse of the demand for money, it would change only if the public alter their holdings of money relative to their income. Several empirical research have been done to estimate aggregate money demand in various countries (Wong, 1977; Butter and Fase, 1981), but to the best of our knowledge, none for the countries under study here. In order to arrive at a more definite conclusion

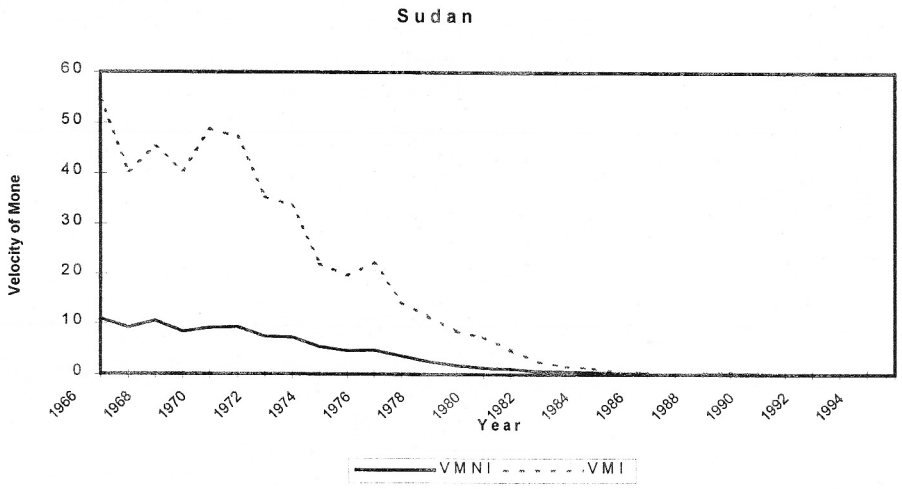
Figure 1. Velocity of money

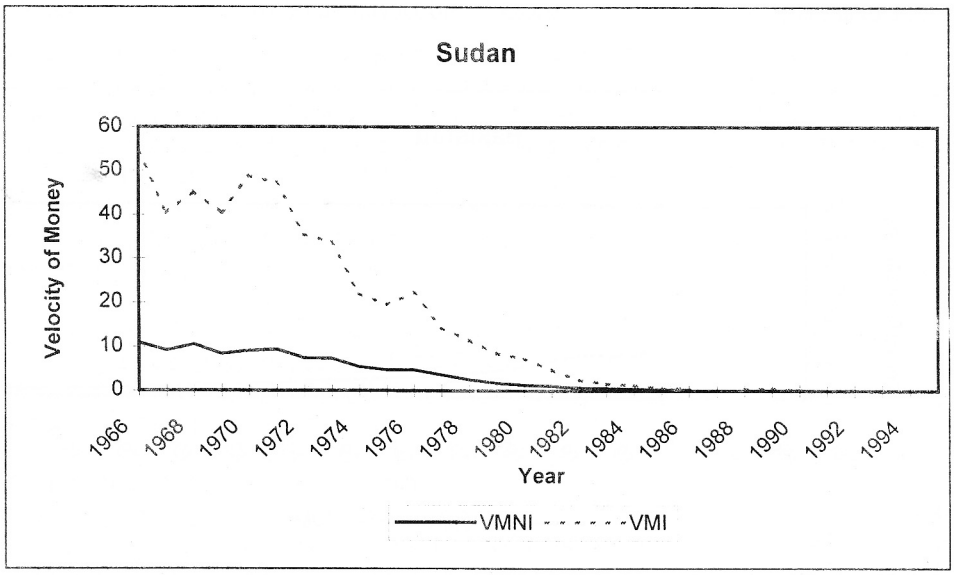


Std Deviation (VMNI) 99.83 Std Deviation (VMI) 99.79



Std Deviation (VMNI) 8.14 Std Deviation (VMI) 15.82





Std Deviation (VMNI) 3.90 Std Deviation (VMI) 18.72

about the relative stability of the financial system with and without interest-bearing assets, we further perform formal tests on the demand function for money.[1]

We assume, following the general portfolio approach (Darrat, 1986), that the desired real money demand, $^{M}/_{P}$, responds positively to real gross domestic product, X, negatively to the yields expected on real assets, P^{e}_{t}, and negatively to the yield expected on alternative financial assets, if available. Here, we aim to test these hypotheses in the presence of interest-bearing financial assets or in case of their absence, utilising data from Pakistan, Sudan, and Iran.

Due to the lack of sophisticated capital and bond markets in most developing countries, it has become common practice to omit the yield on (non-bank) financial assets from the money demand function (Driscoll and Lahiri, 1983). The general money demand function may, thus, be expressed as $(^{M}/_{P})_{t} = f(X^{t}, P^{e}_{t})$. The money demand is cast in real terms because theoretical considerations usually postulate that economic agents are a priori free of money illusions and hence their money demand is demand for real purchasing power. Applying the usual logarithmic functional form, the equation becomes $\log(^{Mj}/_{P}) = b_0 + b_1 \log X_t + b_2 P^{e}_{t} + b_3 \log(^{Mj}/_{P})_{t-1}$.

Next, we need to approximate expected inflation since this variable is not observable. Assuming static expectations as in Driscoll and Lahiri (1983), the actual inflation rate in any given period is used as a proxy for the inflation rate expected to prevail in the next period. Such an assumption seems reasonable in the context of annual time-series data.

We also need to replace the desired real money demand which is also unobservable with observable real money holdings. One popular such technique in money demand literature is the Koyck partial adjustment procedure which assumes that the adjustment of actual real money holdings to the desired level is only a fraction of the gap between the desired level in the current period (*t*) and the actual level in the previous period (*t-1*). Combining this partial adjustment scheme with the money demand equation above, it can be shown that the entire adjustment process can be approximated by a lagged dependent variable. Thus, the public demand for real balances can be represented by the following equation (1):

$$\log(\frac{M_j}{P})_t = b_0 + b_1 \log X_t + b_2 P_t^e + b_3 \log(\frac{M_j}{P})_{t-1} + U_t \qquad (1)$$

where $_j$ refers to either interest-bearing or non-interest-bearing money stock, and *U* is the associated error term, assumed to be white noise with zero mean and a constant variance. As is typically the case in most developing countries, all demand deposits in the three countries under study here are non-interest bearing. Thus, we refer to the currency in the hands of the public and demand deposits as interest-free money.

Interest-bearing money is defined as the public's time and savings deposits with commercial banks.[1]

Rewriting equation 1 for non-interest- and interest-bearing money stock, MNI and MI respectively, we get equations (2) and (3):

$$\log\left(\frac{MNI}{P}\right)_t = \underset{(t_1)}{c_0} + \underset{(t_2)}{b_1}\log X_t + \underset{(t_3)}{b_2}\,P_t^e + \underset{(t_4)}{b_3}\log\left(\frac{MNI}{P}\right)_{t-1} \qquad (2)$$

$$\log\left(\frac{MI}{P}\right)_t = \underset{(t_1)}{c_0} + \underset{(t_2)}{b_1}\log X_t + \underset{(t_3)}{b_2}\,P_t^e + \underset{(t_4)}{b_3}\log\left(\frac{MI}{P}\right)_{t-1} \qquad (3)$$

To obtain the demand equation for interest- and non-interest-bearing money, the above equations are regressed, and Table 1 presents the results of the regression analysis. The three countries show a positive relationship between money demand and the real gross domestic product, signifying that an increase in the GDP leads to an increase in money demand. Noteworthy is the high significance of the variable X for Pakistan and Sudan. This is not the case for Iran. The coefficients of the expected yields on real assets have the right sign and are significant only for Pakistan. Iran and Sudan showed counter-intuitive signs. The coefficients, moreover, are small in absolute value and are statistically insignificant.

When the dependent variable is the interest-bearing money, the three countries again show a positive relationship between money demand and the real GDP, X, although the variable is significant only for Pakistan. The variable P^e is not significant in any case.

The equations were then subjected to the Chow Test (1960) for structural stability with results also presented in Table 1. At the 5% level, the critical F-value is 3.01 and the Chow Test clearly does not reject the hypothesis that the public's demand for non-interest money is stable in Pakistan and Sudan. However, the test rejects the stability hypothesis for interest-bearing money in the two countries. In short, estimation of aggregate demand for interest-bearing- and non-interest-bearing money in Pakistan and Sudan supports our previous historical analysis of the velocity of money.

In the case of Iran, we did not arrive at any conclusive results. The F-statistics, 0.08 and 2.99 for the interest-bearing and non-interest-bearing money demand equations respectively, are below the critical value of 3.01. Hence, we could not draw any conclusions regarding the relative stability of each type of system.

Both tests suggest that the public's demand for non-interest-bearing assets is structurally stable over time for Pakistan and Sudan but the public's demand for interest-bearing assets suffers from structural instability over time. Such a finding may

render the presence of interest-bearing money assets a potential source of disruption within the Iranian financial system as well.

Table 1: Money Demand Regression and Stability Results

NON-INTEREST BEARING MONEY							CHOW Test
	C	LOG(X)	PE	LOG($MNIP_{T-1}$)	R^2	DW	F-Statistic LMNIP
IRAN	3.00 (0.77)	0.07 (0.46)	0.07 (0.57)	0.82 (11.59)	0.92	2.11	.08
PAKISTAN	-3.51 (-3.99)	0.94* (5.69)	-0.16** (-2.67)	0.15 (0.97)	0.99	1.67	.4
SUDAN	-4.05 (-3.35)	0.38* (4.75)	0.01 (2.80)	0.79 (17.44)	0.98	1.46	2.27
INTEREST-BEARING MONEY							
	C	LOG(X)	PE	LOG(MIP_{T-1})	R^2	DW	F-Statistic LMIP
IRAN	-7.92 (-0.52)	1.00 (1.65)	0.16 (0.35)	0.22 (1.00)	0.33	2.29	2.99
PAKISTAN	-1.55 (-0.89)	0.40* (2.16)	-0.02 (-0.14)	0.63 (3.37)	0.92	1.19	3.75
SUDAN	-6.04 (-0.90)	0.54 (1.35)	0.03 (1.34)	0.73 (6.37)	0.81	2.90	8.34

Note: Numbers in parentheses below the coefficient estimates are the absolute values of the ratios.
* Indicates significance at the 1% level and ** at the 5% level. Dependent variable is the desired real money demand (MNI—non-interest-bearing, MI—interest bearing). X = real domestic product, PE = expected yield on real assets.

Policy controllability

Batten and Thornton (1983) argue that for a monetary aggregate to be useful for policy purposes, it has to be effectively under the control of the monetary authority without being affected by unnecessary non-policy factors, and a reliable and strong link must exist between the monetary aggregate and the main goals of the authorities. To further assess the prevalence of each financial systems, we test for the above in both interest-free and interest-based systems.

Since in most developing countries monetary aggregates are controlled through regulating the monetary base, we examine and assess the statistical relationship between interest and non-interest bearing monetary aggregate with the monetary base. Although some analysts have argued that under a fixed exchange rate regime, domestic control of monetary base may be impossible unless the country is a reserve currency country (Putnam and Wilford, 1978), others have argued that this would be so only when the country's domestic capital and product markets are perfect substitutes, and are perfectly integrated with foreign markets (Boyer, 1979). Assuming that monetary base in indeed under the control of the authorities, we attempt to assess which monetary aggregate shows a stronger link to monetary base and may thus be called more controllable.

In doing so, we follow the conventional way of discussing monetary policy in a growth-rate framework and express monetary base (MB) and both monetary aggregates (MI and MNI) in percentage changes denoted by the operator D: $D\text{MNI} = c_0 + ß_0 D\text{MB}$ (4), and $D\text{MI} = c_1 + ß_1 D\text{MB}$ (5). Regression results are presented in Table 2.

When the growth of interest-free money is regressed against the monetary base, no strong relationship could not been shown in Iran between the two variables. Hence, the tool may not be useful in this country. Similarly, although both Pakistan and Sudan showed significant changes in the monetary base, the changes may be too small (0.51, 0.59) to be useful for policy purposes. When the dependent variable is interest-bearing money, the relationship with the monetary base is highly significant and positive for Iran and Sudan. The same could not said for Pakistan. Not only is the coefficient low, it is also insignificant.

Monetary Aggregate-Economic Goal Link

In addition to controllability, the monetary aggregate must show a strong and reliable link with the ultimate goals of the policy-maker, and here we aim to check for compatibility of the economic aggregates with other economic goals. Since for many central banks price stability has been traditionally considered a prime target (Darrat, 1988), we analyse the impact of the growth rate of the two monetary aggregates on

inflation (DP) as measured by the growth rate of the GDP deflator. The results are summarised in Table 3.

Table 2: Monetary Aggregate-Monetary Base regression Results

NON-INTEREST BEARING MONEY	C	DBM	R^2	DW
IRAN	0.17 (2.73)	0.01 (0.09)	0.00	0.54
PAKISTAN	0.07 (2.55)	0.51* (3.23)	0.28	2.54
SUDAN	0.12 (3.79)	0.59* (8.92)	0.71	1.52
INTEREST-BEARING MONEY	C	DBM	R^2	DW
IRAN	0.00 (0.02)	2.97** (6.29)	0.61	2.01
PAKISTAN	0.13 (1.95)	0.26 (0.65)	0.02	1.44
SUDAN	0.18 (1.07)	1.05** (3.02)	0.22	2.06

Note: Numbers in parentheses below the coefficient estimates are the absolute values of the ratios.
* Indicates significance at the 1% level and ** at the 5% level. Dependent variable is the rate of change of non-interest-bearing (DMNI)- and interest-bearing (DMI) money. DBM = the rate of change in monetary base.

Table 3: Monetary Aggregate-Economic Goal Regression Results

NON-INTEREST BEARING MONEY	C	DMNI	DMNI(-1)	DMNI(-2)	DMNI(-3)	R^2	DW
IRAN	0.16 (1.47)	0.12 (0.77)	0.12 (0.31)	0.37 (0.77)	-0.42 (-0.82)	0.21	1.63
PAKISTAN	-0.24 (-1.17)	0.78 (1.29)	-0.09 (-0.15)	1.60 (2.69)	-0.65 (-1.18)	0.28	1.29
SUDAN	-0.17 (-3.52)	0.85 (4.54)	0.06 (0.42)	0.87 (3.98)	-0.14 (-0.46)	0.89	1.50
INTEREST BEARING MONEY	C	DMI	DMI(-1)	DMI(-2)	DMI(-3)	R^2	DW
IRAN	0.18 (4.05)	0.00 (0.33)	0.00 (0.22)	0.00 (0.24)	0.00 (0.89)	0.01	1.26
PAKISTAN	0.21 (2.78)	-0.19 (-0.84)	0.05 (0.21)	-0.45 (-1.89)	-0.63 (-2.40)	0.40	1.46
SUDAN	0.17 (2.61)	0.42 (6.40)	0.08 (1.60)	-0.13 (-2.12)	-0.11 (-1.85)	0.68	1.04

Note: Numbers in parentheses below the coefficient estimates are the absolute values of the t-ratios. All variables are significant at the 5% level. Dependent variable is the growth rate of the GDP deflator. DMNI and DMI are the growth rate of non-interest-bearing- and interest-bearing money respectively.

$$DP_t = c_0 + \alpha_1 DMNI_t + \alpha_2 DMNI_{t-1} + \alpha_3 DMNI_{t-2} + \alpha_4 DMNI_{t-3} \quad (6)$$

$$DP_t = c_1 + \beta_1 DMI_t + \beta_2 DMI_{t-1} + \beta_3 DMI_{t-2} + \beta_4 DMI_{t-3} \quad (7)$$

The DP equation with regard to interest-free money explains 21%, 28% and 89% of the variation in inflation in the tested period for Iran, Pakistan and Sudan respectively while the DP equation with respect to interest-bearing money explained 1%, 40% and 68% of the inflation for the three countries. We could conclude the DP/DMNI equation better explains the inflation situation in Iran and Sudan but not for Pakistan.

Table 4 Periodic Money Demand Regression Results

Non-Interest-Bearing Money		C	LOG(X)	PE	LOG(MNIP $_{T-1}$)	R^2	DW
1966 – 1975	IRAN	10.83	0.93	0.11	-0.37	0.82	2.02
		(1.71)	(2.07)	(0.14)	(1.51)		
	PAKISTAN	8.57	0.42	-0.16	0.21	0.62	1.40
		(0.74)	(0.31)	(-1.21)	(0.02)		
	SUDAN	-2.44	0.28	0.04	0.80	0.97	2.57
		(-1.20)	(1.54)	(2.43)	(3.29)		
1976 - 1985	IRAN	49.36	-0.80	1.00	0.18	0.71	2.23
		(1.53)	(-1.11)	(0.77)	(0.44)		
	PAKISTAN	1.54	0.52	0.32	0.40	0.96	2.43
		(0.66)	(1.76)	(1.31)	(1.54)		
	SUDAN	4.19	0.16	0.01	0.67	0.89	2.67
		(0.92)	(1.03)	(0.94)	(5.37)		
1986 - 1995	IRAN	12.75	0.08	0.06	0.66	0.92	2.64
		(1.10)	(-0.47)	(2.01)	(2.83)		
	PAKISTAN	-0.02	0.91	-0.25	0.04	0.95	2.07
		(-0.00)	(2.00)	(-1.29)	(0.12)		
	SUDAN	-25.84	0.38	0.05	1.90	1.00	3.37
		(-1.15)	(5.62)	(1.82)	(1.09)		
Interest-Bearing Money		C	LOG(X)	PE	Log(MIP $_{t-1}$)	R^2	DW
1966 - 1975	IRAN	-0.47	0.18	-1.20	0.83	0.95	3.05
		(-0.04)	(0.20)	(-1.59)	(1.51)		
	PAKISTAN	19.50	0.18	-0.14	0.01	0.38	2.05
		(1.51)	(0.31)	(-1.20)	(0.02)		
	SUDAN	0.49	0.37	-0.00	0.53	0.90	1.95
		(0.12)	(1.50)	(-0.02)	(1.85)		
1976 - 1985	IRAN	-3.43	-0.42	-6.50	1.56	0.29	0.98
		(-0.02)	(-0.19)	(-1.24)	(0.37)		
	PAKISTAN		Data	Not	Avail able		
	SUDAN	27.38	-0.89	0.03	0.49	0.84	2.51
		(1.20)	(-1.08)	(1.30)	(1.41)		
1986 - 1995	IRAN	24.21	0.15	-0.03	0.03	0.46	1.48
		(4.15)	(0.80)	(-0.54)	(1.20)		
	PAKISTAN	-13.96	0.66	0.47	0.84	0.73	1.06
		(-1.07)	(1.32)	(0.52)	(2.50)		
	SUDAN	48.91	-6.57	-0.81	6.21	1.00	3.41
		(4.11)	(-3.07)	(-2.65)	(3.08)		

Numbers in parentheses below the coefficient estimates are the absolute values of the t-ratios.
Source: International Financial Statistic (Variables are as stated in Table 1).

Additional Testing

We further test the stability of the model in 3 shorter periods of 10 years within the 30-years time-series. The regression results for the respective periods are presented in Tables 4. The money demand equations were again subjected to stability test, but due to lack of sufficient observations to conduct the Chow Test, to test for the stability of regression relationships we computed the cumulative sums of square as proposed by Brown, Durbin and Evans (1975) who suggested using recursive residuals.[1]

CONCLUSION

Earlier empirical studies (e.g. Darrat, 1988), fearing possible biases due to the neglect of important inter-country differences, did not use cross-section data from various Islamic countries in testing the stability of financial systems with and without interest bearing assets. They relied, therefore, solely on time series data in analysing the issues at hand. Having done so, in Tunisia for example, the behavior of non-interest velocity of money appeared to have become smooth and stable if interest-bearing assets were eliminated. It was also shown that in contrast to the interest-based system, an interest-free financial system exhibited well-behaving and smoother velocity for money. Moreover, only the interest-free system had a structurally stable demand for money function. And finally, only the interest free monetary aggregates could be usefully utilised by the monetary authorities as an appropriate intermediate policy target. The latter evidence was based on the finding that only the interest-free monetary assets could be effectively under the control of policy makers and that only such assets had a reliable link with the ultimate policy objectives.

Although Islamic in orientation, at the time of the study, the Tunisian government had not announced any plans toward Islamising its financial system. While it is quite interesting to test whether such a move on the part of the Tunisian government *would be* beneficial from purely economic standpoint, examining the efficiency of financial system *after* a complete Islamisation process was the goal of this study. This was done with data from Iran, Pakistan, and Sudan, with the following conclusions:

First, we found that although similar results were often obtained for the three countries, the details were not identical. Sudan proved to be the country that best supported the results of previous studies -- the velocity of interest-free money was smoother, lower, and more well-behaved than that of interest-bearing money, while the Chow test results strongly rejected the stability of money demand under an interest-bearing system in this country. Evidence from Pakistan further supported the viability of the Islamic financial

system -- the demand function was more stable, as was the velocity of non-interest-bearing money, when compared to similar measures under the interest-bearing system.

The results for Iran, however, were more fickle. For non-interest bearing money, although there was a positive relationship between money demand and the real gross domestic product, the variable was not as significance as it was for Pakistan and Sudan. For the case of interest-bearing money as the dependent variable, the relationship between money demand and the real GNP was positive, but again not statistically significant. The results of the Chow test for Iran pointed to the fact that the public's demand for non-interest-bearing assets was structurally stable while the demand for interest-bearing assets suffered from structural instability over time. Based on this, the presence of interest-bearing assets may be disruptive within the Iranian financial system.

When measuring the strength and the reliability of the link between the operating targets and the ultimate goals through analysing the impact of the growth rate of the two monetary aggregates on the growth rate of the GDP deflator, we concluded that non-interest-bearing money equation better explained the inflationary situation in Iran. Then, in order to assess the controllability of monetary aggregates in the country, we examined the strength of the link between each aggregate and the monetary base. Regression results suggested a statistically non-significant relationship in the case of interest-free money, but a highly significant and positive relationship between interest-bearing money and the monetary base.

In addition to the possibilities of data inaccuracies, another conceivable reason for the presence of such small, but nevertheless inherent discrepancies in results in the case of the Islamic Republic of Iran is the abrupt steps taken towards Islamisation of the financial system. This may have introduced a modest element of instability to the Iranian economy. The Pakistani experience, for example, differs from the Iranian one in that Pakistan opted for a gradual Islamisation process starting in 1979. The gradual pace of transition made it easier for the Pakistani banks to adapt to the new system without disturbing the basic functioning and structure of the banking system.

Another reason to explain the performance of Islamic Banking in Iran as compared to Sudan and Pakistan, is the stronger influence of various internal and external factors which have generally been more pronounced for this country a long crippling war with Iran soon after the Islamisation process began, as well as various trade embargoes. The results for Pakistan and Sudan could even be more promising had it not been for political instabilities, riots, and frequent dismissal of the Pakistani government on corruption charges. Finally, the inaccuracy of the data for the three developing nations, and the variation between actual and reported data must be acknowledged.

Nevertheless, given the available data, it does appear that the interest-free monetary system has positive merit on financial stability, policy usefulness and economic efficiency as evident by the Iranian, Pakistani, and Sudanese experience.

ENDNOTES

[1]For further clarification, see "Islamic Banking: Current Developments", by Ramin Cooper Maysami, in *Asia Business Law Review*, No. 16, April 1997, pp 66-72.

[2]A complete introduction to Islamic Banking may be found in "Interest-Free Financial Activities in Indonesia, Malaysia, Bahrain, and Pakistan, " by Ramin Cooper Maysami in *Asian Economies*, Vol.24, No.2, 1995, pp27-45.

[3]The data is extracted from the IMF's International Financial Statistics for the period 1966 to 1995.

[4]For a complete derivation of the model, see Darrat (1988).

[5]For detailed explanation of authorised Islamic banking facilities, including yhe sources and the uses of credit, see "Pragmatic interest-free Banking: Metamorphosis of the Iranian Financial System," by Maysami, Golriz, and Hedayati, in Journal of International Banking Law, Vol.12, Issue 3 (March 1997), pp. 99-98.

[6]R.l. Brown, J. Durbin and J.M. Evans, " Techniques for Testing the Constancy of Regression Relationships,"*Journal of the Royal Statistical Society, Series B,* Vol. 37, 1975.

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