

**CAUSALITY BETWEEN MONEY SUPPLY AND STOCK PRICES: A  
PRELIMINARY INVESTIGATION ON MALAYSIAN STOCK MARKET**

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# **CAUSALITY BETWEEN MONEY SUPPLY AND STOCK PRICES: A PRELIMINARY INVESTIGATION ON MALAYSIAN STOCK MARKET**

## **ABSTRACT**

This study investigates the notion of causality between money supply and stock prices by using a simple bivariate Granger causality test for Malaysia stock market. The results suggested the existence of bi-directional relationship between money supply and stock prices. However adding further lags indicates that causality running from stock prices to money supply becomes weaker compared with causality running from money supply to stock prices. This may indicate that anticipating the changes in money supply may provide better understanding on the changes in stock prices.

## **1. INTRODUCTION**

Security market reflect what is expected to go on in an economy because the value of an investment is determined by its expected cash flows and its future required rate of return. Its expected aggregate economic environment influences both of these factors. From this interrelated economy, we begin to study the expected relationship between economic activity (money supply growth) and the security markets to provide empirical evidence of this relationship. In the classic work, Friedman & Schwartz specifically demonstrated that declines in the rate of growth of money supply have preceded business contractions by an average of 20 months, while increase in the growth rate of the money supply have preceded economic expansion by about 8 months.

In case of Malaysia, the improved performance of the economy and stronger economic fundamentals in year 2000 further enhanced investor confidence. The composite index of the Kuala Lumpur Stock Exchange (KLSE) increased to 1,009.53 points on 24 February 2000, an increase of 284 per cent compared with the lowest level of 262.7 points on 1 September 1998. Thus, performance of the KLSE should be determined by developments in the domestic economy and the performance of companies listed on the KLSE.

Other researchers contend that excess liquidity is the relevant monetary variable that influences stock prices. It means that the growth rate of nominal GDP may indicate the need for liquidity in the economy. If the money supply growth rate exceeds the GDP growth rate, this indicates there is excess money (liquidity) in the economy that is available for buying securities. Therefore, it is reasoned that excess money should lead to higher security price.

This study intended to investigate the causal relationship between money supply and stock prices in particular composite index of Kuala Lumpur Stock Exchange. Better understanding on the relationship between these two variables will provide some insight in explaining the change in stock prices. Indeed the study has also been extended to examine the timing of the relationship between money supply and stock prices.

## **2. PREVIOUS STUDIES**

Beryl W. Sprinkel (1971) is among the early researchers to investigate the changes in the growth rate of the money supply and stock prices. His study indicated the strong leading relationship between money supply changes and stock prices. Such result implied that changes in the growth rate of the money supply could serve as a leading indicator of stock price changes. In similar context, V.L Cooper (1974) analyzed the relationship between these two variables and found that there are strong relationship between money supply growth and the stock prices. Although these studies likewise found a relationship between money supply and stock prices, the timing of the relationship differed. Indeed these studies found that changes in the growth rate of the money supply did not lead stock prices but consistently lagged stock returns by about one to three months

By using Granger Causality test, Azlan & Azuddin (1998) has performed the test on money and stock prices for four different lag structures (3, 6, 9 and 12 months) to ensure the consistency of the relationship. The result strongly indicates that money Granger cause stock prices particularly for the Composite, Finance and Property sector for every

lag structure. They also concluded that in the Malaysia stock market causation between money and stock prices is uni-directional running from money to stock prices but not the reverse except for shares included under the Finance sector.

A study done by Lawrence S. Davidson and Richard T. Froyen (1982) examined the relationship of stock returns to anticipated and unanticipated money supply growth using weekly money supply data. The results indicated that money changes affect stock prices but stock prices adjust very quickly to unexpected changes in money supply growth. Therefore, if one wanted to enjoy superior returns, it is necessary to forecast unanticipated changes in money supply growth.

Beenstock and Chan (1986) used the Arbitrage Pricing Theory (APT) in the context of UK security market. They investigated about the economic forces in the London stock market by using monthly observations on rate of returns for 220 different securities over the period 1961-1981. The study found that four factors namely interest rate, material cost, money supply and inflation strongly influenced the stock market. The sensitivity of portfolio returns to these risk factors significantly explained their expected returns.

On the other hand study by Lorie and Hamilton (1985) found corporate profits as the significant determinant of the level of stock prices. During the Great Depression, corporate profits and stock prices fell by more than 75 percent. In all subsequent period up to 1960, profits rose quickly while stock prices lagged badly for several years. If an investor could forecast profits and the ratio of prices to profits, one could obviously forecast stock prices and become extremely wealthy. They believe that stock prices are not determined or significantly influenced by the GNP, employment rather it respond more to corporate profits. In the recession of 1969-1970 in US, the relationship between changes in nominal GNP and nominal corporate profit is surprising. While nominal GNP was rising in every quarter, corporate profits declined 21 percent between the third quarter of 1969 and the fourth quarter of 1970. There were generally persistent high rate of return on equities between 1954 and 1965 and between 1982 and 1989 when the American economy had relatively stable prices

Shih Mo-Lin and C. Yuan (1994) study the relationship between stock returns and money supply in three Asian Newly Industrialized countries by examining the cross spectral coherence and the partial coherence for four financial and economic variables. Depending on the country examined, the direction of causality is found to be either from stock returns to money supply or vice versa. Indeed in the short and long run more than one variable responded to the changes in another variable suggesting the existence of more than one channel through which money supply is related to stock returns.

Homa and Jaffe (1971) investigated the relationship between money supply and stock prices by using quarterly data of the growth rate of money supply and Standard & Poor's 500 index to represent stock prices. A regression analysis was conducted to identify their relationship. The result implied that the two variables are significantly correlated and the investor's ability to predict the money supply and act accordingly generates better investment return.

Based on Singh & Talwar (1982), in turn, examined the causal relationship between monetary and fiscal policies on the stock prices by employing a bivariate autoregression model. In general, the study concluded that fiscal and monetary policies influence stock prices. The result showed that the M1 cause Toronto Stock Exchange (TSE) with one-quarter lag and Federal Government expenditure cause the TSE with eight quarters order lag.

### **3. THE DATA**

The empirical analysis is conducted over 13 years using quarterly data that covers from 1990:1 to 2003:3. Composite index of Kuala Lumpur Stock Exchange (KLSI) is used as the proxy for the stock price and the narrow money definition (M1) is used to measure the money supply (MS). All the data were obtained from DataStream.

#### 4. GRANGER CAUSALITY

To examine the causality relationship between KLSI and money supply the Sims' causality test based on Granger definition was used. The OLS version of the Granger test was used because of its easiness of implementation, power and robustness in finite samples. The approach is expressed in two pairs of regression equation by simply twisting independent and dependent variables as follows<sup>1</sup>:

A formal test for Granger causality running from MS to KLSI is shown as

$$KLSI_t = a_1 + \sum_{j=1}^J b_j KLSI_{t-j} + \sum_{k=1}^K c_k MS_{t-k} + \varepsilon \quad (\text{UNRESTRICTED}) \quad (1)$$

$$KLSI_t = a_1 + \sum_{j=1}^J b_j KLSI_{t-j} + \varepsilon \quad (\text{RESTRICTED}) \quad (2)$$

Where,

*KLSI* = Composite Index of Kuala Lumpur Stock Exchange

*MS* = Money Supply (M1)

*t* = time

According to Granger's definition of causality MS does not cause KLSI, if the past value of MS fails to explain the change in stock prices. To judge as whether these conditions hold the F-statistics were applied to equation 1 relative to equation 2.

$$F = [ (R^2_{UR} - R^2_R) / m ] / [(1-R^2_{UR}) / (n-2m-1)]$$

**Where,**

$R^2_{UR}$  = Sum Square of the Unrestricted equation

$R^2_R$  = Sum Square of the restricted equation

n = number of observation

m = number of regressors

Four possible direction of causality may occur; MS causes KLSI, KLSI causes MS, bi-directional/feedback causality or MS and KLSI are independent

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<sup>1</sup> To test causality running from KLSI to money supply, now the dependent variable becomes MS.

## 5. UNIT ROOT TEST

For the results to be reliable the variables of the model need to be stationary (free from unit root) since non-stationary variables can cause “spurious regression” problem discussed by Granger and Newbold (1974) and Phillips (1986). Indeed when model includes non-stationary variables the usual test statistics such as t and F would not have the standard distribution. However if the variables are non-stationary Granger suggested that the time series could achieve stationarity if differenced appropriately. To examine the properties of the variables the Augmented Dickey Fuller (ADF) test is employed.

**TABLE 1: AUGMENTED DICKEY-FULLER UNIT ROOT TEST FOR MS AND KLSI**

	ADF Statistics (No Trend)	ADF Statistics (With Trend)	Lag	I(d)
<b>Panel 1: Log Levels</b>				
MS	-0.658063	-2.676614	0	I(1)
KLSI	-2.315243	-2.274366	0	I(1)
<b>Panel II: Log Differences</b>				
MS	-6.623677	-6.792971	0	I(0)
KLSI	-8.497887	-8.449768	0	I(0)

Note: All regression is estimated with and without a time trend. Selection of the lags was done based on AIC. I(d) indicates that the series are integrated of order d.

**TABLE 2: MACKINNON CRITICAL VALUES FOR REJECTION OF HYPOTHESIS OF A UNIT ROOT**

Critical Value	Log Levels		Log Differences	
	No Trend	With Trend	No Trend	With Trend
1%	-3.5547	-4.1348	-4.1383	-3.5572
5%	-2.9157	-3.4935	-3.4952	-2.9167
10%	-2.5953	-3.1753	-3.1762	-2.5958

The results from the test indicate that MS and KLSI are non-stationary since ADF test-statistics is greater than the critical “tau” at 1%, 5% and 10% significant level. However after the first differences its is noted that the time series becomes stationary meaning to say that we could accept the  $H_1$  that the series doesn’t has an unit root problem and the series is a stationary series at 1%, 5% and 10% significant level.

However, one needs to test for co-integration before turning to the test of causality. Extensive work by Granger (1987) has shown that ignoring co-integration when it exists can lead to serious model misspecification. This study uses two-step procedure suggested by Engel and Granger (1987) to test for the existence of co-integration. The unit root test on the residual suggested that the residual from the regression of KLSI and MS are I(1); that is they are non-stationary. This indicates that regressing KLSI and MS may result in spurious regression problem. Hence to test the causality relationship the first differences of MS and KLSI is used.

**TABLE 3: F STATISTICS FOR GRANGER CAUSALITY ANALYSIS**

<b>Null Hypothesis: Money Does Not Cause Stock Prices</b>				
Dependent Variable	Lag-period (months)			
	3	6	9	12
KLSI	7.73994 (0.00760)	5.91646 (0.00511)	5.21192 (0.00363)	7.41438 (0.00014)
<b>Null Hypothesis: Stock Prices Does Not Cause Money</b>				
MS	11.5847 (0.00132)	8.81801 (0.00056)	8.97165 (9.4E-05)	7.13326 (0.00019)

Note: Figures in parentheses are the significant level.

The result of the bivariate Granger causality test between money supply and stock prices are presented in Table 3. The null hypothesis states that there is no causation between the two variable which is performed for four different lag periods namely 3, 6, 9 and 12 months. It can be concluded that in all cases the null hypothesis of money supply doesn't Granger cause KLSI could be rejected meaning to say that money supply significantly explains the changes that occurs in stock prices. Indeed the results are consistent for all the lag periods. To test the reverse causality from stock prices to money supply, the money had been made as the dependent variable. The F statistics for testing the reverse causation indicates that we could strongly reject the null hypothesis that KLSI doesn't

cause money supply. As a conclusion the Granger causality analysis indicates the strong existence of bi-directional causation running from money supply to stock prices and stock prices to money supply. Indeed this result is consistent with the other research which noted the expansionary effect of monetary policy on stock prices. In addition the results are consistent even after applying several lag periods. However it can be noted that when more lag is applied the relationship running from stock price to money supply becomes weaker than the relationship running from money supply to stock prices.

## 6. CONCLUSION

In this paper, relationship between money supply and stock price has been examined. The result suggested the existence of a feedback causal relationship between money supply and stock prices. Investors should be able to gain additional information by anticipating the changes in monetary policy, which exert a significant impact on stock prices. However, further research should be focused on including other economic variables such as GDP, interest rate and others to investigate the overall impact on the stock prices.

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