

## The Relationship between the Money Market Rates and the Common Stock Returns: The Malaysian Experience

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### ABSTRACT

*The relationship between monetary developments and common stock returns has been the focus of a considerable amount of research in recent years. This paper addresses the relationship between the money market rates and the common stock returns in Malaysia. Statistical analyses were conducted to provide empirical linkage between the two market; i.e., money market and capital market. The results indicated that no significant relationship exist between money market rates movement and common stock returns. However, the inverse relationship between the two variables was traced in the Malaysian market. Among all money market rates, the interbank rates offer some predictive power as it is commonly used as liquidity barometer in the Malaysian financial market. This study also found evidence of disintermediation, i.e., outflow of fund from the banking sector into direct capital market due to changing level of interest rate.*

### ABSTRAK

*Hubungan antara perubahan monetari dan pulangan saham biasa telah menjadi fokus bagi sejumlah besar kajian sejak kebelakangan ini. Kajian ini mengutarakan hubungan antara kadar faedah pasaran wang dan pulangan bagi saham biasa di Malaysia. Analisis statistik telah dijalankan bagi melihat hubungan empirik di antara kedua-dua pasaran iaitu pasaran wang dan pasaran modal. Keputusan menunjukkan bahawa tiada hubungan yang signifikan wujud antara pergerakan kadar faedah pasaran wang dan pulangan saham biasa. Walau bagaimanapun hubungan songsang yang jelas telah dikesan di dalam pasaran Malaysia. Antara kesemua kadar faedah pasaran wang, kadar antara bank telah menunjukkan kuasa jangkaan yang minor. Ini adalah jelas kerana kadar antara bank sering digunakan sebagai penunjuk kecairan di dalam pasaran kewangan Malaysia. Kajian ini juga menemui bukti penyahantaraan, iaitu, aliran keluar dana daripada sektor perbankan kepada pasaran modal terus akibat perubahan kadar faedah.*

## LITERATURE REVIEW

The relationship between monetary developments and common stock returns has been the focus of a considerable amount of research in recent years. Numerous studies testing the effect of money supply changes on share prices have been conducted (Sprinkel (1964), Palmer (1970), Homa & Jaffe (1972), Sorenson (1982), and Pearce & Roley (1983)). These authors generally conclude that money supply changes precede stock price changes in a positive direction. Although scholars have studied the subject extensively, studies on the relationship between interest rate movement and common stock returns are still lacking, especially for the Pacific Rim countries. It is the purpose of this paper to examine the statistical relationship between money market rates movement and common stock returns in Malaysia.

Theoretically, the value of a common stock is the present value of all future incomes (dividends) which will be received by the owner (Malkiel 1963);

$$V_j = \sum_{t=1}^{\infty} \frac{D_0(1+g_j)^t}{(1+k_j)^t} = \sum_{t=1}^{\infty} \frac{D_0(1+g_j)^t}{(1+r_{ft}+r_{pt})^t}$$

where  $D_0$  is the level of current dividends,  $g_j$  is the expected growth rate of dividends at time  $t$  for stock  $j$  and  $k_j$  is the discount rate for stock  $j$  at time  $t$ . The discount rate ( $k_j$ ) on the other hand is determined by the riskless rate ( $r_{ft}$ ) and the risk premium ( $r_{pt}$ ). It is thus apparent that the price of any share of common stock will be determined by three variables, i.e., the level and growth rate of dividends, the riskless rate of interest and the risk premium.

The movement of interest rate affect the valuation model in two directions. First, higher level of interest rate reduces the firm current and expected earning, thus, the dividend payoff. Companies which finance their operation with a variable rate instruments are now required to pay higher interest charges as the rate adjusts to a new higher level. Higher financing cost also cut the number of capital investment as higher net return are required to assure profitability. Planned capital expenditures were disrupted leading to a lower dividend growth. Secondly, the discount rate ( $k_j$ ) which can be thought as a sum of risk free rate ( $r_{ft}$ ) plus a risk premium ( $r_{pt}$ ), is intimately tied to the level of interest rate in the economy. Higher interest rate increases the risk free rate as credit rationing occur. The risk component ( $r_{pt}$ ) which reflects the uncertainty feature of the dividend payment and the riskless rate, moves up as the two variables becoming more uncertain. Higher interest rate level implies lower common stock returns and vice versa.

Hashemzadeh and Taylor (1988) examined the causality between stock prices, money supply and interest rates. Using Granger-Sims' test, they found that a rise in interest rates (Treasury bill rate) reduces the present value of future cash flows yet to be received by the investors. In addition, the causality seems to be mostly

running from interest rates to stock prices, but not the other way around. Flannery and James (1984) studied the interest rate sensitivity of the common stock returns of the financial institutions in United States. They found a significant negative association between interest rate changes and common stock returns. They also tested the implication of nominal contracting hypothesis (maturity mismatch hypothesis) and concluded that differences in the maturity composition of the net nominal assets cause significant differences in the interest rate sensitivity of the common stock returns.

Mampe (1968) investigated the impact of interest rates on share prices with special emphasis on expectation, growth and leverage. The study which covers 46 unlevered electric utilities companies over 30 month sample period found high correlation between the share yields and the long term bond yields (Standard and Poor's AAA Utility Bonds). Sweeny and Warga (1986) analyzed the electric utilities companies to determine the pricing of interest rate risk. Empirically, they indicated that shares from the utilities industries are highly sensitive to changes in government bond yields. Furthermore, this sensitivity to changes in interest rates seems to be priced, the ex ante returns incorporate a premium based on the risk of interest rate changes proportional to the stocks sensitivity to these changes. They identified regulatory lags as the main source which cause the utilities shares to be interest sensitive.

In a study by Oldfield and Rogalski (1981), the Treasury bill weekly returns was found to provide a source for identifying statistical factors that influence common stock returns. This implies linkage between the money market rates and stock market performance. Titman and Warga (1989) examined whether stock returns provide forecast of changes in interest rates and inflation. In contrast to previous studies (Fama & Schwert 1977), they found a statistically significant positive relationship between stock returns and future interest rate changes. The real estate investment trusts, which are interest - and inflation - sensitive securities were found to provide better forecast than a broad market index. Based on the high correlation they suggested the inclusion of the stock price movement in the inflation forecasting models.

## DATA AND METHODOLOGY

This study covers a period of 10 years (January 1980 - December 1989). Monthly observation of 7 money market rates, namely, KLIBOR (Overnight and 7-Day), T-Bills (3 month, 6 month and 12 month), Time Deposits (Average Fixed Deposit and Savings Deposit) were taken from the monthly bulletin issued by the Bank Negara Malaysia (Central Bank of Malaysia). The measurements of the common stock returns were based on the monthly closing of the seven widely quoted indices in Malaysia, namely, the KLSE Composite Index, the KLSE Industrial Index, the KLSE Finance Index, the KLSE Properties Index, the KLSE Tins Index, the KLSE Hotels Index and finally the KLSE Plantations Index.

The monthly rate of return for month  $t$  in year  $N$  was calculated as:

$$R_{t,N} = [(I_{t,N} - I_{t-1,N}) / I_{t-1,N}] \times 100\%$$

where  $I_{t,N}$  and  $I_{t-1,N}$  refer to the monthly closing index of year  $N$  for month  $t$  and  $t-1$ , respectively. The monthly rates of return were calculated for all the 7 stocks indices.

The regression and correlation analysis were conducted on the time series data in identifying the impact of money market rates movement on common stock returns. The ordinary least squares (OLS) method was employed to measure the influence of the money market rates on the dependent variables. The regression model and the hypotheses are as follows:

$$R_{t,N} = B_0 + B_1 i_{t,N} + e$$

The two hypotheses tested are:

$$H_0 : B_1 = 0$$

$$H_1 : B_1 \neq 0$$

where,  $R_{t,N}$  = monthly rate of return of the common stock for month  $t$  in year  $N$ ,  
 $i_{t,N}$  = money market rate for month  $t$  in year  $N$ ,  
 $e$  = error term,  
 $B_1$  = the response coefficient of the common stock returns toward changes in money market rate, and  
 $B_0$  = constant term.

The null hypothesis ( $B_1 = 0$ ) indicates that changes in the money market rates have zero effect on the stock market performance. While the second hypothesis ( $B_1 \neq 0$ ) means the opposite, i.e., market rates changes influenced the stock market performance. The magnitude of influence is the value of  $B_1$ . In testing these hypothesis the t-statistic test and coefficient of determination ( $R^2$ ) were used.

$$t_{b_1} = \frac{b_1}{S_{b_1}}$$

where,  $b_1$  = ordinary least squares estimates of  $B_1$ , and  
 $S_{b_1}$  = standard error of estimates for  $b_1$ .

If the value of  $b_1/S_{b_1}$  is greater than  $t_{\alpha/2}$  or less than  $-t_{\alpha/2}$ , we would reject  $H_0 : B_1 = 0$  and would conclude that changes in the money market rates do have significant impact on the common stock returns. The coefficient of determination,  $R^2$ :

$$R^2 = \frac{\text{Regressian Sum of Squares}}{\text{Total Sum of Squares About the Mean}}$$

$$= \frac{\sum_{t=1}^n (\hat{R}_t - \bar{R})^2}{\sum_{t=1}^n (R_t - \bar{R})^2}$$

If perfect linear relationship exists between money market rates movement and the common stock returns, then  $R^2 = 1$ . If there is no linear relationship between the dependent and independent variables, then  $R^2 = 0$ . If  $R^2$  is positive but less than 1, it implies that variability of the money market rates can be used to explain movement in common stock returns. To measure the associations of the two variables the Pearson correlation coefficient was used. It is defined as:

$$P = \frac{N \sum_{t=1}^N i_t R_t - \sum_{t=1}^N i_t \sum_{t=1}^N R_t}{[N \sum_{t=1}^N i_t^2 - (\sum_{t=1}^N i_t)^2]^{1/2} - [N \sum_{t=1}^N R_t^2 - (\sum_{t=1}^N R_t)^2]^{1/2}}$$

where,  $i_t$  = money market rates,  
 $R_t$  = monthly rate of return for the indices, and  
 $N$  = number of cases.

The absolute value of  $p$  indicates the strength of the linear relationship. The largest possible absolute value is 1, which occurs if the two variables are perfectly correlated. Zero correlation coefficient implies no linear relationship between the two measures.

## RESULTS AND DISCUSSION

This section presents the empirical results on the relationship between the money market rates movement and the common stock returns. Tables 1 through 7 report the summary statistics of the regressions between each of the 7 indices and the money market rates. The regressions results suggest several findings.

Parallel to the stock valuation model explained in section 1 all the seven indices posted negative coefficients of response toward changes in money market rates. As the short term rates increase, the stock returns decrease. However, two exceptional

cases exist. These refer to the positive response of the Finance and Hotels sectors toward changes in the Treasury bills rates. The positive coefficients for the Finance sector are the results of the liquidity requirement imposed by the central bank on the commercial banks and finance companies operated in Malaysia. The holding of Treasury bills by these institutions satisfy the liquid asset requirement. About 75% of the bills outstanding in 1987 were in the banks portfolios. Due to lack of trading activities most banks held these bills till maturity. Thus, the increase in T bills yields contributes to higher net interest margin for these institutions, and in turn to the value of their shares. Average absolute coefficients of response for all indices are; Overnight (0.414), 7 day (0.328), TB3 (0.385), TB6 (0.512), TB12 (0.547), AFD (0.39) and SD (0.537). The response is greater toward longer term rates.

The results also indicate that money market rates movement is not a significant factor that determines the common stock returns. This is true for all of the 7 sectors. The coefficients of determination,  $R^2$ , are very low with the largest  $R^2$  is 0.0299 (Hotels with Overnight). Variation in money market rates can explain only a minor position of variation in stock returns. Average  $R^2$  for these rates are ; Overnight (0.0151), 7 day (0.0131), TB3 (0.0025), TB6 (0.0029), TB12 (0.003), AFD (0.0145) and SD (0.01). Among all rates, interbank rates play the greatest role in explaining stock returns variation. This is as expected because the interbank rates are the major indicators of the liquidity status in Malaysian economy. Ghazali (1990) indicated that the interbank rates are highly correlated with the lending rates in Malaysia. This supported the idea that higher interbank rates means higher financing cost for the companies. This further reduces the value of the shares. The P-Prob values support the non significant role played by these money market rates. The  $b_1$  values are not significantly different from zero. This implies rejection of hypothesis  $H_1$ .

Focusing toward the last two rows of the tables reveal the disintermediation process which occurs in Malaysian economy. The coefficients of response for the Average Fixed Deposit (AFD) and Saving Deposit (SD) are large for all indices except the Finance sector. The slightly higher  $R^2$  and smaller P-Prob values indicate that when banks reduce the rates offered for Fixed and Savings deposits, depositors will shift their money into the stock market. The higher demand for stocks causes the price of the shares to increase. Table 8 shows the correlation coefficients for each of the variables in the analysis. All of the coefficients are negative except for the Finance with T-Bills and Hotels with T-Bills which is similar to the regressions results. In addition none of the coefficients is significant. The small and non significant correlation values tell us that the the money market rates and common stock returns are not significantly correlated. Knowing the future direction of the money market rates will not promise any gain for the investors.

TABLE 1. Summary statistics of regressions between KLSE Composite Index and money market rates

	Constant a	Beta b	Calculated T-value (t-b)	Coefficient of Determination R <sup>2</sup>	Significance Level P-prob
Overnight	4.170	-0.535 (0.367)	-1.459	0.0179	0.1472
7-Day	4.010	-0.418 (0.274)	-1.525	0.0195	0.1300
T Bill - 3 months	2.571	-0.310 (0.930)	-0.355	0.0011	0.7233
T-Bill - 6 months	2.789	-0.367 (0.974)	-0.377	0.0012	0.7071
T Bill - 12 months	2.914	-0.386 (1.053)	-0.367	0.0012	0.7146
Average Fixed Deposit	4.551	-0.470 (0.313)	-1.502	0.0189	0.1359
Savings Deposit	4.616	-0.639 (0.572)	-1.117	0.0106	0.2662

Note: Standard errors of estimates for beta are shown in parentheses.

TABLE 2. Summary statistics of regressions between KLSE Industrial Index and money market rates

	Constant a	Beta b	Calculated T - value (t - b)	Coefficient of Determination R <sup>2</sup>	Significance Level P-prob
Overnight	4.176	-0.523 (0.359)	-1.457	0.0178	0.1479
7-Day	4.191	-0.434 (0.268)	-1.617	0.0219	0.1086
T Bill - 3 months	3.203	-0.457 (0.910)	-0.046	0.0022	0.6169
T Bill - 6 months	3.633	-0.536 (0.953)	-0.562	0.0027	0.5752
T Bill - 12 months	3.595	-0.516 (1.031)	-0.501	0.0021	0.6174
Average Fixed Deposit	4.449	-0.446 (0.307)	-1.453	0.0177	0.1488
Savings Deposit	4.043	-0.521 (0.561)	-0.928	0.0073	0.3551

Note: Standard errors of estimates for beta are shown in parentheses.

TABLE 3. Summary statistics of regressions between KLSE Finance Index and money market rates

	Constant a	Beta b	Calculated T - value (t - b)	Coefficient of Determination R <sup>2</sup>	Significance Level P-prob
Overnight	3.433	-0.359 (0.349)	-1.030	0.0090	0.3053
7-Day	2.926	-0.223 (0.261)	-1.853	0.0062	0.3956
T Bill - 3 months	0.460	0.210 (0.880)	0.238	0.0005	0.8121
T Bill - 6 months	0.442	0.207 (0.922)	0.224	0.0004	0.8231
T Bill - 12 months	0.129	0.270 (0.997)	0.270	0.0006	0.7873
Average Fixed Deposit	2.412	-0.141 (0.299)	-0.470	0.0019	0.6389
Savings Deposit	2.065	-0.124 (0.544)	-0.228	0.0005	0.8197

Note: Standard errors of estimates for beta are shown in parentheses.

TABLE 4. Summary statistics of regressions between KLSE Property Index and money market rates

	Constant a	Beta b	Calculated T - value (t - b)	Coefficient of Determination R <sup>2</sup>	Significance Level P-prob
Overnight	5.393	-0.679 (0.436)	-1.556	0.0203	0.1223
7-Day	4.451	-0.424 (0.328)	-1.294	0.0141	0.1982
T Bill - 3 months	4.832	-0.751 (1.105)	-0.680	0.0039	0.4981
T Bill - 6 months	4.819	-0.723 (1.158)	-0.625	0.0033	0.5334
T Bill - 12 months	4.946	-0.736 (1.252)	-0.587	0.0029	0.5581
Average Fixed Deposit	5.815	-0.588 (0.373)	-1.578	0.0209	0.1172
Savings Deposit	5.996	-0.818 (0.681)	-1.201	0.0122	0.2321

Note: Standard errors of estimates for beta are shown in parentheses.



TABLE 5. Summary statistics of regressions between KLSE Tins Index and money market rates

	Constant a	Beta b	Calculated T - value (t - b)	Coefficient of Determination R <sup>2</sup>	Significance Level P-prob
Overnight	2.458	-0.348 (0.421)	-0.827	0.0058	0.4098
7-Day	2.270	-0.260 (0.315)	-0.825	0.0058	0.4109
T Bill - 3 months	4.814	-0.985 (1.057)	-0.931	0.0074	0.3535
T Bill - 6 months	5.635	-1.132 (1.106)	-1.023	0.0089	0.3084
T Bill - 12 months	6.554	-1.306 (1.196)	-1.092	0.0101	0.2771
Average Fixed Deposit	5.175	-0.644 (0.356)	-1.810	0.0272	0.0729
Savings Deposit	5.433	-0.906 (0.651)	-1.392	0.0163	0.1664

Note: Standard errors of estimates for beta are shown in parentheses.

TABLE 6. Summary statistics of regressions between KLSE Hotel Index and money market rates

	Constant a	Beta b	Calculated T - value (t - b)	Coefficient of Determination R <sup>2</sup>	Significance Level P-prob
Overnight	3.472	-0.451 (0.238)	-1.898	0.0299	0.0602
7-Day	2.840	-0.281 (0.179)	-1.570	0.0206	0.1192
T Bill - 3 months	0.748	0.034 (0.606)	0.056	0.0000	0.9551
T Bill - 6 months	0.622	0.061 (0.635)	0.096	0.0001	0.9239
T Bill - 12 months	0.784	0.025 (0.687)	0.036	0.0000	0.9713
Average Fixed Deposit	2.346	-0.198 (0.205)	-0.965	0.0079	0.3368
Savings Deposit	3.983	-0.563 (0.371)	-1.517	0.0193	0.1319

Note: Standard errors of estimates for beta are shown in parentheses.

TABLE 7. Summary statistics of regressions between KLSE Plantation Index and money market rates

	Constant a	Beta b	Calculated T - value (t - b)	Coefficient of Determination R <sup>2</sup>	Significance Level P-prob
Overnight	1.790	-0.237 (0.338)	-0.699	0.0048	0.4861
7-Day	2.181	-0.258 (0.261)	-0.990	0.0096	0.3247
T Bill - 3 months	2.365	-0.437 (0.848)	-0.515	0.0026	0.6074
T Bill - 6 months	2.993	-0.561 (0.882)	-0.636	0.0040	0.5259
T Bill - 12 months	3.285	-0.613 (0.953)	-0.642	0.0041	0.5221
Average Fixed Deposit	2.176	-0.241 (0.290)	-0.831	0.0068	0.4079
Savings Deposit	1.459	-0.189 (0.544)	-0.348	0.0012	0.7284

Note: Standard errors of estimates for beta are shown in parentheses.

TABLE 8. Correlation coefficients between the KLSE indices and money market rates (January 1980 to December 1989)

	Industrial	Finance	Properties	Tins	Hotels	Composite
Overnight	-0.134	-0.095	-0.142	-0.076	-0.173	-0.134
7-Day	-0.148	-0.079	-0.119	-0.076	-0.144	-0.140
T Bill (3)	-0.046	0.022	-0.063	-0.086	0.005	-0.033
T Bill (6)	-0.052	0.021	-0.058	-0.094	0.009	-0.035
T Bill (12)	-0.046	0.025	-0.054	-0.100	0.003	-0.034
Avg. Fixed Dep.	-0.133	-0.044	-0.144	-0.165	-0.089	-0.138
Savings Dep.	-0.086	-0.021	-0.110	-0.128	-0.139	-0.103

Note: All coefficients are not significant at 0.01 level.

## CONCLUSION

Overall the regressions analysis indicated that there is no significant relationship between the money market rates movement and the common stock returns in Malaysia. However, the direction of response between the two variables are inversely related except for Finance with TBills and Hotels with TBills. Regulatory

requirement can be used to explain variation in the Finance Sector. The interbank rates which are the leading rates in Malaysia carry some valuable information for investors in the stock market.

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