An Investigation of Stock Price Determinants: Case of MALAYSIA

Erma Zulaikha Omar, Tay Bee Hoong*

Faculty of Business Management, Universiti Teknologi MARA Cawangan Johor,
KM12, Jalan Muar, 85200 Segamat, Johor.
Email: taybe869@johor.uitm.edu.my

Abstract

Stock price is one of the most important leading indicators in the economy. It can be affected by a many factors including volatility of the market, current economic conditions and popularity of the company. Thus, stock price is an essential determinant of a country's economic growth. The purpose of conducting this study is to examine the relationship between stock prices and selected variables namely exchange rate, inflation rate, interest rate, money supply, balance of trade, disposable income and gross domestic products. Quarterly data are used in this study ranges from 1999 to 2011. The statistical method used in this study is the multiple linear regression which is used in determining the relationship between dependent variable and independent variables. The findings of this study show that there are positive relationship between stock prices of the Kuala Lumpur Composite Index (KLCI) with the balance of trade and interest rate. This study emphasizes on the effects of selected variables toward the stock prices.

Keywords stock prices, balance of trade and interest rate.

INTRODUCTION

Stock price is one of the most important leading indicators in the economy. It can be affected by many factors. Investment in shares is one of the most familiar types of investment among the investors because it is the easiest way of investing and it offers convenient way to liquidate the assets. For a company, stock market is an important avenue to raise fund. In finance, the stock market is the single most important market with respect to corporate investment decisions. Besides that, stock price shows the expectation of earnings and yield in the investment and also react to other indicators in the economy.

Stock price is a crucial factor of a country's economic growth. It can be affected by a number of things including volatility in the market, current economic conditions and popularity of the company. One of the main things that affect the stock price is

macroeconomic indicators. Arbitrage pricing theory which developed by Ross (1976) is one of the theories used in determining relationships between the determinants of the stock prices.

Study by previous researchers such as Pal and Mittal (2011) focused on the macroeconomic variables such as inflation rate, exchange rates and money supply. In addition, Imran, Kashif, Ayse, Aslam and Hassan (2010) used variables namely inflation rate, exchange rate, balance of trade and index of industrial production in their study that related to stock prices. However, variables such as gross domestic product and disposable income received less attention by the previous researchers.

OBJECTIVE OF THE STUDY

In order to understand more about this topic, a study on determinants of stock price in Malaysia is conducted to examine the relationship between selected variables and stock price. This study is significant since stock price and stock index are generally the benchmark for predicting the future economy performance. The purpose of this study is to analyze the relationship between the determinants of stock price in Malaysia.

LITERATURE REVIEWS

This study undertakes macroeconomic variables, namely interest rate, inflation rate, exchange rate, money supply as proposed by the previous researchers [Tsoukalas(2003), Rjoub, Tursoy and Gunsel(2009), Wickremasinghe(2011), Pal and Mittal (2011)]. Variables such as gross domestic product (Wickremasinghe, 2011) and disposable income (Garcia, 1999) are included in this study due to the fact thatit has received lessattention from the previous studies and less evidence are found from Malaysian stock market. In the context of Malaysian equity market, study by Ibrahim and Aziz (2003) analyzed the dynamic linkages between stock price and macroeconomic variables, namely exchange rates and money supply by using cointegration and vector autoregressions.

Inflation rate and interest rate are the two essentialfactors that seem to substantially affect the stock price behavior. In fact, many arguments arise on how it affects the stock prices. In regards to this, study by Apergis and Eleftheriou (2001) presented that stock prices followed inflation rather than interest rate movements for the Athens Stock exchange (ASE). Stock prices of ASE are continuously increases with continuous reduction in inflation which results in high economic growth.

In addition, Pal and Mittal (2011) who studied on the long-run relationship between the Indian capital markets and macroeconomic variables found out that inflation rate have a significant impact on both BSE Sensex and the S&P CNX Nifty. Nevertheless, study by Merikas and Merika(2006) proposed that inflation rate affected negatively the stock price. Same results are drawn from the study by Anthony and Kwame (2008) for the Ghana Stock Exchange.

Money supply is one of the macroeconomic variables which act as indicator for a country's growth. It refers to total money available in economy circulation. Increasing in money supply may lead to high uncertainty in inflation and give negative impact

on stock markets (Rjoubet al., 2009; Ibrahim and Aziz, 2003). Mukherjee and Naka (1995) documented positive long-run relationship between stock prices and money supply for Japan and Singapore.

On top of that, past researches showed that exchange rate and stock prices are negatively associated when using cointegration and vector autoregression (VAR) analyses. [Ibrahim and Aziz (2003), Zhao (2010), Rjoub et al. (2009) and Wickremasinghe(2011)].

On the other hand, Rjoub et al.(2009) suggested that one of the influential macroeconomic variables is interest rate as stock value is directly affected by the discount rate. Ordinary Least Square method is used in their study which proposed a significant positive relationship between the two variables. In contrast, study by Khaled and Le (2009) established that interest rate has negative relationship with the Vietnamese stock price by referring to multivariate vector autoregression (VAR). Likewise for study conducted by Alam and Uddin (2009).

Balance of trade is the difference of exports and imports. Study by Imran et al. (2010) found that there is no Granger causality between Karachi Stock Exchange Price and balance of trade and other macroeconomic variables. This shows that macroeconomic variables cannot be used as an indicator in predicting Pakistani equity markets. However, study by Nishat and Shaheen (2004) found causal relationship between stock price and macroeconomic variables.

Wickremasinghe (2011) stated in his results that there are short-run and long-run causal relationships between stock prices and macroeconomic variables such as gross domestic product, exchange rate, interest rate, inflation rate and also money supply. In addition, study by Nisa and Nishat (2007) proposed that there is significant impact between Karachi Stock exchange and gross domestic products.

In this study, disposable income is included because less research is being conducted to examine the influence of this variable towards the stock price. Study by Garcia (1999) noted that income is highly correlated with the stock market size. High income did promote and catalyze the development of the stock market. By using causality test, a positive relationship between disposable income and stock price is concluded.

DATA AND METHODOLOGY

The multiple linear regression method is used to analyze the relationship between the macroeconomic variables with the stock price. The stock price is represented by the Kuala Lumpur Composite Index (KLCI). While the other variables are represented by base lending rate for interest rate, changes in consumer price index for inflation rate, Malaysian Ringgit to US Dollar for exchange rate, goods trade balance for balance of trade, M2 for money supply, current GDP for gross domestic product and Malaysian disposable income for disposable income. All of the data are range from first quarter of 1999 to fourth quarter of 2011.

Research Framework

The research framework undertakes this study is provided by the following diagram. It shows that stock prices are influence by the selected variables for this study.
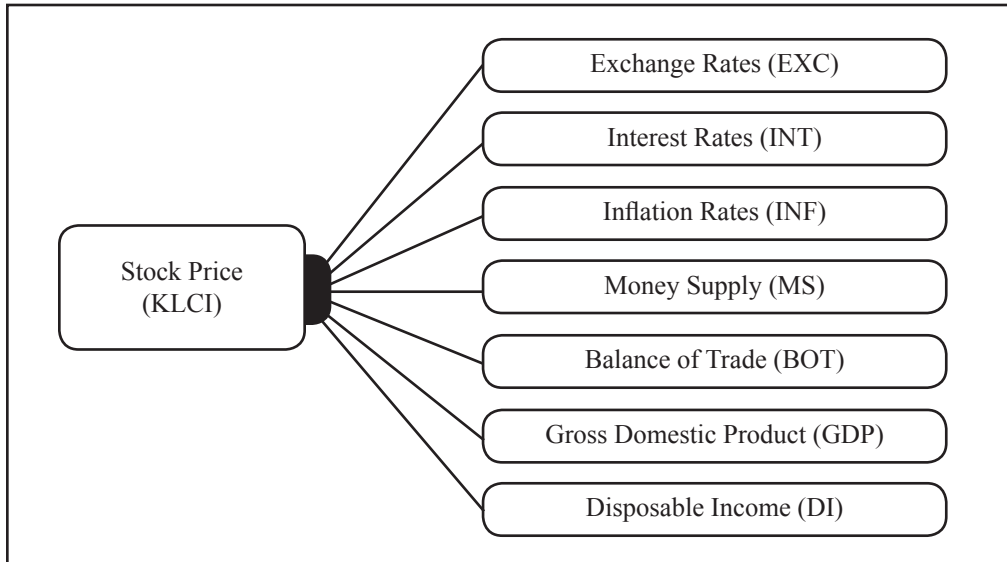
The Model

From the above research framework, the model constructed for this study is as follows:

$$KLCI\ (Y) = b_0 + b_1 EXC + b_2 INT + b_3 INF + b_4 MS + b_5 BOT + b_6 GDP + b_7 DI + e$$

where Y shows stock prices as presents by the Kuala Lumpur Composite Index (KLCI) while X refers to all the independent variables as stated below:

EXC : Exchange rates
INT : Interest rates
INF : Inflation rates
MS : Money supply
BOT : Balance of trade
GDP : Gross domestic product
DI : Disposable income
e : Error term

Hypothesis Statement

The hypothesis statement for this study is stated below. As null hypothesis, we hypothesized that there is no significant relationship between the selected variables and the stock price.

H_0: There is nosignificant relationship between the selected variables and the stock price.
H_1: There is a significant relationship between the selected variables and the stock price.

DATA ANALYSIS

Unit Root Test

By using the Augmented Dickey-Fuller (ADF) test, data stationarity is checked based on the following hypotheses to test on the present of unit root:

H_0: Data is nonstationary.
H_1: Data is stationary.

The results on the unit root tests are presented as follows:

Table 1 Summary of the Unit Root Tests

VARIABLES	LEVEL (p-value)	1st DIFFERENCE (p-value)
KLCI	0.0182	-
EXC	0.5296	0.0000
INF	0.0000	-
INT	0.1360	0.0001
M2	0.9329	0.0037
BOT	0.0312	-
DI	0.7206	0.0132
GDP	0.2587	0.0000

Refer to table 1, only KLCI, INF and BOT data are stationary at level because its p-value is smaller than 5% significance level, hence the null hypothesis are rejected. Data on EXC, INT, M2, DI and GDP are stationary at 1st difference.

Regression models: findings

The regression models for this study are show in the following table.

Table 2 Summary of the Regression Models

VARIABLES		MODEL 1	MODEL 2	MODEL 3	MODEL 4
EXC	Coefficient	-222.13	-	-544.58	-
	p-value	0.6554	-	0.2309	-
	VIF	1.4268	-	1.1378	-
INF	Coefficient	14.4718	-	12.9509	-
	p-value	0.7404	-	0.6910	-
	VIF	1.3118	-	1.1376	-

INT	Coefficient	253.5765	-	-	368.46
	p-value	0.2010	-	-	0.0187**
	VIF	1.6003	-	-	1.0031
M2	Coefficient	0.0027	-	0.0025	-
	p-value	0.2958	-	0.3318	-
	VIF	1.5601	-	1.4923	-
BOT	Coefficient	0.0203	0.0242	0.0217	0.0234
	p-value	0.0000*	0.0000*	0.0000*	0.0000*
	VIF	1.4626	1.0000	1.4872	1.0031
DI	Coefficient	428.7976	-	-	-
	p-value	0.9030	-	-	-
	VIF	2.2142	-	-	-
GDP	Coefficient	0.0034	-	-	-
	p-value	0.6296	-	-	-
	VIF	2.7737	-	-	-
C	Coefficient	304.84	263.77	285.10	291.82
	p-value	0.0093*	0.0122**	0.0112**	0.0051*
F-test		8.0749	51.6078	12.6021	29.4189
Prob(F-statistic)		0.0000*	0.0000*	0.0000*	0.0000*
R^2		0.5737	0.5079	0.5283	0.5507
Akaike info criterion		13.6093	13.5432	13.5905	13.4786
Test of assumptions					
Normality test		4.3127	4.7935	5.4726	3.9192
		0.1157	0.0910	0.0649	0.1409
Autocorrelation		23.1508	26.8581	22.8383	21.8662
		0.0000*	0.0000*	0.0000*	0.0000*
Heteroscedasticity		9.7598	9.1812	23.4039	12.6650
		0.2026	0.0101**	0.0540	0.0267**
Ramsey reset		0.0999	2.2695	0.0013	2.0785
		0.7537	0.1384	0.9714	0.1560
Multicollinearity		No serious multicolinearity	No serious multicollinearity	No serious multicollinearity	No serious multicollinearity

Notes: * and ** denote significance at the 1 and 5 percent level.

Based on the above results, the best model is model 4 since it has lowest Akaike info criterion.

Model 4

The model that best fit the objective of the study is model 4 with the following equation:

$$KLCI = 291.82 + 0.0234BOT + 368.46D(INT) + e$$

Refer to table 2 (model 4), balance of trade is statistically significant at 1% level of significance. This means that one unit increase in balance of trade will increase the stock price marginally by 0.0234. It is inconsistent with the previous study by Imran

et al. (2010) which stated that there is no causal relationship between stock price and balance of trade.

On the other hand, interest rate is significant at 5% level of significance. Therefore, increasing in one unit of interest rate will increases 368.46 unit of stock price. It is consistent with study by Rjoubet al.(2009) which determined that the relationship between interest rate and stock price is significant positive.

The F-test shows that this model can be used to analyze and interpret the data. The model's goodness of fit is 0.5507 which means 55.07% of the dependent variable is explained by the balance of trade and interest rate.

Test on normality of error term

To test on the normality of error term whether the residuals are normally distributed or not, these hypotheses are used:

H_0:   Error term is normally distributed.
H_1:   Error term is not normally distributed.

The test on normality of error term is represents by the results on Jarque-bera test which is 3.9192 with the p-value of 0.1409. By choosing 5% significance level, the null hypothesis is not rejected since its p-value is greater than the significance level. As a result, the error term is normally distributed.

Test on serial correlation of error term

To test on serial correlation of error term, the following hypotheses are used:

H_0:   Error term is serially independent.
H_1:   Error term is not serially independent.

From table 2, autocorrelation represents the test on serial correlation of error term by using the Breusch-Godfrey serial correlation LM test. The "Obs*R-squared" result shown 21.8663, while its prob. Chi-Square is 0.0000. This means, null hypothesis is rejected at 5% level of significance which signifies that the error term is not serially independent. Thus, it is concluded that autocorrelation problem is existed in this study since its p-value is smaller than the level of significance.

Test on variance of error term

To check whether the error term has constant variance, the hypotheses are:

H_0:   Error term is homoscedastic.
H_1:   Error term is heteroscedastic.

Table 2 shows that the error term has constant variance since it's"obs*R-squared" is 12.6650 and its prob. Chi-square is 0.0267. Based on the results shown, it can be concluded that this model fails to reject the null hypothesis and the error term is homoscedastic.

Test on functional form

To test the present of any misspecification on the functional form, the following hypotheses are used:

H_0:   No misspecification.
H_1:   Error in specification.

The test on functional form is conducted by using Ramsey's Regression Error Test (RESET). With the p-value of 0.1560, the results show no error in specification of the functional form.

Multicollinearity

Variance Inflation Factors (VIF) is used to test on the multicollinearity problem. The centered VIF is used as the tool to identify serious multicollinearity between the variables. The value of VIF should range from 1 to 10 to enable the t-test and F-test be used without any doubt. By refer to the above table, both the centered VIF of balance of trade and interest rate are 1.0031. This means that there is no serious multicollinearity problem.

As a summary, model 4 is chosen as the best model for this study even though it has autocorrelation problem. Present of autocorrelation problem is because of the used of time series data. Nevertheless, the model is in correct functional form, the error term is normally distributed, serially independent and homoscedastic, as well as the model does not have multicollinearity problem.

DISCUSSION

Four models are derived from the regression analysis and model 4 is chosen as the best fit model for this study. It is concluded that only balance of trade and interest rate are statistical significant and have relationship with the stock prices. In this study, balance of trade has positive relationship with the stock price. The results support study by Nishat and Shaheen (2004)who found causal relationship between stock price and macroeconomic variables. However, it is inconsistent with the previous study by Imran et al. (2010) which stated that there is no causal relationship between stock price and balance of trade.

On the other hand, interest rate is identified to have positive relationship with the stock prices and it is consistent with study by Rjoubet et al. (2009) who determined that the relationship between interest rate and stock price is significantly positive. However, the results are not consistent with study by Khaled and Le (2009), Apergis and Eleftheriou (2001).

The results derived from this study provide some insights for policy implication. Since balance of trade is statistically significant and have relationship with stock prices, the policy maker may consider improving on the net export position in order to facilitate better performance of the stock market. In addition, interest rate is the variable that affects more on the stock price since one unit increases in interest rate will increase the stock prices more if compared to the balance of trade. Therefore, the

policy maker may focus on interest rate as a monetary tool to develop the stock market as well as to enhance the economic performance.

In order to improve the studies on this topic, there are some recommendations that can be taken into consideration for the future researchers. The researchers may add other significant variables to improve the discussion on this issue and provide a more conclusive perspective for this study. In addition, researchers may extend the time horizon to get better results. Last but not least, other more advance methodologies should be considered to improve the results of the study.

REFERENCES

Alam, M.M., & Uddin, M.G.S. (2009). Relationship between Interest Rate and Stock Price: Empirical Evidence from Developed and Developing Countries. *International Journal of Business and Management*, 4(3), 43–51.

Anthony, K.C. & Kwame, F.A. (2008). Impact of macroeconomic indicators on stock market performance. *Journal of Risk Finance*, 9(4), 365–378.

Apergis, N., & Eleftheriou, S. (2001). Interest rates, inflation and stock prices: the case of the Athens Stock Exchange. *Journal of Policy Modeling*, 24, 231–236.

Fischer, S., & Merton, R.C. (1984). Macroeconomics and finance: The role of the stock market. National Bureau of Economic Research, Revised January 1984.

Garcia, V.F. (1999). Macroeconomic determinants of stock market development. *Journal of Applied Economics*, Vol. 2 (1), 29–59.

Ibrahim, M.H., & Aziz. H. (2003). Macroeconomic variables and the Malaysian equity market: A view through rolling subsamples. *Journal of Economic Studies*, Vol. 30 (1), 6-27.

Imran, A., Kashif, U.R., Ayse, K.Y., Muhammad, A.K. & Hasan, A. (2010).Causal relationship between macro-economic indicators and stock exchange prices in Pakistan. *Journal of Business Management*, Vol. 4 (3), 312–319.

Khaled, H. & Le, K.N. (2009). The impact of macroeconomic indicators on Vietnamese stock prices. *Journal of Risk Finance*, Vol. 10 (4), 321–332.

Merikas, A.G., & Merika, A.A. (2006). Stock prices response to real economic variables: the case of Germany. *Journal of Managerial Finance*, Vol 32 (5), 446–450.

Mukherjee, T.K., and Naka, A. (1995). Dynamic relations between macroeconomic variables and the Japanese stock market: an application of a vector error-correction model. *The Journal of Financial Research*, Vol 18, No 2, 223–237.

Nisa, M., & Nishat, M. (2007). The Determinants of Stock Prices in Pakistan. *Asian Economic and Financial Review*, 1(4), 276–291.

Nishat, M., and Shaheen, N. (2004). Macroeconomic factors and Pakistani equity market. *The Pakistan Development Review*, 43(4) Part II, 619–637.

Pal, K., & Mittal, R. (2011). Impact of macroeconomic indicators on Indian capital markets. *Journal of Risk Finance*, Vol. 12 (2), 84–97.

Rjoub, H., Tursoy, T., & Gunsel, N. (2009). The effects of macroeconomic factors on stock returns: Istanbul stock market.*Studies in Economics and Finance*, Vol. 26 (1), 36–45.

Ross, S. (1976). The Arbitrage Theory of Capital Asset Pricing. *Journal of Economic Theory*, 13(2), 341–360.

Tsoukalas, D. (2003). Macroeconomic factors and stock prices in the emerging Cypriot equity market. *Journal of Managerial Finance*, Vol. 29 (4), 87–92.

Wickremasinghe, G. (2011). The Sri Lankan Stock Market and the Macroeconomy: An Empirical Investigation. *Journal of Economics and Finance*, Vol. 28 (3), 179–195.

Zhao, H. (2010). Dynamic relationship between exchange rate and stock price: Evidence from China. *Journal of International Business and Finance*, Vol. 24, 103–112.