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Real Versus Nominal Adjustment Mechanism of the Malaysian Money Demand Function : Further Evidence

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ABSTRAK

Artikel ini mengkaji isu mengenai spesifikasi pelarasan 'benar' atau nominal untuk fungsi permintaan wang di Malaysia. Prestasi kedua-dua spesifikasi ini tertakluk kepada beberapa ujian, iaitu ; spesifikasi model, kebolehlunjuran dan ujian kestabilan. Keputusan menyarankan bahawa fungsi permintaan wang M1, M2 dan M3 yang dinyatakan dalam bentuk 'benar' mahupun nominal adalah tidak stabil untuk jangkamasa 1962 - 1991. Persoalannya , adakah ketakstabilan fungsi permintaan wang Malaysia ini disebabkan oleh inovasi kewangan yang berlaku dalam tahun-tahun 1979 - 1991 ? Ujian terhadap hipotesis Gurley-Shaw telah dilakukan untuk menjawab soalan ini. Walau bagaimanapun, keputusan menunjukkan bahawa inovasi kewangan bukan penyebab utama kepada ketidakstabilan fungsi permintaan wang di Malaysia dalam tempoh kajian. Malahan untuk tempoh tersebut, keanjalan kadar bunga (untuk kedua-dua jangka pendek dan jangka panjang) telah semakin tidak anjal yang menggambarkan bahawa dasar kewangan adalah lebih berkesan untuk tujuan-tujuan dasar negara.

ABSTRACT

This article investigates the issue of real versus nominal adjustment specifications in the Malaysian money demand function. Performance of both specifications was subjected to several tests, namely ; model specification ex-post forecasting ability and stability tests. Our results shows that under both specifications, the Malaysian money demand function for M1, M2 and M3 are not stable for the period 1962 - 1991. Our question is , does financial innovation during the period of 1979 - 1991 affected the stability of the Malaysian money demand function ? A test on Gurley-Shaw hypothesis was done to answer the above question. However, our results suggests that financial innovation does not play a major role in affecting the Malaysian money demand function during the period under study. Nevertheless, the interest rate elasticities (for both short-run and long-run) has been declining over the period of 1979 - 1991, indicating the effectiveness of monetary policy as a policy tool.

INTRODUCTION

One of the controversial issues that has been subjected to serious thought in monetary economics is on the specification of the adjustment mechanism pertaining to the demand for money balance. In the late 1960's and early 1970's, the adjustment mechanism of money balances has been defined in real terms. The theoretical background on this hypothesis has been outlined by Chow (1966). However, since Goldfeld's (1976) article, there has been a plethora of studies which put the form of the adjustment mechanism to a rethinking. Apparently, the nominal specification has increasingly been used. Apart from Goldfeld, other researchers that have incorporated the nominal adjustment of the desired to actual money balances include Laumas and Spencer (1980), Spencer (1985), Liang (1984), Milbourne (1983), Gordon (1984) and Thornton (1985).

Laumas and Spencer (1980) and Liang (1984) have also determined that money demand function specified with nominal partial adjustment mechanism gives better prediction results. Spencer (1985) and Milbourne (1983), on the other hand, pointed out that money demand function that is specified with real partial adjustment mechanism is subjected to misspecification error; and Milbourne (1983) further stated that, under the nominal adjustment mechanism, inflation rate is automatically included in the model.

For the developing countries, studies on money demand are mostly centered on the determinants and the stability of the money demand function. Among the developing countries, India has been the main sources of literature on money demand study. The majority of the money demand studies on other developing countries have been of a cross-country nature: for example; studies have been done on Latin America (Sheehey, 1980; Holden and Peel, 1979), Asian countries (Khan, 1980; Aghevli et. al., 1979) and on Middle Eastern countries (Crockett and Evans, 1980). However, all these authors had estimated money demand functions with the real partial adjustment mechanism incorporated explicitly in their models, and thus, the issue on real versus nominal specifications of the money demand function is still open to further debate. Nevertheless, few studies that have been undertaken to deal with this issue includes Sampath and Hussain (1981) for India, Howard (1983) for Trinidad and Tobago, Ghaffar and Habibullah (1978a, 1978b), Yahya (1984b) and Spencer and Yahya (1985) for Malaysia.

However, for Malaysia, Yahya (1984b) and Spencer and Yahya (1985) had assumed without any empirical justification (based on the developed countries) that the money demand function which follow the nominal partial adjustment mechanism type of money demand model is subjected to misspecification. Thereafter, Yahya (1984b) and Yahya and Spencer (1985) go on to estimate their models assuming the nominal specification without looking into the validity of the specification for the Malaysia data.

In the developing countries, the case may not be the same as the developed countries, especially for Malaysia which experiences moderate inflation. In contrast, Ghaffar and Habibullah (1987b), found out that the Malaysian money demand function could be specified either in real or nominal specifications.

Furthermore, the Malaysia financial system had undergone a radical transformation from the relatively simple structure of the early 1960s comprising the Central Bank, the post office saving banks, the provident funds, and small financial intermediaries into a more sophisticated financial system which was characterised by the prevalence of finance companies, merchant banks, commercial bank dominated by domestic banks, discount houses, development finance institutions, capital, money and commodity markets, and new thrift and trust institutions. These structural changes and financial innovations in the financial system have significant implications on the stability of the money demand function, for both specifications.

The objective of this paper is to present further evidence on the performance of both specifications (real and nominal specifications) of the Malaysian money demand function in a changing financial enviroment. Section 2 of this paper discusses on the financial development in Malaysia, and section 3 presents the model used in the study. Empirical results are presented in section 4 and section 5 contains the conslusion.

FINANCIAL INNOVATIONS IN MALAYSIAN FINANCIAL SECTOR

After thirty-five years of independence, Malaysia has experience rapid development in her financial system. It has transformed into a more sophisticated financial system characterised by the dominance of local owned commercial banks, saving and development banks, discount houses, money and capital markets, commodity futures market, new thrift and trust funds, bond market and others. All these structural changes and financial innovations have been the prominent events in the 1980s.

The development of the Malaysia financial sector into an efficient system which is often referred to as financial deeping has been recognised by economist. Yeoh and Lim (1984), Lin (1986) and Schulze (1986) pointed that besides Singapore, Malaysia is considered a relatively more developed and rapidly developing economy in terms of output growth, and experienced a greater financial deeping compared to the other ASEAN members. In addition, Gupta (1984) concluded that Malaysia is one of the developing country that has demonstrated spectacular growth in her financial development besides Korea, Taiwan, Singapore, Panama and Venezuela.

However, it has been pointed in the literature that stuctural changes in the financial system have significant implications for monetary policy purposes. Laumas and Porter Hudak (1986) argued that the success of monetary policy depends on the extent to which the demand for money function can be estimated, and on the stability of the money demand function. Judd and Scadding (1982) believed that money demand instability are mostly due to the financial and monetary developments which includes regulatory changes on interest rates and also the financial innovations in the financial markets. These innovations will alter the public behavior in the holding of real money balances.

Gurley and Shaw (1960) have put forward that, with financial and monetary developments, the role of the non-bank financial intermediaries becomes apparent, offering a spectrum of interest-bearing financial assets with variants maturity dates. A shift out of money balances to these non-bank financial intermediary liabilities will subsequently affect the stability of the money demand function.

Financial Innovation and Money Demand Function: Some Empirical Evidence

Several studies have suggested that significant financial innovations have caused instability in the money demand function. Gurley and Shaw (1960) hypothesised that the presence of interest-bearing financial assets offered by non-bank financial intermediaries would increase the interest rate elasticity of money demand, with the subsequent impotent of the monestary authority's ability to affect economic condition.

Various studies have tested the Gurley-Shaw hypothesis. Among other are studies by Cagan and Schwatz (1975), and Hafer and Hein (1984) for United States, Chowdhury (1989) for Canada, and Darrat and Webb (1986) for India. In the above studies, money demand was specified in real terms, except for Cagan and Schwatz (1975), both specifications of money demand were used in the analysis. However, studies by Cagan and Schwatz (1975) and Hafer and Hein (1984), and Chowdhury (1989) have rejected the Gurley-Shaw hypothesis. In Chowdhury's study, no significant increase in the interest elasticity of money demand was noted in Canada. Besides rejecting the Gurley-Shaw hypothesis for the case of the United States, Cagan and Schwatz (1985), and Dafer and Hein (1984) found that the interest elasticity had in fact declined during the period under study. On the other hand, Darrat and Webb (1986) found that there was no empirical evidence to support the Gurley-Shaw hypothesis for the Indian economy, although the Indian financial market has undergone significant changes.

THE MODEL

The standard Keynesian money demand function has traditionally been represented in a multiplicative form as follows :

$$M^*(t) = ao\ y(t)^{a1}\ r(it)^{a2}\ r(Mt)^{a3}\ P(t)^{a4} \quad \text{— (1)}$$

where M*(t) is the desired nominal money stock, y is the real income level, r (i) is the short-term interest rate, r(M) is the rate of return on money, and P is the general price level. In logarithm form, equation (1) can be transformed into :

$$\log M(t) = \log ao + a1\log y(t) + a2\log r(it) + a3\log r(Mt) + a4\log P(t) \quad \text{—(2)}$$

It is known that attempts by individuals to adjust his money holding from the desired to the actual level involved a time lag. Chow (1966) offered the real partial adjustment mechanism as follows :

$$[\log M(t)/P(t) - \log M(t-1)/P(t-1)$$
$$= \theta\ [\log M^*(t)/P(t) - \log M(t-1)/P(t-1)] + \mu\ (t) \quad \text{—(3)}$$

where, (t-1) is the last period level of money stock and price, and is the disturbance term. Substituting equation (2) into (3) and assuming homogeneity in money balances and price we have the following short-run demand for real money balance as :

$$\log m(t) = \alpha o + \alpha 1 \log y(t) + \alpha 2 \log r(it) + \alpha 3 \log r(Mt) + \alpha 5 \log m(t-1) + \varepsilon(t) \quad —(4)$$

where $\alpha o = \theta \log ao$, $\alpha 1 = \theta \alpha 1$, $\alpha 2 = \theta a2$, $\alpha 3 = \theta a3$, $\alpha 5 = (1-\theta)$, $m(t) = M(t)/P(t)$, $m(t-1) = M(t-1)/P(t-1)$, and $\varepsilon(t) = \theta\mu(t)$. It is normally assumed that $\varepsilon(t) = \theta\mu(t)$ has mean zero and constant variance. Note that the price level disappears in equation (4). Incorporation of the rate of inflation in the estimating model is done by in including variable log P (t)/P(t-1) in equation (4) :

$$\log m(t) = \alpha o + \alpha 1 \log y(t) + \alpha 2 \log r(it) + \alpha 3 \log r(Mt) + \alpha 4 \log p(t) + \alpha 5 \log m(t-1) + \varepsilon(t) \quad —(5)$$

where $\log p(t) = \log P(t)/P(t-1)$, is the log of the rate of inflation. Equation (5) is then the estimating equation throughout this study for the real partial adjustment mechanism (RPAM). On the other hand, the nominal partial adjustment mechanism offered by Goldfeld (1976) has been of the following form :

$$\log M(t) - \log M(t-1) = \theta[\log M^*(t) - \log M(t-1)] + \eta(t) \quad —(6)$$

where η is the disturbance term. Substituting equation (2) into (6) and again assuming homogeneity in money balances and price, we have :

$$\log M(t) = \theta \log ao + \theta a1 \log y(t) + \theta a2 \log r(it) + \theta a3 \log r(Mt) + \theta \log p(t) + (1-\theta) \log m(t-1) + \theta\eta(t) \quad —(7)$$

Adding both sides of equation (7) with log P(t) and (1 - θ) log P (t-1) and rearranging terms, we have :

$$\log m(t) = \beta o + \beta 1 \log y(t) + \beta 2 \log r(it) + \beta 3 \log r(Mt) + \beta 4 \log p(t) + \beta 5 \log m(t-1) + \tau(t) \quad —(8)$$

where $\beta o = \theta \log ao$, $\beta 1 = \theta a l$, $\beta 2 = \theta a2$, $\beta 3 = \theta a3$, $\beta 4 = -(1-\theta)$, $\beta 5 = (1-\theta)$ and $\tau(t) = \theta\eta(t)$. It is further assumed that $\tau(t) = \theta\eta(t)$ has mean zero and constant variance. Note that the rate of inflation enters in the equation automatically. Comparing equation (5) and (8), there is a restriction imposed on the parameter of the rate of inflation in equation (8). Note that, in equation (8), $\beta 4 = -(1-\eta) = -\beta 5$. Milbourne (1983) stated that, equation (8) should perform better than equation (5) with the restriction $\beta 4 = -\beta 5$. Thus, throughout this study, equation (8) is the estimating equation for the nominal partial adjustment mechanism (NPAM).

Sources of Data

This study is based on Malaysian annual time series data for the period 1960 - 1991. the variables used in this study are money stocks M1 (defined as currency in circulation plus demand deposits held by non-bank private sector), M2 (M1 plus saving and fixed deposits at commercial banks), and M3 (M2 plus saving and fixed deposits at finance companies, merchant banks, and discount houses), gross national product (GNP), consumer price index (CPI, 1967 = 100), and the relevant rate of interest. In this study the relevant interest rate for the short-term financial assets is the 6 month Treasury bill rate for all three Malaysian money stocks. For the rate of return on money, commercial bank saving deposit rate is used as a proxy for the own rate of money M2, and commercial bank 12 month fixed deposit rate for M3. However, a proxy for the rate of return for the Malaysian money M1, can be derived according to the following formula given by Habibullah (1989),

$$rM1 = \{rL - [rL/(rSD + rFD)]\}(DD/BA) \quad —(9)$$

where rL is the commercial bank average lending rate, rSD is the commercial bank saving deposit rate, rFD is the commercial bank 12 month fixed deposit rate, DD is the demand deposit held at commercial bank and BA is the commercial bank total assets.

All data are obtained from various issues of the *Quarterly Bulletin* published by Bank Negara Malaysia. All equations were corrected for autocorrelation (since one of the regressor is the lagged dependent variable) using the maximum likelihood method due to Beach and Mackinnon (1978).

DISCUSSIONS OF EMPIRICAL RESULTS

The results of the estimated regression equations for the three Malaysian money stocks M1, M2 and M3, for both specifications are presented in TABLE 1. In this study we have performed the analysis over two periods; period 1962-1991 which includes the so called 'era of financial innovation', and period 1962-1979 otherwise. The overall results are very satisfactory with goodness of fit of 0.99, and all estimated coefficients show correct signs.

As shown by the results, it is not an easy task to differentiate between the real and nominal specifications of money demand. Overall, both specifications performed equally well in terms of the significance of the estimated coefficients.

Nevertheless, one interesting point to note form the above resuslts is that, money demand model for M1 seems to break down for the longer data period (1962-1991) compared to a shorter period (1962-1979). On the contrary, for money stocks M2 and M3, there is an appreciable improvement of the model in terms of the significance of the estimated coefficients over the period under study.

Test for Model Specification

What criterion do we use in order to select the 'best' model given the above results, since all estimated equations have comparatively goodness of fit of 0.99? However, according to Fair (1987), a direct test in differentiating between the real adjustment versus the nominal adjustment mechanism is simply to put lagged dependent variable log m (t-1) of equation (5) into equation (8) (See also Serletis, 1987). Thus, we have the following equation ,

$$\log m(t) = \phi o + \phi 1 \log y(t) + \phi 2 \log r(it) + \phi 3 \log r(Mt) + \phi 4 \log m(t-1) + \phi 5 \log P(t)/P(t-1) + \phi 6 \log m(t-1) \quad \text{—(10)}$$

Imposing the restriction that $-\phi 5 = \phi 6$, we have the final estimating equation as follows,

$$\log m(t) = \delta o + \delta 1 \log y(t) + \delta 2 \log r(it) + \delta 3 \log r(Mt) + \delta 4 \log M(t-1)/P(t-1) + \delta 5 \log M(t-1)/P(t) \quad \text{—(11)}$$

If the real adjustment is correct, log M(t-1)/P(t-1) should be significant and log M (t-1)/P(t) insignificant. If the nominal adjustment specification is correct, log M(t-1)/P(t) should be significant and log M(t-1)/P(t-1) insignificant. However, inconclusive results is achieved if both log M(t-1)/P(t-1) and log M(t-1)/P(t) are significant or insignificant.

The results to discriminate between the real and nominal adjustment specifications using Fair approach are presented in a TABLE 2. In TABLE 2, the results are presented for both periods; 1962-79 and 1962-91. Our main interest is on the significance of variables M(t-1)/P(t-1) and M(t-1)/P(t). Our results clearly show that for money M1, the result is inconclusive. For the period 1962-1979, both variables are significant, but for period 1962-1991, both variables are insignificant.

On the other hand, our results provide strong support for the nominal adjustment mechanism for money M2 and M3 since in all cases, for both periods, variable M(t-1)/P(t) dominates variable M(t-1)/P(t-1) in terms of the significance of the estimated coefficients of the variables of our main interests. Interestingly, our results are comparable to the findings by Fair (1987) and Serletis (1987) for

TABLE 1. Results of Maximum Likelihood Estimations of the Money Balances M1, M2 and M3

Model	Constant	y(t)	r (it)	r(Mt)	p(t)	m(t-1)	R^1	DW	rho
A) Period 1962 - 1979									
RPAM - M1	-2.9878	0.99581	-0.21610	0.78326	-1.3452	0.38080	0.993	1.82	-0.206
	(-3.5082)***	(4.3456)***	(-2.3062)**	(2.9590)**	(-2.1855)**	(1.9640)*			
NPAM-M1	-1.9158	0.82585	-0.26401	0.40679	-0.39417	0.39417	0.991	2.05	-0.311
	(-3.5695)***	(4.0895)***	(-2.9367)***	(3.1450)***	(-2.0655)*	(2.0655)*			
RPAM-M2	-0.84731	0.47808	-0.17567	0.22497	-1.1093	0.63655	0.997	1.81	-0.001
	(-1.3373)	(1.8224)*	(-1.9399)*	(2.0811)*	(-2.9757)***	(3.1852)***			
NPAM-M2	-0.68456	0.40312	-0.17432	0.14749	-0.71373	0.71373	0.996	1.91	-0.118
	(-1.0940)	(1.5549)	(-1.88771)*	(1.9995)*	(-3.7568)***	(3.7568)***			
RPAM-M3	-0.25277	0.13103	-0.26594	0.27322	-1.2807	0.91794	0.998	2.03	-0.167
	(-0.5576)	(0.7651)	(-3.4101)***	(3.4184)***	(-4.7118)***	(3.3581)***			
NPAM-M3	-0.18450	0.11646	-0.23720	0.20389	-0.93674	0.93674	0.998	2.09	-0.195
	(-0.3956)	(0.6557)	(-3.0140)***	(3.1035)***	(-9.2196)***	(9.2196)***			
B) Period 1962-1991									
RPAM-M1	-21.7897	0.82855	-0.13484	0.13353	-0.86346	0.34658	0.994	1.90	0.550
	(-3.0561)***	(3.4787)***	(-1.3688)	(0.8844)	(-1.3891)	(1.4000)			
NPAM-M1	-1.6416	0.85509	-0.10549	0.02035	-0.25994	0.25994	0.994	1.93	0.397
	(-3.0588)***	(3.6782)***	(-1.2216)	(0.1971)	(-1.1311)	(1.1311)			
RPAM-M2	-1.2193	0.55833	-0.08385	0.04054	-0.62720	0.65629	0.998	1.93	0.013
	(4.3090)***	(4.9468)***	(-1.7949)*	(1.2262)	(-2.0970)**	(9.5212)***			
NPAM-M2	-1.2297	0.56166	-0.08312	0.04242	-0.65403	0.65403	0.998	1.93	0.028
	(-4.8138)***	(5.3084)***	(-1.8689)*	(1.5865)	(-10.251)***	(10.251)***			
RPAM-M3	-1.2455	0.50497	-0.09534	0.0960	-1.1913	0.71953	0.999	2.13	0.490
	(-3.5720)***	(3.9304)***	(-1.8011)*	(1.8011)*	(-4.2542)***	(10.092)***			
NPAM-M3	-1.1448	0.47541	-0.08407	0.05672	-0.73806	0.73806	0.998	1.96	0.274
	(-3.5677)***	(3.8798)***	(-1.7146)*	(1.3882)	(-10.961)***	(10.961)***			

Notes :

*** Statistically significant at the one per cent level

** Statistically significant at the five per cent level

* Statistically significant at the ten per cent level

Figures in the parentheses are t-statistics. RPAM and NPAM denotes real and nominal partial adjustment mechanism respectively.

the developing countries and United States respectively, in favouring the nominal specification of the money demand function.

The Ex-Post Forecasting Ability

A good economic model should represent the 'real world'. Therefore, in order to evaluate the historical simulation or the ex-post forecast of the real and nominal specifications of the Malaysian money demand function, we have employed the root mean squared error (RMSE) and the theil's inequality coefficient, defined as;

$$U = \frac{\left[(1/T) \sum_{t=1}^{T} (Y(st) - Y(at))^2 \right]}{\left[(1/T) \sum_{t=1}^{T} Y(st)^2 + (1/T) \sum_{t=1}^{T} Y(at)^2 \right]} \qquad \text{—(12)}$$

where Y(s) is the estimated value of Y, Y (a) is the actual value of Y and T is the length of the period in the simulation. The RMSE is shown by the numerator of U (Pindyck and Rubinfeld, 1981).

The simultion results are given in TABLE 3. The results show that in all cases the real specification has a better forecasting ability compared to the nominal specification for the period 1962-79. For example, comparison of real with nominal specifications revealed an appreciable improvement in terms of both the RMSE and their inequality coefficient of 12.7 percent, 6.3 percent and 8.5 percent for M1, M2 and M3 respectively. However, for the period 1962-91, the real specification dominates the nominal specification for the Malaysian money M1. But, for M2 and M3, both specifications are rather comparable.

Stability Test

As mentioned earlier, a stable money demand function is very important for monetary policy purposes. In this study, the stability of the Malaysian demand for money function for both specifications are tested using Chow's stability test (Chow, 1960). In order to perform the test we have subdivided the

TABLE 2: Results of Real Versus Nominal Adjustment Specifications Using Fair Approach

Money Stocks	Periods	Constant	y(t)	r(it)	r(Mt)	M(t-1)/P(t-1	M(t-1)/P(t)	R	DW
M1	1962-79	-2.9350	0.95543	-0.22592	0.80870	-1.1178	1.5466	0.992	2.06
		(-3.7375)***	(4.3330)**	(-2.3333)**	(3.0791)***	(-1.9502)**	(2.4476)**		
	1962-91	-1.4188	0.80786	-0.07680	-0.05268	0.46989	-0.21107	0.993	1.53
		(-2.7617)***	(3.7693)***	(-1.0927)	(-0.4697)	(1.0001)	(-0.4003)		
M2	1962-79	-0.84744	0.47809	-0.17563	0.22496	-0.47302	1.1095	0.997	1.81
		(-1.4084)	(1.9934)*	(-2.0968)*	(2.4599)**	(-1.2941)	(3.1906)***		
	1962-91	-1.2169	0.55761	-0.08402	0.03999	0.03709	0.61970	0.998	1.91
		(-4.4252)***	(5.0851)***	(-1.8887)*	(1.3043)	(0.13043)	(0.13557)	(2.4447)**	
M3	1962-79	-0.32423	0.15839	-0.26152	0.26878	0.39262	1.2950	0.998	2.27
		(-0.70437)	(0.92259)	(-3.3331)***	(3.3464)***	(-1.5252)	(4.8069)***		
	1962-91	-1.1878	0.48583	-0.07709	0.05982	-0.03348	0.79548	0.998	1.41
		(4.0512)***	(4.3141)***	(-3.0140)*	(1.5295)	(-0.1276)	(3.0106)***		

Note: As per Table 1 above

TABLE 3. Results of Ex- Post Simulation

Periods	M1		M2		M3	
	RPAM	NPAM	RPAM	NPAM	RPAM	NPAM
<u>1962 - 1979</u>						
RMSE	0.03467	0.03979	0.03028	0.03233	0.02470	0.02699
Theil's inequality coefficient	0.00547	0.00627	0.00390	0.00416	0.00311	0.00340
<u>1962 - 1991</u>						
RMSE	0.05219	0.05327	0.03368	0.03369	0.03383	0.03385
Theil's inequality coefficient	0.00717	0.00732	0.00367	0.00367	0.00357	0.00357

Note : As per Table 1 above

TABLE 4. Chow's Stability Test

Models	M1	M2	M3	Critical F-Value at 5% Level
RPAM	5.29*	2.78*	7.14*	2.66 F (6,18)
NPAM	3.28*	3.28*	8.03*	2.71 F (5,20)

Note : * Rejected at the five per cent level of significant.
Others are as per Table 1 above.

TABLE 5. Estimated Short-Run and Long-Run Interest Rates Elasticities of Money Demand M1, M2 and M3

Sub-Periods	M1		M2		M3	
	RPAM	NPAM	RPAM	NPAM	RPAM	NPAM
(A) Short-Run Interest Rates Elasticities						
1962 - 1979	-0.21	-0.26	-0.17	-0.17	-0.26	-0.23
1962 - 1980	-0.22	-0.27	-0.15	-0.15	-0.26	-0.23
1962 - 1981	-0.23	-0.27	-0.16	-0.16	-0.12	-0.20
1962 - 1982	-0.23	-0.27	-0.15	-0.16	-0.12	-0.19
1962 - 1983	-0.24	-0.26	-0.15	-0.16	-0.12	-0.19
1962 - 1984	-0.25	-0.27	-0.16	-0.16	-0.10	-0.18
1962 - 1985	-0.25	-0.27	-0.14	-0.14	-0.10	-0.18
1962 - 1986	-0.32	-0.32	-0.19	-0.19	-0.15	-0.19
1962 - 1987	-0.35	-0.35	-0.20	-0.20	-0.20	-0.22
1962 - 1988	-0.30	-0.29	-0.18	-0.19	-0.15	-0.18
1962 - 1989	-0.23	-0.23	-0.14	-0.14	-0.10	-0.12
1962 - 1990	-0.15	-0.12	-0.09	-0.09	-0.09	-0.08
1962 - 1991	-0.13	-0.10	-0.08	-0.08	-0.09	-0.08
(B) Long-Run Interest Rates Elasticities						
1962 - 1979	-0.34	-0.43	-0.48	-0.60	-3.24	-3.75
1962 - 1980	-0.39	-0.44	-0.40	-0.49	-3.18	-3.32
1962 - 1981	-0.39	-0.44	-0.38	-0.45	-0.35	-1.04
1962 - 1982	-0.39	-0.45	-0.40	-0.47	-0.36	-0.87
1962 - 1983	-0.47	-0.50	-0.40	-0.47	-0.36	-0.87
1962 - 1984	-0.41	-0.49	-0.41	-0.45	-0.29	-0.76
1962 - 1985	-0.42	-0.38	-0.32	-0.35	-0.30	-0.69
1962 - 1986	-0.71	-0.67	-0.57	-0.61	-0.59	-0.90
1962 - 1987	-0.72	-0.72	-0.65	-0.66	-0.88	-1.05
1962 - 1988	-0.53	-0.61	-0.51	-0.62	-0.62	-0.82
1962 - 1989	-0.37	-0.36	-0.46	-0.44	-0.39	-0.49
1962 - 1990	-0.23	-0.16	-0.29	-0.28	-0.32	-0.31
1962 - 1991	-0.20	-0.14	-0.24	-0.24	-0.33	-0.32

Note : As per Table 1 above

sample period into two equal sub-sample periods; 1962-1976, and 1977-1991. Each sub-sample period is then estimated using ordinary least square and the F- statistics are calculated as follows :

$$F\,(K, N - 2K) = \left[\left(RSSo - \sum_{i=1}^{2} RSSi\right)/K\right] / \left[\sum_{i=1}^{2} RSSi/(N - 2K)\right] \qquad \text{—(13)}$$

where RSSo is the sum of squared residuals of the whole sample period 1962-1991; RSS1 and RSS2 are the sum of squared residuals of sub-sample periods 1962-1976 and 1977-1991 respectively; N is the number of observations, and K is the number of parameters including the intercept. TABLE 4 shows the calculated F-values for the above test for both specification for each of the money stocks M1, M2 and M3. The results indicated that under both specifications, money stocks M1, M2 and M3, are unstable over the sample period 1962-1991.

Financial Innovations and Money Demand Instability

Our results of instability of the Malaysian money demand function is of no suprise. As mentioned earlier, during the period of 1960 to 1991, Malaysia has experience rapid growth and structural changes in the financial system. Parallel to the increase in the sophistication of Malaysian financial system, there is evidence that financial innovations have become more frequent issues in the nation's financial market. Among the major innovations was the liberalisation of interest rates, the emergence of various new non-bank financial intermediaries, variants interest-bearing financial instruments, electronic banking and others.

Our question is: Has financial innovations affected the stability of the Malayisan money demand for the period under study? In other words, does the Malaysian financial data support the Gurley-Shaw hypothesis?

In order to test the Gurley-Shaw hypothesis for Malaysia, equations (5) and (8) for all three Malaysian money stocks M1, M2 and M3 were estimated using annual data over the period 1962-91. Our main interest here is to examine the temporal nature of the interest rate elasticity in Malaysia during the period 1979-91. In order to do this, we began our estimation from sub-period 1962-79, and then by forward-lengthening the sub-period, we extent the sample and points by one-year increments. A total of 13 year sub-periods were estimated. According to Darrat and Webb (1986), in order to validate the Gurley-Shaw hypothesis, significant increase in the interest elasticity should be observed as we continually add more recent years to the end points of the estimated sub-periods.

From TABLE 5, we observed that the short-run and the long-run interest rates elasticity in both specifications for the three money demand M1, M2 and M3, all have one common feature, that is, the interest elasticity is quite stable for the sub-periods 1962-1985. For the next three sub-periods; 1962-1986, 1962-1987 and 1962-1988, there is a noticeable increase in the short-run and long-run interest elasticity of money demand M1, M2 and M3 in both real and nominal specifications. However, after sub-period 1962-1988, it declined again abruptly by as much as 20-40 percent in sub-period 1962-89, and thereafter declinded further until sub-period 1962-91.

The above trends in the interest rate elasticity of the Malaysian money demand is rather interesting. Do the above results support the Gurley-Shaw hypotesis? If the Malaysian financial data does support, then, it is short-lived. However, we suspect that the upward surged in the interest rate in 1986-88 period was due to external forces rather than due to the changing financial environment in the Malaysian financial system. Recession in mid-1980s had an impact on the performance of the Malaysian economy. Further, action by the Central Bank of Malaysia to activate the economy by reducing the reserve asset requirements has, however, resulted in the excess of loanable funds in the market. Coupled with the collapse of the real estate sector due to recession, commercial banks are facing excess liquidity. Subsequently, this led to a decline in domestic deposit rates from the last quarter of 1986, which has been followed by their collapse in 1987 (Thillainathan, 1987). The low deposit rates will subsequently lead to the shift out of supply of deposits elsewhere.

CONCLUSION

The specification of the money demand function has been a highly debated issue, particularly in the developed countries. The aim of this paper is to ascertain empirically whether the Malaysian money demand function should be specified with nominal adjustment or the real adjustment specification. In this study, the Malaysian money demand function are subjected to several tests; specification, ex-post forecasting ability and stability.

Using Fair approach to discriminate between nominal versus real adjustment specifications, we found that the results strongly support the nominal specification for Malaysian money M2 and M3. However, for money M1, the result is inconclusive. On the other hand, our simulation results pointed out that in the period prior to the 'era of financial innovation,' the real specification has a better forecasting ability compared to the nominal specification. However, when the money demand is subjected to longer data period, except for money M1, both specifications are comparable for money stocks M2 and M3.

The Malaysian money demand function are further subjected to the stability test. Our results indicate that in all cases, money stocks M1, M2 and M3, under both speficications are unstable for the period 1962-91. This imply that the Malaysian financial sector had undergone rapid structural changes during the period under study.

In order to test whether these structural changes and financial innovations have caused the instability of the Malaysian money demand function (for both specifications), we followed Darrat and Webb approach in testing the Gurley-Shaw hypothesis. However, our results do not support the Gurley-Shaw contention that changes in the financial markets and the growth of money substitutes will increase the interest elasticity of money demand. In fact, for the period 1979-91, our empirical results indicate a slight decline in the interest elasticity. However, the increase in interest elasticity in the three years, particularly in 1986, 1987 and 1988 were mostly due to the collapse of the deposit interest rates due to economic downturn rather than due to the contention put forward by Gurley and Shaw (1960). As a matter of fact, the behavior of the Malaysian long-run interest elasticity of money demand during the period under study were consistent with the declining trend in the interest elasticity of money demand of the United States as documented by Cagan and Schwatz (1975) and Hafer and Hein (1984). As Marty (1961) argued forcefully that the growth of substitutes has shifted the money demand function to the left and in good part extinguished the holdings which were once close substitutes for money.

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