

## ISLAMIC BANKING AND MONEY DEMAND FUNCTION IN MALAYSIA An Econometric Analysis

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**Abstract.** The Central Bank of Malaysia is facing unique challenges in transmitting its monetary policies due to Islamic banking, which strictly prohibits the interest payments. This article develops new methodology to calculate the demand for money function in the presence of Islamic banking. It indicates some weaknesses in the existing mechanism and raises thought that would be helpful in revising the monetary related policies in Malaysia.

### I. INTRODUCTION

Finding a stable demand for money is generally considered essential for the formation and conduct of efficient monetary policy. It enables the policy makers to decide changes in monetary aggregates to have predictable influences on output, interest rates and the price level. Because of its importance, a steady stream of theoretical<sup>1</sup> and empirical<sup>2</sup> researches has been carried out worldwide. It can be argued that in the absence of an appropriate money demand function; there would be chances of disturbances in monetary aggregates for targeting overall liquidity in the economy.

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<sup>1</sup>Keynes (1930), Baumol (1952), Tobin (1956), Friedman (1956) etc.

<sup>2</sup>Mehra (1993) for US, Arize and Shwiff (1993) for Japan, Orden and Fisher (1993) for Australia and New Zealand, Price and Insukindro (1994) for Indonesia, Celasun and Mangal (2002) for Iran etc.

Calculating the demand for money under Islamic financial system (non interest based) is not a new concept. Several empirical studies (Khan, 1980; 1982; Ahmad and Khan, 1990; Yousafi and McCormick, 1997) have already been conducted on modeling the monetary aggregates performance in case of Pakistan and Iran, which have fully Islamized their financial system since the mid eighties. These studies concluded that the monetary aggregates in both countries are as stable and effective as before the islamization of their economies. Darrat (1988) also developed a model to check the performance of monetary aggregates under Islamic banking system. He examined the validity of his model by applying it on Tunisian financial data. Darrat assumed M1 as an Islamic instrument and claimed it as stable as before. However, the validity of his study cannot be verified, as Tunisia had no Islamic bank in the country at the time of his study.

This article calculates the demand for money equations in case of dual banking system. It selects Malaysia as case study where the government operates both interest and interest free, conventional and Islamic banking systems on parallel basis.<sup>3</sup> This article may help the policy makers in understanding the impacts of differences in Islamic and conventional banking instruments on overall demand for money. It may also help in examining the performances of Islamic banking instruments as an alternative in transmitting monetary policies.

## II. MODEL

Typically, the demand for money in semi open economies depends upon the total number of transactions, existing inflation and the interest rates of the economy and can be summarized as

$$\ln M_t = \alpha_0 + \alpha_1 \ln YR_t + \alpha_2 \ln P_t^e + \alpha_3 R_t + u_t \quad (1)$$

Where  $M_t$  is the function of money demand, while  $YR$  and  $P^e$  denote to growth in gross national product (GDP) and expected rate of inflation respectively,  $R$  refers to growth in nominal interest rate yield existing in the economy and  $u$  stands for structural disturbance term.

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<sup>3</sup>In Malaysia, Islamic banking was first introduced with the establishment of Bank Islam Malaysia Berhad (BIMB) in 1983. Later in 1993, the government introduced the Islamic banking scheme (IBS) which allowed all the conventional banking institutions to offer and participate in Islamic banking products and services through their existing branches. Now Islamic banking operates under two different setups: full-fledged Islamic banks and IBS banks.

Earlier studies calculating the demand for money in case of Malaysia used Partial Adjustment Model in their analysis (Merris and Rosli (1987), Gerad and Patrick (1991), the Central Bank of Malaysia (1994).<sup>4</sup> This approach assumes that market is in equilibrium initially and either interest rates or income or both adjust continuously to restore the market back to this equilibrium state, hence desired money level should be equal to the actual money level. This can be described as,

$$\ln (M/P)_t = \alpha + \beta_1 \ln YR_t + \beta_2 \ln P^e_t + \beta_2 R_t + \beta_3 \ln (M/P)_{t-1} + \mu \quad (2)$$

In equation 2, M/P stands for the desire of real money. The dependent variable is observable and assumes as the fraction of gap between the desired level in the current period ( $t$ ) and the actual level in previous period ( $t - 1$ ). The addition would help us determining the total time that the depositors need to adjust to changes in the determining variables.  $YR$  refers to growth in GDP. Similarly,  $P^e$  and  $R$  stand for the growth rate of consumer price index (CPI) deflator and nominal interest rates respectively.

### III. DEVELOPMENT OF ISLAMIC AND CONVENTIONAL INTERMEDIATE AND CREDIT AGGREGATES

Under Islamic financial system, monetary policy can only be implemented through those monetary instruments that are consistent with Islamic teachings. The article selects intermediate (M1 and M2) and bank credit (Credit) aggregates, for targeting economic activities. As we know, that M1 is defined as currency in circulation and demand deposits of the non-bank private sector and M2 as M1 plus quasi money.<sup>5</sup> Here for the purpose of modeling and giving equal weight to Islamic and conventional aggregates under dual banking system, quasi money is specified as savings and term deposits only. Extending this definition towards Islamic intermediate aggregates, Islamic M1 (M1\*) is defined as currency in circulation plus Islamic demand deposit, while Islamic M2 (M2\*) as M1\* plus *Islamic quasi*

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<sup>4</sup>Latifah, Ismail A., L. P. Sim, A. Farizah and Bernag Ng (1994), *Monetary Policy and Inflation*. Bank Negara Malaysia, Discussion Paper No 30.

<sup>5</sup>The Central Bank of Malaysia, quarterly bulletin (2001), defines quasi money as the sum of deposits (interest bearing instruments including SPI instruments) placed by the non-banks private sector with the commercial banks (excluding inter placements among commercial banks). Foreign currency deposits refer to the deposits of foreign currency held by the non-bank Malaysian residents with the commercial banks.

money (investment plus savings deposits held under Islamic banking scheme).

In Malaysia, even though the non-banking financial sector is rapidly flourishing, commercial banks are still considered as the major source of credit. Furthermore, broadening the scope of this research, two credit instruments – loans and advances from commercial banks under both Islamic and conventional schemes are developed. However, no separate classification is made for the loans extended to priority groups<sup>6</sup> or sectors. These instruments are abbreviated as “Credit” and “Credit\*”.

Equations 3, 4 and 5 cover the demand for money under conventional intermediate aggregates (M1, M2 and Credit). It also includes one dummy variable named, Dcrisis, to cover the impacts of East Asian financial crisis. This additional variable would also help us to verify the claim of Khan (1985) that Islamic banking instruments are more stable against financial crisis as its liabilities fluctuate with its assets due to profit and loss nature.

$$\ln (M1/P)_t = \alpha' + \beta_1' \ln YR_t + \beta_2' \ln P^e_t + \beta_3 R_t + \beta_4' Dcrisis + \beta_5' \ln (M1/P)_{t-1} + \mu_t' \quad (3)$$

$$\ln (M2/P)_t = \alpha' + \beta_1' \ln YR_t + \beta_2' \ln P^e_t + \beta_3 R_t + \beta_4' Dcrisis + \beta_5' \ln (M2/P)_{t-1} + \mu_t' \quad (4)$$

$$\ln (Credit/P)_t = \alpha' + \beta_1' \ln YR_t + \beta_2' \ln P^e_t + \beta_3 R_t + \beta_4' Dcrisis + \beta_5' \ln (Credit/P)_{t-1} + \mu_t' \quad (5)$$

Equations 6, 7 and 8 discuss the money demand under Islamic intermediate aggregates (M1\*, M2\* and Credit\*).

$$\ln (M1^*/P)_t = \alpha' + \beta_1' \ln YR_t + \beta_2' \ln P^e_t + \beta_3 R^*_t + \beta_4 Dcrisis + \beta_5' \ln (M1^*/P)_{t-1} + \mu_t' \quad (6)$$

$$\ln (M2^*/P)_t = \alpha' + \beta_1' \ln YR_t + \beta_2' \ln P^e_t + \beta_3 R^*_t + \beta_4 Dcrisis + \beta_5' \ln (M2^*/P)_{t-1} + \mu_t' \quad (7)$$

$$\ln (Credit^*/P)_t = \alpha' + \beta_1' \ln YR_t + \beta_2' \ln P^e_t + \beta_3 R^*_t + \beta_4 Dcrisis + \beta_5' \ln (Credit^*/P)_{t-1} + \mu_t' \quad (8)$$

Equations 6, 7 and 8, replace three months conventional money market rates ( $R$ ) with three months Islamic money market returns ( $R^*$ ). It is due to the reason that in Malaysia separate Islamic and conventional money markets

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<sup>6</sup>Loans extended to Bumiputra community, residential sector etc.

have been operated successfully since January 1994. Here the Central Bank aims to implement the monetary policies through Islamic and conventional money market on a parallel basis. This article assumes no operational differences between both types of money markets instruments to understand the impacts of introducing Islamic money market on the economy. Lastly, the article covers the period from March 1994 to December 2005 on a quarterly basis while all data is collected from quarterly bulletins issued by the Central Bank of Malaysia.

Table 1 presents demand for money regression analysis. It covers conventional intermediate aggregates as discussed in equations 3, 4 and 5. Overall performances of our models are quite satisfactory and explain a minimum of ninety percent of variation in the dependant variables. The results show that M1/P and M2/P demonstrate t statistics of 2.29 and 1.92 in case of GDP (*YR*). These figures are significant at 5 percent and 10 percent levels respectively. The coefficients of GDP (*YR*) move from 0.58 to 0.27 showing that demand for transaction balances rise in consonance with increased economic activities.

Inflation ( $P^e$ ), as per prior expectation, carries negative signs in cases of M1/P and M2/P. They are significant at 5 percent and 10 percent level. The negative sign of coefficient in case of M1/P indicates that with the increase in prices people tend to decrease the non-earning assets. Similarly, in case of M2/P the results conclude that people move their funds from banking institutions towards other assets with the increase in inflation. The next variable, money market return (*R*) shows relationship only with M1/P at 10 percent significance level. The coefficient of  $-0.05$  suggests that 1% increase in interest rate decreases 0.05% in money holding. The coefficients of dummy variable (*Dcrisis*) are significant in case of M1/P and Credit/P. However, it rejects the impact of financial crisis on M2/P. These results imply that the financial crisis has lesser level of impact on deposits under savings and fixed accounts.

The coefficients of lagged value of the dependent variables show income elasticity of 0.89, 0.91 and 1.01 in case of M1, M2 and Credit aggregates. The figures are higher than the Central Bank's own findings of 0.71 and 0.88 in case of M1 and M2.<sup>7</sup> The figures conclude that 11 percent (1 minus 0.89) in case of M1/P and 9 percent (1 minus 0.91) in case of M2/P of the

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<sup>7</sup>Latifah, Ismail A., L. P. Sim, A. Farizah and Bernag Ng (1994), *Monetary Policy and Inflation*. Bank Negara Malaysia, Discussion Paper No 30.

TABLE 1  
 Summary of Regression Analysis: Calculation of Money Demand Equation  
 by Using Conventional Intermediate Aggregates

	N	C	ln YR <sub>t</sub>	ln P <sup>c</sup> <sub>t</sub>	R <sub>t</sub>	Deris <sub>t</sub>	ln M1/p <sub>t-1</sub>	ln M2/p <sub>t-1</sub>	ln Credit/P <sub>t-1</sub>	Adj R <sup>2</sup>	H Test	F Stat
M1/P		-1.06	0.58	-0.29	-0.05	-0.04	0.89			0.90	0.49	134.51
	47	(-2.08)*	(2.29)**	(-2.51)**	(-1.77)*	(-2.05)**	(14.49)***					
M2/P		-1.21	0.27	(-0.32)	-0.03	-0.01		0.91		0.96	0.67	185.23
	47	(-2.39)**	(1.92)*	(-1.77)*	(-0.59)	(-1.25)	(18.50)***					
Credit/P		0.72	0.05	0.14	0.05	-0.02			1.01	0.95	0.79	637.21
	47	(1.48)	(0.95)	(1.08)	(1.48)	(-1.89)*			(17.34)***			

Note: T statistics are in parenthesis, \*\*\* significant at the 1% level, \*\* significant at the 5% level, \* significant at the 10% level.

TABLE 2  
 Summary of Regression Analysis: Calculation of Money Demand Equation  
 by Using Islamic Intermediate Aggregates

	N	C	$\ln YR_t$	$\ln P^e_t$	$R^*_t$	$Deris_t$	$\ln M1^*/P_t$	$\ln M2^*/P_t$	$\ln Credit^*/P_t$	Adj $R^2$	H Test	F Stat
M1*/P		-0.63	-0.06	0.36	-0.03	-0.04	0.85			0.90	0.88	134.21
	47	(-1.15)	(-0.49)	(2.56)**	(-1.01)	(-2.74)**	(11.63)***					
M2*/P		-1.50	-0.01	-0.53	-0.11	-0.07		0.80		0.96	0.52	371.58
	47	(-1.99)*	(-0.33)	(-2.36)**	(-1.89)*	(-1.18)		(11.52)***				
Credit*P		1.06	0.09	0.19	-0.01	-0.02			0.95	0.94	0.98	178.21
	47	(0.16)	(0.36)	(0.15)	(-0.18)	(-1.89)*			(27.17)***			

Note: T statistics are in parenthesis, \*\*\* significant at the 1% level, \*\* significant at the 5% level, \* significant at the 10% level.

discrepancies between desired and actual stocks is completed within one quarter. However, the coefficient of 1.01 in case of Credit/P does not carry any statistical meanings. Finally, H statistics are not significant even in single case, evidencing low level of autocorrelation.

Table 2 uses equations 6, 7 and 8. It presents the demand for money regression analysis covering Islamic intermediate and credit aggregates. The results show no prominent relationship between Islamic intermediate aggregates and GDP ( $YR$ ). It indicates the under develop structure and small size of Islamic banking. The coefficients of inflation ( $P^e$ ) show significant relationship with  $M1^*/P$  and  $M2^*/P$ . However, it is also interesting to note that  $M1^*/P$  appears with positive sign and is significant at 5 percent level. This implies that current accounts holders prefer to stay with Islamic banking even at increasing inflation.

Islamic intermediate aggregates show significant relationship with Islamic money market returns ( $R^*$ ) in case of  $M2^*/P$ . The negative sign implies that Islamic term and savings deposits decrease with the increase in Islamic rate of returns or vice versa. Our findings also show that the variable,  $Dcrisis$ , demonstrate  $t$  statistics of  $-2.74$  and  $-1.82$  in case of  $M1^*/P$  and  $Credit^*/P$ . These figures do not confirm the stability of the Islamic intermediate aggregates during the financial crisis when compared with conventional intermediate aggregates. It thus rejects Khan's (1985) earlier claim in case of Malaysia that Islamic banking instruments due to their profit/loss sharing nature are more stable against financial crisis.

The lagged value of the dependent variable shows income elasticity of 0.85, 0.80 and 0.95 in cases of  $M1^*/P$ ,  $M2^*/P$  and  $Credit^*/P$  aggregates. The figures show that 15 percent (1 minus 0.85), 20 percent (1 minus 0.80) and 5 percent (1 minus 0.95) of the discrepancies between the desired and actual stocks are adjusted within one quarter. Lastly, our results Durbin' H statistics do not show any autocorrelation in our model.

Overall results from Table 2 find positive relationship between  $M1^*/P$  and inflation and negative relationship between  $M2^*/P$  and  $R^*$ . These findings can be interpreted that depositors include non-earning assets in their portfolio even at rising inflation rates. They also prefer to stay with the Islamic banking even at declining rates of returns.<sup>8</sup> However, a better

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<sup>8</sup>According to the Central Bank of Malaysia annual report (1997: p. 142), that the rapid growth in Islamic deposits are mainly attributed to the shifting of government deposits



decision can only be made when Islamic term deposit is segregating into various categories. According to the Central Bank of Malaysia monthly bulletin (December 2005), government and financial institutions represent 32.51 percent of total Islamic deposits as compared to 37.57 percent and 29.92 percent in cases of business and individuals' categories.

#### IV. RELATIONSHIP BETWEEN CONVENTIONAL MONEY MARKET RETURNS AND ISLAMIC INTERMEDIATE AGGREGATES

This article further examines the proposition that conventional money market rates have impacts on Islamic intermediate aggregates. It develops this idea in relation to Islamic money market, which has been operational since January 1994. Islamic money market operates under the concept of *Al-Wadiah* (promise) and aims to fulfill the short-term liquidity requirements of Islamic banks and IBS banks. However, the discrepancies arise in case of IBS banks which are free to make financial transactions in the money market (Islamic and conventional) of their choices while Islamic banks are restricted to make transactions with the Islamic money market only. The present arrangements provide arbitrage opportunities to IBS banks which can borrow at lower margins from one market and can make investments in another market at higher returns.

This article argues that the existing structure of the Islamic money market is not in favour of separate Islamic banks. Separate Islamic banks like BIMB face market constrain in having a limited choice in placing or raising money. To save Islamic banks from potential losses, currently the Central Bank of Malaysia has little option but to offer returns on Islamic money market instruments similar to conventional money market interest rates.<sup>9</sup> In other words, one can say that Islamic money market returns are indirectly influenced by conventional money market returns, which can ultimately affect the performance of Islamic intermediate aggregates.

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from Central Bank of Malaysia towards Islamic banks and IBS commercial bank, even at decreasing rate of returns.

<sup>9</sup>The Central Bank of Malaysia introduced the minimum benchmark for Mudarabah Inter-bank Investments (MII) in February 1995 using the prevailing rate of the Government Investment Issues (GII) plus a spread of 0.5 percentage points. For details see, *The Central Bank and the Financial System in Malaysia* (1999: p.248).

TABLE 3  
 Summary of Regression Analysis: Calculation of Money Demand Equation by Using Islamic Intermediate Aggregates (To Check the Impacts of Conventional Money Market Returns)

	N	C	ln YR <sub>t</sub>	ln P <sup>e</sup> <sub>t</sub>	R <sub>t</sub>	Deris <sub>it</sub>	ln M1*/P <sub>t</sub>	ln M2*/P <sub>t</sub>	ln Credit*/P <sub>t</sub>	Adj R <sup>2</sup>	H Test	F Stat
M1*/P		-0.16	0.56	0.37	-0.62	-0.15	0.61			0.89	0.74	104.21
	47	(-0.119)	(0.23)	(1.83)*	(-1.93)*	(-1.87)*	(11.82)***					
M2*/P		-1.29	-0.10	-0.23	-0.49	-0.21		0.79		0.96	0.79	215.29
	47	(-2.37)**	(-0.93)	(-2.10)**	(-2.13)**	(-1.25)		(10.71)***				
Credit*/P		-1.07	0.24	0.31	-0.39	-0.38			0.91	0.96	0.46	98.26
	47	-0.18	(0.99)	(1.19)	(-1.60)	(-2.13)**			(29.12)***			

Note: T statistics are in parenthesis, \*\*\* significant at the 1% level, \*\* significant at the 5% level, \* significant at the 10% level.

To confirm the argument, we replace Islamic money market returns with ( $R^*$ ) conventional money market returns ( $R$ ). Our results expect negative relationship between Islamic intermediate aggregates and conventional money market returns. It can be explained as increases in conventional money market rates induce IBS banks to transfer their funds from Islamic money market towards conventional money market in search of higher return or vice versa. Equations 9, 10 and 11 explain the following regression models as,

$$\ln (M1^*/P)_t = \alpha' + \beta_1' \ln YR_t + \beta_2' \ln P^e_t + \beta_3 R_t + \beta_4 Dcrisis_t + \beta_5' \ln (M1^*/P)_{t-1} + \mu_t' \quad (9)$$

$$\ln (M2^*/P)_t = \alpha' + \beta_1' \ln YR_t + \beta_2' \ln P^e_t + \beta_3 R_t + \beta_4 Dcrisis_t + \beta_5' \ln (M2^*/P)_{t-1} + \mu_t' \quad (10)$$

$$\ln (Credit^*/P)_t = \alpha' + \beta_1' \ln YR_t + \beta_2' \ln P^e_t + \beta_3 R_t + \beta_4 Dcrisis_t + \beta_5' \ln (Credit^*/P)_{t-1} + \mu_t' \quad (11)$$

Table 3 presents demand for money regression analysis by using Islamic intermediate and credit intermediate aggregates. The results show that coefficients of GDP (YR) appear with positive signs. However, they do not indicate any significant relationships. Inflation ( $P^e$ ) variable shows  $t$  statistics of 1.83 and  $-2.10$  in case  $M1^*/P$  and  $M2^*/P$ . The outcomes are similar to Table 2. Our findings show that the coefficients of conventional money market returns ( $R$ ) fall in the critical region in case of  $M1^*/P$  and  $M2^*/P$ . They show  $t$  statistics of  $-1.93$  and  $-2.13$  and are significant at 10% level. Lastly, no prominent changes have been observed in cases of  $Dcrisis$  and lagged dependent variables, when compared with Table 2.

Table 3 finds prominent relationship between money market returns ( $R$ ) and  $M1^*/P$  and  $M2^*/P$  which supports our hypothesis that the present setup of the Islamic money market is not in favour of Islamic banking itself. The Central Bank of Malaysia should introduce some restrictions on IBS banks in terms of total investments in Islamic and conventional money market. It can bind IBS banks to maintain the same percentage of Islamic money market instruments in their portfolio as the Islamic deposits they hold. For example, IBS banks should accomplish up to 10 percent of their liquid requirements from Islamic money market if they hold 10 percent Islamic funds in their portfolio. The new restrictions would eventually help Central Bank not to necessarily offer the identical rates of returns on Islamic and conventional money market instruments.

This article suggests that even similarities in rates of returns do not save Islamic banking from the potential affects of changes in interest rates mainly

due to their markup based financing portfolios. For example, an increase in money market returns automatically assumes to a rise in the lending rates. However, this case may not be possible in case of Islamic banking in Malaysia where three non-PLS modes of financing like *Murabaha*, *Ijara* and *Bai Baithamal Ajil* represented 79.10 percent of total Islamic financing at the end of 2005.<sup>10</sup> Non-PLS financial instruments do not allow banks to re-price their markup returns without the consents of third party. The facts thus recommend that Islamic banking in Malaysia to introduce new flexible instruments to reduce assets/liabilities mismatching.

## V. CONCLUSION

This article is an attempt to model the performance of monetary aggregates under the dual banking system in Malaysia. It develops various Islamic and conventional intermediate aggregates and compares their performances. The results show that the coefficient of inflation appears with positive sign in case of  $M1^*/P$  which indicates that depositors prefer to stay with Islamic banking even at increasing prices. The results also find that the financial crisis affect Islamic and conventional intermediate aggregates in the same manners. This article also develops relationship between Islamic intermediate aggregates and the conventional money market returns ( $R$ ). The results support the views that the present setup of the Islamic money market is not in favour of Islamic banks.

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<sup>10</sup>BNM Annual Report (2005: p. 167).

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