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An Empirical Study of Relationship between Monetary Policy and Stock Market Performance in Malaysia

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Abstract: This study examined the relationship between monetary policy and stock market performance for sample data from first quarter of 1991 to first quarter of 2011 in Malaysia. The result of Unit Root test revealed the monetary supply variables namely; M1, M2, and M3 were stationary only after first difference. The results also show same characteristic within market index of Kuala Lumpur Composite Index. Real interest rate was level stationary as well. The Augmented Dickey Fuller (ADF) and Phillip-Perron (PP) tests confirmed each other. Co-integration analysis and Vector Error Correction Models (VECM) were also suggested a possibility of merely one long-run equilibrium relationship between real Kuala Lumpur Composite Index regards to M1, M2, M3, and real interest rate. On the other hand, results of trace and maximum Eigenvalue methods suggested only one co-integration equation amongst research variables. The Vector Error Correction Models analysis shows a statistically significant relationship between M1 and M2 as a monetary supply variable included in the model; so that M1 and M2 has long term influence on Kuala Lumpur Composite Index. All in all, the research findings suggested that by increasing the money supply, the market index of Kuala Lumpur Composite Index would growth in long term.

Key words: KLCI, Monetary Policy, Money Supply, Real Interest Rate.

INTRODUCTION

The background of Malaysian monetary policy implementation can be divided into two main periods; monetary policy during the pre-liberalization and monetary policy during post-liberalization (Ngah, Saini, Habibullah, & Mohamed, 2000). Monetary policy during the pre-liberalization involved first decade after independence, through which the monetary policy stressed the development of integrated financial system. As the banking system promoted in 70's, demands for banking service- for instance financial loan requested by enterprises- has been increased significantly. At the time, Bank Negara Malaysia (BNM) monitored money supply and credits of commercial banks through several monetary policy tools namely; statutory reserve requirement (SRR), minimum liquidity requirement (MLR), volume and direction of credit (VDC), interest rate and moral suasion.

On the other hand, monetary policy implemented during the post-liberalization started from 1978, which involved two separate stages; first, the moving maturity stage of monetary policy embarked on 1979 and continued to 1988. The second stage was a challenging period started from1989 to 1995. In 1978 banking sectors were released to determine interest rate based on cost of loan. At the same time, Minimum Lending Rate (MLR) was reduced for many times and credit quotas were eliminated to dedicate loans. However, central bank supervised the loans for purchasing house and setting up industrial company. Besides, the money supply was adapted with market index under BNM control. During 1979 to 1988, inflation was hold 3.7 percent and interest rate for banking sectors reach 11.54% in 1985, which was the highest rate compared to the previous years (after independence). Additionally, money supply growth had been reduced during the period. It is confined regards to contractionary monetary policy, which was implemented by government in order to rectify the effect of global economic recession experienced in 1980. Conversely, during 1989 to 1994, Malaysia experienced incredible economic growth by the average annual rate of 8.6%, which reduced the unemployment rate throughout the nation. On that conducive situation of Malaysian money demands, BNM implemented expansionary monetary policy to satisfy economic needs at the time (Ngah, Saini, Habibullah, & Mohamed, 2000). There are three Monetary aggregates – M1, M2 and M3- and interest rate have been illustrated in Figure 1 and 2 as monetary policy instruments in Malaysia.

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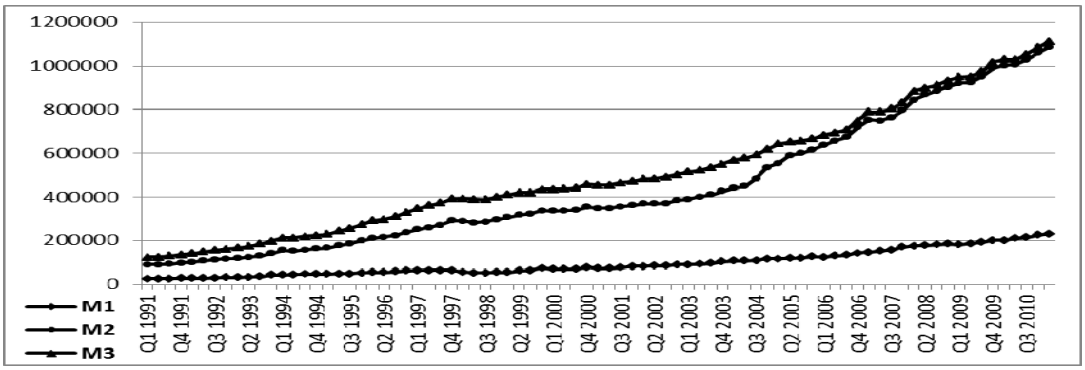


Fig. 1: Money supply M1, M2 and M3 (RM Million) during Q1 1991 to Q1 2011

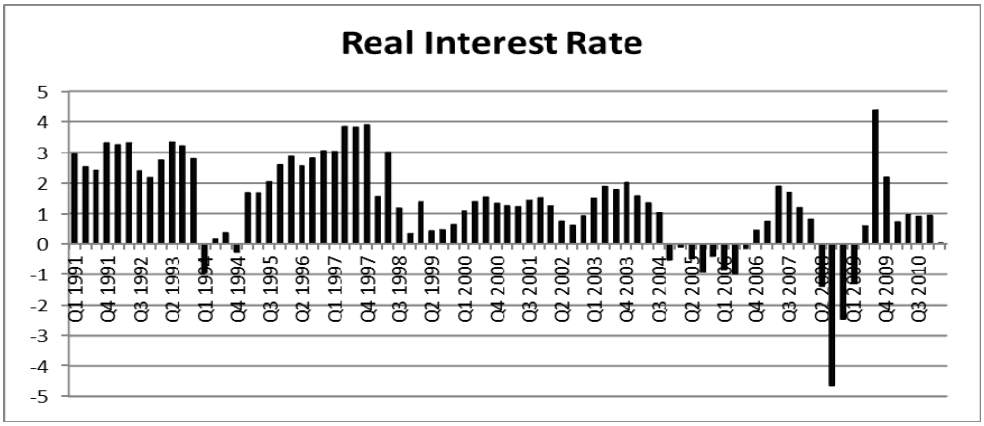
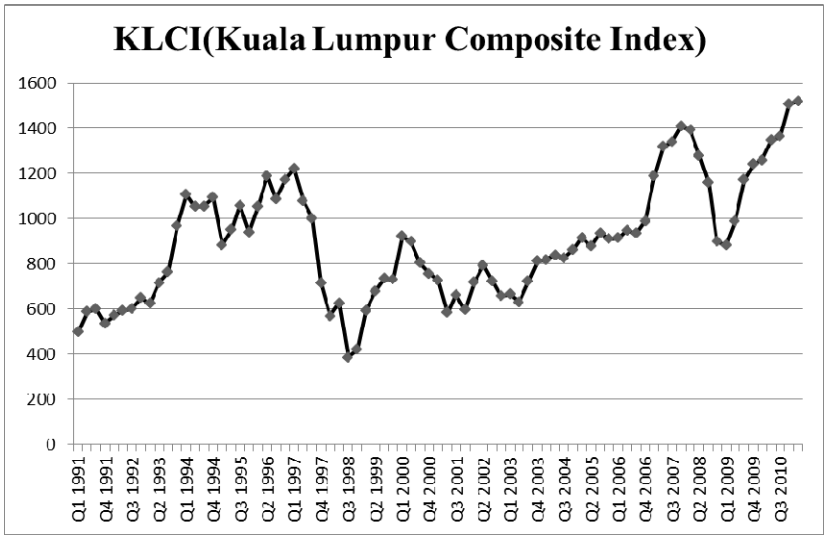


Fig. 2: Interest rate of Malaysia during Q1 1991 to Q1 2011

Fluctuations in stock market index of Bursa Malaysia (formerly known as Kuala Lumpur Stock Index, or KLSE, with the market index of Kuala Lumpur Composite Index, or KLCI) are depicted in Figure 3. Minimum value for KLCI was 386.27 in third quarter of 1998 and the maximum value was 1519.94 in first quarter of 2011. Figure 3 illustrates the rapid growth in equity market during the period of between 1993 to 1997 and subsequent Asian Financial Crisis of 1997 to 1999. After 2000, stock market has witnessed rebounds, especially in 2007 and 2008. It also shows the effect of Global Financial Crisis of 2008/2009 on Malaysian stock market.



Source: World Bank Data Catalog

Fig. 3: Fluctuation of KLCI during 1991Q1 to 2011Q1

Given above, many emerging and developing countries deal with the unstable international environment subject to a variety of shocks. Countries with a higher stock market performance withstand the adverse impact of sudden capital outflows and exchange rate depreciation, originating from the global financial crisis to a larger extent (Aizenman and Sun, 2009). To this context, Short-term nominal interest rate is considered as the standard monetary policy instrument. Monetary authority uses nominal interest rate to alleviate short-run economic fluctuations. A reduction of nominal interest rate stimulates economic expenditure and hence economic demand. On the other hand monetary authority increases nominal interest rate when economic contraction is required. The monetary policy framework has evolved in parallel to the stock market system in the South East Asian countries. The monetary policy implementation has accompanied several major financial, institutional, and policy developments (Kim and Park, 2006). As it may be seen, the concept of monetary policy and stock market performance can be found in finance literature, yet the linkage between the concepts considering interest rate is still open debate. The link between the concepts (monetary policy, stock market, and interest rate) was planned to be investigated in this research study. This paper is organized as follows.

Theoretical Background:

Transparency of monetary policy has become one of the main attribute of monetary decision during the recent decades. In theory, transparency of monetary policy means the symmetric information between private sectors and monetary policy makers. Monetary policy transparency can enhance the predictability of monetary policy outcomes which helps market participants. It increases credibility and stability of inflation expected for private sectors (Geraats, 2006). Arbitrage Pricing Theory (APT) indicates the asset's return can be predicted as a linear function of many macro-economic factors. APT theory is able to consider multiple risk factors, such as price level of energy, inflation rate and interest rate (Vickers, 1999).

$$r = E(r) + \beta_1 F_1 + \beta_2 F_2 + \ldots + \beta_n F_n + \square \quad (1)$$

Where r is the actual return of security, E(r) indicates expected return of security, F_1 is the first factor, β_1 represents the sensitivity of security to the first factor. Asset prices are determined in markets with future-looking of participants. Asset prices influence the spending decision of public, for instance; higher stock prices decreases the cost of equity financing, which stimulates investment growth (Issing, 2009). In following section empirical practices on monetary policy and stock market performance is discussed.

Empirical Frameworks of Monetary Policy and Stock Market Performance:

One of the methodologies for evaluating monetary policy is Vector Autoregressive (VAR) method which is reflected in the study by Cassola and Morana (2004). They employed a cointegrated VAR system, which consists of real GDP, M_3, Interest rate, Inflation rate and stock prices in order to study effects of monetary policy within European Union (Crowder, 2006). According to the results, monetary policy shocks have great impact on stock return. Bjornland (2009), however, examined the relationship between U.S monetary policy and Standard & Poor's 500 (or S&P 500). The study used structural VAR to prove existence interdependence between federal fund rate and stock return. Following equation was applied in their research (Bjornland & Leitemo, 2009).

$$i_t = F_t(...) + \sigma\varepsilon^{MP} \quad (2)$$

Where i_t is a tool used by the monetary authority (Federal rate in the United States). F is the function that associated with the interest rate. ε^{MP} is the monetary policy shock; and σ is the standard deviation of the monetary policy shock.

Bernanke and Kuttner (2005) examined the reaction of equity prices as result of changing in federal rate. They applied Campbell and Ammer model to prove their hypotheses which used VAR to assess the relation between reflections of equity prices in response to changing on interest rate (Bernanke & Kuttner, 2005). According to the research, 0.25 percent reduction on interest rate increases stock indices by 1 percent. They used following equation described here:

$$H_t = a + b_1 \Delta i_t^e + b_2 \Delta i_t^u + \square_t \quad (3)$$

Where H_t indicates stock return; Δi_t^e indicates the difference between expected interest rate; and Δi_t^u indicates the difference between unexpected interest rate.

Growder (2006) used a structural VAR model to observe the reaction of the stock market return in order to change discount rate. According to the findings, changing federal fund rate led to probable results. Reasons for doing the research were illogic volatilities in stock market in the late 90s which raised arguments for using proper monetary policy. However, researcher believed Federal Reserve affects economic situation in society by

using interest rate and money supply. Monetary policy could influence stock market return effectively with changing expectation of stock market contributors. In the other words, contractinary monetary policy reduced firm's expectation about future profitability and become the main reason for stock returns' reduction. within this relationships, interest rate increased as result of executing tight monetary policy and reduced the stock prices due to decreasing in present value of companies' future cash flow(author used daily data during February 3, 1970 to June 16, 2003 for proving his viewpoint). The present value model was applied in this research presented in following.

$$P_{t+1} = E_t [\sum(1/(1+R_t))^i D_t] + E_t [\sum(1/(1+R_t))^m P_t] \quad (4)$$

Where $P_{t+1}$is the present value of stock; D_t is the future expected cash flow; E_t indicates operators' expectation according to availability of information on the market participants at time t; and R_t is the discount rate that used by market participant to discount future cash flow.

The study by Ioannidis and Kontonikas (2008) assessed the effect of monetary policy on stock market among members of Organization for Economic Co-operation and Development (OECD) during the period of 1972 to 2002. They realized that monetary policy had a considerable impact on stock market, which showed changing in discount rate influenced on contributors of stock markets significantly (Ioannidis & Kontonikas, 2008). As might be known, tight monetary policy increases interest rate; therefore, stock's value reduces according to reduction in the value of companies' future cash flows. In this investigation, stock price and interest rate were considered as monthly data, which were collected from 13 members of OECD including 7 members of G7 and 6 members of European Union (Belgium, Finland, Netherland, Sweden, Switzerland and Spain) from January 1972 until July 2002. The study used regression model to examine the relationship between interest rate and stock market return.

$$\Delta S_t = a + \beta \Delta r_t + u_t \quad (5)$$

ΔS_t indicates the equity returns; Δr_t shows monetary policy changes. According to the research assumption, positive (or negative) value of Δr were related to the contractionary (or expansionary) monetary policy; for instance, if the β is negative and interest rate is increased, then the contractionary monetary policy eliminates the equity returns at the same month. This equation has been regularly applied in the financial economic literature to support the inverse relationship between interest rate and equity return.

Dufour and Tessier (2006) also investigated the relationship between monetary policy and stock market return. According to their research, monetary aggregates affect income and inflation in long run. In the case of United States, authors could not find any evidence to indicate macroeconomic variables influence stock return; yet in Canada, there were some findings which indicated the relationship between money supply, inflation and GDP (Dufour & Tessier, 2006). Vector Autoregressive (VAR) model was used in order to investigate short and long term relationship between monetary policy tools and stock returns.

$$W(t) = \mu(t) + \sum\pi w(t) + a(t); t = 1, 2, \ldots, T \quad (6)$$

$W(t) = (w_{1t}, w_{2t}, \ldots, w_{mt})$ which is a random vector.

$\mu(t)$ indicates a deterministic trend; and a(t) indicates a white-noise process of order two with a non-singular variance-covariance matrix Ω.

Bohl, Siklos and Sondermann (2007) analyzed the reaction of stock markets to unanticipated interest rate volatility in European countries. In this research four largest stock markets were selected in the European Union namely; the German DAX 30, the Italian MIB 30, The Spanish IBEX 35 and the French CAC 40. Intentions of this research were to assess the short term effect of monetary policy on stock market in European countries. According to their findings, there was a significant relationship between unexpected interest rate decisions and European stock market index. They found increasing interest rate by 0.25 percent; stock market indices would confront a reduction between 1.56 to 2.32 percent (Bohl, Siklos, & Sondermann, 2008). This relationship was more significant than the interdependence between monetary policy shock and stock return in the U.S. They used heteroskedasticity approach of Rigobon and Sack in their research. Equations below presented the method applied in the study.

$$\Delta i_t = \beta \Delta s_t + \gamma z_t + \sum_t \quad (7)$$

$$\Delta s_t = \alpha \Delta i_{t+} z_{t+} \eta_t \quad (8)$$

Equation (7) indicates the function of a monetary policy reaction where the stock return changes leads to reaction of monetary policy. Equation (8) illustrates dependency of stock return by changing in the monetary policy.

Chortareas, Nankervis and Noikokyris (2010) studied the effect of monetary policy on stock return before and after implementation of inflation targeting in the United Kingdom during 1982 to 2010. The research findings indicated that stock return had a negative association with monetary policy before the inflation targeting. However, publication of inflation reports affected on both stock prices and fluctuation of stock returns (Chortareas, Nankervis, & Noikokyris, 2010). Heteroscedasticity methodology of Rigbon and Sack with methodology of Bernanke and Kuttner were employed in this research (Bernanke, 2007).

$$r_i = \alpha + \beta\Delta i_i^{UK} + \square_i \quad (9)$$

Where r_i indicates a daily returns on the FTSE all shared Index, Δi_i^{UK} indicates the changes in the UK official policy rate.

The study by Pennings and Ramayandi (2011) tended to prove effectiveness of monetary policy on financial market in several countries such as: Canada, New Zealand, Australia, United Kingdom, Korea, Indonesia, Thailand and Malaysia during financial crisis (Pennings, Ramayandi, & Tang, 2011). According to their research, if interest rate increased by 1 percentage point, stock market index declined by one percent. For OECD countries, there was no strong evidence on the impact of monetary policy in financial market during financial crisis; yet in non OECD countries, some evidences indicated the stronger effect of monetary policy on stock return in the period of financial crisis. In this research two crisis-periods were studied, the narrower period was during 15 September 2008 to 15 March 2009 and the broader period begun at 1 January 2008 to 1 June 2010. The study pursued Bernanke and Kuttner's method to analyze the impact of monetary policy on financial market during the financial crisis (Bernanke, 2007).

$$\Delta f_t = \alpha + \beta\Delta i_t^{un} + \square_t \; ; \; f = e,s \quad (10)$$

Where Δi_t^{un} indicates unexpected changes in the monetary policy and Δf_t represents financial variables such as the exchange rate (e) and the stock market index (s). Following section describes the data and methodology applied together with the results extracted in analysis process.

Data, Methodology, and Results:

There are several steps were applied in this study. Through each step, one set of analysis is applied and results determine the next steps. The data for this study were collected from financial sources from 1991 to 2011 quarterly in Malaysia. The stationary analysis was tested in the first step. Hence, Augmented Dickey Fuller (ADF) Test and Phillip-Perron (PP) Test were conducted on data to test for existence of unit root. The non-stationary data were treated in a way to become stationary for further analysis. This was done by means of differencing exist in data. In the next step, co-integration test was conducted before applying Vector Error Correction Model (VECM) (Khin, Eddie, Zainalabidin, & Nasir, 2010). Results of unit root test are presented in Table 1.

Table 1: Results of Unit Root Test

	Augmented Dickey Fuller Test			Phillip-Perron Test		
Variable	Level	1st Difference	2nd Difference	Level	1st Difference	2nd Difference
M1	3.920	-4.626***	-9.356***	5.462	7.862***	-42.113***
M2	3.468	-5.309***	-10.877***	4.976	-5.307***	-27.613***
M3	3.162	-5.641***	-11.567***	4.267	-6.037***	-22.021***
KLCI	-1.670	-7.236***	-11.152***	-1.742	-7.277***	-15.257***
Real Interest Rate	-3.349**	-8.871***	-11.058***	-3.502**	-8.871***	-23.124***

*, **, ***: statistically significant at respectively 0.10, 0.05, and 0.01 acceptance levels

The results of unit root test indicate that monetary supply variables (M1, M2, and M3) are stationary only after first difference. Real GDP and market index of KLCI also have similar characteristics. They are also stationary after first difference. On the other hand, the real interest rate is inferred to be level stationary too. Thus, the results of ADF and PP tests confirm each other. In order to test the research model, long term relations between variables were identified by means of cointegration tests. Results of Johansson cointegration test on the model (cointegration rank) is presented in Table 2.

Table 2: Results of Johansson Cointegration Test on KLCI and Monetary Policy Instruments

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.450130	84.21622	69.81889	0.0023
At most 1	0.220461	36.96835	47.85613	0.3490
At most 2	0.146445	17.29322	29.79707	0.6183
At most 3	0.057040	4.783946	15.49471	0.8313
At most 4	0.001823	0.144146	3.841466	0.7042

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.450130	47.24787	33.87687	0.0007
At most 1	0.220461	19.67514	27.58434	0.3640
At most 2	0.146445	12.50927	21.13162	0.4983
At most 3	0.057040	4.639800	14.26460	0.7864
At most 4	0.001823	0.144146	3.841466	0.7042

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

As illustrated in Table 2, Johansson cointegration results encompassed both methods of Trace and Maximum Eigen-value. Results of trace method suggested the existence of one cointegration equation; while similarly maximum Eigen-value method suggested that one cointegration equation. In other words, there is a possibility of existence of only one long-run equilibrium relationship between KLCI, M1, M2, M3, and real interest rate within a multivariate framework.

Table 3: Results of Vector Error Correction Model (VECM) of KLCI, Money Supply and Real Interest Rate

Error Correction:	D(LNKLCI)	D(LNM1)	D(LNM2)	D(LNM3)	D(REAL_INT...
CointEq1	-0.887156	0.312307	0.070735	0.013084	-1.850155
	(0.17187)	(0.05969)	(0.03564)	(0.02571)	(1.73977)
	[-5.16193]	[5.23184]	[1.98456]	[0.50887]	[-1.06345]
D(LNKLCI(-1))	-0.017459	-0.165937	-0.049044	-0.029642	1.019443
	(0.12470)	(0.04331)	(0.02586)	(0.01866)	(1.26235)
	[-0.14001]	[-3.83115]	[-1.89639]	[-1.58884]	[0.80758]
D(LNM1(-1))	-0.992596	-0.052221	0.171976	0.093282	-2.039568
	(0.36125)	(0.12547)	(0.07492)	(0.05405)	(3.65691)
	[-2.74766]	[-0.41619]	[2.29549]	[1.72598]	[-0.55773]
D(LNM2(-1))	-1.363894	0.297062	-0.314360	0.108394	-24.38854
	(0.88992)	(0.30910)	(0.18456)	(0.13314)	(9.00861)
	[-1.53260]	[0.96107]	[-1.70330]	[0.81414]	[-2.70725]
D(LNM3(-1))	1.690925	-0.384606	0.091334	-0.419345	9.113335
	(1.12238)	(0.38983)	(0.23277)	(0.16792)	(11.3617)
	[1.50655]	[-0.98659]	[0.39238]	[-2.49735]	[0.80211]
D(REAL_INTEREST_RA...	-0.016609	0.007363	0.007102	0.004072	-0.587484
	(0.01058)	(0.00367)	(0.00219)	(0.00158)	(0.10711)
	[-1.56981]	[2.00350]	[3.23643]	[2.57249]	[-5.48506]
C	0.000410	-0.000201	-0.000157	-0.000188	0.001579
	(0.01472)	(0.00511)	(0.00305)	(0.00220)	(0.14904)
	[0.02785]	[-0.03936]	[-0.05158]	[-0.08535]	[0.01059]
R-squared	0.466032	0.520583	0.287519	0.275461	0.337313
Adj. R-squared	0.420908	0.480069	0.227310	0.214232	0.281311
Sum sq. resids	1.199353	0.144686	0.051584	0.026844	122.9014
S.E. equation	0.129970	0.045142	0.026954	0.019445	1.315677
F-statistic	10.32778	12.84943	4.775304	4.498880	6.023258
Log likelihood	52.14492	134.6287	174.8517	200.3247	-128.4095
Akaike AIC	-1.157562	-3.272532	-4.303889	-4.957044	3.472038
Schwarz SC	-0.946063	-3.061032	-4.092389	-4.745544	3.683537
Mean dependent	-0.000172	-7.08E-05	-5.94E-05	-0.000195	-0.010197
S.D. dependent	0.170793	0.062605	0.030664	0.021936	1.551954

The long run relation (cointegration equation 1), where represented in the horizontal equation in the first row, suggests that money supply variables of M1 and M2 have statistically significant impact on KLCI. According to the Table 3, t-statistics of 5.23 for M1 shows a significant relation between M1 and KLCI at 0.01 acceptance levels and t-statistics of 1.98 for M2 indicates a significant relationship between M2 and KLCI at 0.05. However, t-statistics of 0.50 fail to support a significant relationship between M3 and KLCI. In addition, t-

statistics of -1.063 indicates that there is not a statistically significant relationship between real interest rate and KLCI at any acceptance levels. In this long run equation, coefficients of KLCI and money supply variable (M1) had a similar sign which indicates a direct relationship between them.

Results of VECM model also provide information about the short term relation of the variables. First column on the left reveals the short term relation between KLCI and its own one period lagged term, one period lagged money supply variables (M1, M2, and M3) and one period lagged real interest rate. In other words, it shows the effect of KLCI, money supply, and real interest rate variable on one period ahead in time. Results are significant at 0.01 acceptance levels as the F-statistic is 10.32. Thus, existence of such relationship is statistically supported. The R-square of 0.46 indicates that up to 46 percent of variation in KLCI is explained by variation in money supply and interest rate, or their lagged terms. This shows the explanation power of model is acceptable with respect to the fact that the market index is primarily affected by the variation of the value of its underlying stocks. However, they are to some extent affected by variations of different variables including money supply or interest rates.

From Table 3, the t-statistic of -2.74 suggests that M1 (-1) is statistically significant at 0.01 acceptance levels. Thus, M1 can affect the KLCI in short term. However, t-statics of -1.53 and 1.50 fails to support any form of statistical relationship between M2 (-1), M3 (-1) and KLCI. Lastly, t-statistics of -1.56 indicates that the relationship between one quarter lagged real interest rate and KLCI is not acceptable at any level. Therefore, one may expect a short term relationship only between one periods lagged M1 and present term KLCI.

Second column of the Table 3 shows the result of short term effect of one period lagged changes in KLCI, M1, M2, M3, and real interest rate on the present time M1. As the F-statistic of 12.84 suggests, the model is statistically fit to explain the variation in dependent variable (M1) by variation in mentioned independent variables at 0.01 acceptance levels. R-Square of 0.52 shows up to 52 percent of variation in M1 could be explained by variation in the independent variables (lagged changes in KLCI, M2, M3, and real interest rate). As the t-statistic of -3.83 indicates, the present time M1 has a statistically significant negative relationship with one quarter lagged return on KLCI at 0.01 acceptance levels. In a similar manner, t-statistic value of 2.00 indicates that current changes in M1 has a statistically significant positive relationship with one quarter lagged real interest rate at 0.05 acceptance levels. Results fail to support any form of statistical relationship between current M1 and passed M2 or M3 in Malaysia.

Short term determinant of M2 is tested by model specified in the third column from left in Table 3. As the results show, the F-statistic of 4.77 suggests that the model statistically fit at 0.01 acceptance level. Moreover, the R-Square of 0.287 indicates that the model is expected to explain up to 28.7 percent of changes in M2 by changing independent variables (lagged changes of KLCI, M1, M3, and real interest rate). Results of t-statistics 3.23 indicate that present M2 has a positive relation with one period lagged change in real interest rate at 0.01 acceptance levels. Moreover, t-statistic of 2.29 indicates that current M2 has a short term positive relationship with one quarter lagged changes in M1 at 0.05 acceptance levels. Finally, t-statistics of -1.89 and -1.70 suggest present M2 has negative relationships with last quarter return on KLCI and lagged changes in M2 only at 0.10 acceptance level. Results failed to support any statistical relationship between M2 and lagged changes in M3.

Further, current M3 has a short term relationship with last quarter return on KLCI, lagged changes in M1, M2, M3, and real interest rate. F-statistic of 4.49 supports the model fit at 0.01 acceptance level. Moreover, R-square of 0.275 shows that the model has the ability to explain up to 27.5 per cent of variation in dependent variable. As t-statistics of 2.57 and -2.49 suggest, current M3 has respective short term relationship with one quarter lagged changes of real interest rate and M3 at 0.05 acceptance levels. Moreover, t-statistic of 1.72 suggests that current M3 has a positive relationship with one quarter lagged changes in M1 only at 0.10 acceptance levels. Results failed to support any relationship with last quarter return on KLCI, or lagged changes in M2.

Accordingly, present real interest rate has a short term relationship with one period lagged change in KLCI, M1, M2, M3, and real interest rate. This is supported at 0.01 acceptance level by F-statistic of 6.02. Moreover, R-square of 0.337 suggests that up to 33.7 percent of variation in the dependent variable can be explained by variation in independent variables. Results of t-statistics of -5.48 and -2.70 suggest that real interest rate has a negative relation with its own one period lagged change and one period lagged change in M2respectively (at 0.01 acceptance levels). However, results failed to support any form of statistical relationship with other independent variables.

Conclusion:

This paper aimed to investigate the monetary policy impacts on the variables of M1, M2, and M3 and real interest rate on the return of stock market index in Malaysia. The research and theorical background, empirical frameworks of monetary policy concepts and stock market performance are discussed in this study. The results of Johansson cointegration test indicate one long-term relationship among money supply variables of M1, M2, M3 and real interest rate.

The VECM analysis also revealed statistically significant relationship between M1 and M2 as a monetary supply variable included in the research model. Thus, M1 and M2 have long term influence on KLCI. It can be inferred that by increasing money supply the market index of KLCI would increase eventually. This means firms have better access to financing options that can help them towards their economic growth or operations. In other words, firms can increase their revenue and boost their value in capital market. Therefore, firms may expect growth in stock price within the market, results the overall market index growth.

The implication of this finding is basically for policy makers and central bank (*i.e.* Bank Negara Malaysia, or BNM). They may affect the market index positively over a long period by choosing expansionary monetary policy. This is supported by the findings of this study based on expansionary monetary policy (especially in terms of M1 and M2) and would boost the return on the index of Bursa Malaysia.

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