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FOREIGN BILATERAL RELATIONS BETWEEN USA AND MALAYSIA, FROM DJIA AND KLCI PERSPECTIVES.

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Abstract

In this study we investigate the relationship between the DJIA and the KLCI. Extreme movements in the DJIA and KLCI are compared and we examine the extent and magnitude of extreme movements in the KLCI as triggered by extreme movement in the Dow Jones. The data consists of historical indices for DJIA and KLCI. Due to the difference in the ranges of the KLCI and DJIA indices, percentage return is used for comparison. Pearson's correlation coefficient was used to determine the strength of the relationship between the two variables, followed by fitting a linear equation. Using hypothesis testing, extreme movements in returns of KLCI and DJIA are also compared Result shows there exist a moderate relationship between KLCI and DJIA. In particular, we found that regardless of the magnitude of change in both the DJIA and KLCI, the two indices move in the same direction more often than in opposite directions. Thus, KLCI traders should consider this finding when trying to predict directional changes in the KLCI with respect to DJIA movements.

Keywords: Percentage return, Dow Jones industrial average, Kuala Lumpur composite index.

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1. Introduction

The Kuala Lumpur Composite Index (KLCI), now known as the FTSE Bursa Malaysia KLCI, is a stock market index generally accepted as the barometer of the Malaysian stock market. It was introduced in 1986 to satisfy the need for a stock market index which would serve as an accurate performance indicator of the Malaysian stock market as well as the economy. It contains companies from the Main Board such as Malayan Banking, CIMB Group Holdings, Public Bank, Sime Darby, Axiata Group, Genting, Tenaga Nasional, IOI Corporation, PETRONAS Chemical Group and Digi.Com analyze the impact of interest rates and exchange rate on volatility of different sectors and composite indices in Istanbul stock exchange (Vardar, Aksoy & Can, 2008). Results show strong power of prediction of the two variables on the volatility of the composite index.

The Dow Jones Industrial Average was created on May 26, 1986 and named after Charles Dow, nineteenth century Wall Street Journal editor and co-founder of Dow Jones & Company. At that time, there were only twelve stocks in the index, representing the industrial component of America's stocks markets. Furthermore, some alternative explanations for spill over phenomenon between markets are developed based upon behavioural financial theory, which assumes that the information and the characteristics of market participants systematically affect individual investment decisions and market outcomes (Fung & Lam, 2009). The Dow Jones Industrial Average (DJIA) is one of the most closely-watched benchmark indices. It shows how 30 American-based large and publicly owned companies have traded during a standard trading session in the stock market. The companies are Alcoa, Allied Signal, American Express, Boeing, Caterpillar, Chevron, DuPont, Disney, Kodak, General Electric, General Electric, General Motors, Goodyear, Hewlett-Packard, IBM, International Paper Co. , J.P. Morgan, Johnson & Johnson, Coca Cola, McDonalds, 3M, Philip Morris, Merck, Procter and Gamble, Sears, AT&T, Travlers, Union Carbide, United Technologies, Exxon and WalMart. However, due to the unique characteristics of China's stock market, Huang and Bacon (2009) found difficulties in ascertaining that the nine-percent fall in the SSE Composite Index was indeed the sole trigger for the subsequent $1.5 trillion global market shake out. It is a price-weighted average and gives more emphasis on higher-priced stocks without regard for market capitalization and size of the industry, unlike the KLCI.

In August 2017, more than 1 million jobs have been added since USA's President Trump took office. The stock market is at record highs. Christodoulos, Michalakelis and Varoutas, (2010) applied the model to the world broadband and mobile telecommunications' penetration using limited data, results show that the combine model is capable of producing improved one-year-ahead predictions. The USA's President Trump took a victory lap, naming it an "excellent" economy. In August 2017, the exchange rate value of domestic production at US$ 330 billion discusses the economy of Malaysia's the 4th largest in Southeast Asia. A previous study by Drakos and Kutan (2005) has investigated whether there are financial linkages between the Turkish and Greek financial markets. It was found that the Turkish and Greek economies observed similar financial shocks because they

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share trading partners and foreign direct investment sources. Thus, both of the countries have their own strength in economy background. The main element that we can compare and contrast is in terms of stock market index for United State and Malaysia.

The formula to calculate return for this study is:

$$percentage\ return, t = \frac{V_f - V_i}{V_i} \times 100\%$$

$$V_f = final\ value$$

$$V_i = initial\ value$$

This study focuses on the daily data of historical indexes for DJIA and KLCI from year 2013 to 2016. We use percentage return to find the comparison between DJIA and KLCI indexes in order to get the relationship between the Malaysia and the U.S stock market. The result from the percentage return of DJIA and KLCI is used to predict the relationship between DJIA and KLCI when there are extreme movements in the Dow Jones.

The finding from this study can provide information to the investor to predict what happen to local stock market in details. Besides that, the study of the extreme movement on the DJIA also can give ideas to other researcher on the relationship between DJIA and KLCI and mathematical concept.

2. Problem statement

In this project, we examine the relationship between the Kuala Lumpur Composite Index (KLCI) and the Dow Jones Industrial Average (DJIA). Dow Jones is a weighted average of the stock prices of 30 important companies that trade on the New York Stock Exchange. It is common knowledge that the performance of the Dow Jones affects many indices worldwide, including indices in Malaysia. Mathur and Subrahmanyam (1990) found that the Denmark market was affected by the U.S. market, as demonstrated by Granger's causality concept. Hence, the Dow Jones is the stock exchange that traders worldwide usually analyse in detail, in anticipation of trends.

The Dow Jones is widely tracked also because it is an indicator of the health of the global stock market. The Dow includes large-capitalization companies representative of the U.S. industry. Hamao, Masulis and Ng (1990) investigated how price changes in one market influenced the opening prices in the next market to trade and whether changes in price volatility in one market were positively. When US subprime loan crisis worsened in mid-2007, Dow Jones took a deep plunge and so did Asian markets including the KLCI. However, it is noted that the subsequent recovery of the Dow Jones helped to rally other stock markets worldwide including the KLCI, thus aiding with economic recovery both on a macroeconomic and microeconomic scale.

However, the KLCI is still under-performing if we compare it with other Asian stock indices like the Hang Seng Index, the Straits Times Index and the Nikkei 225 index. If the Dow Jones continues performing well, we expect the performance of the KLCI to improve as well. A demand

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forecasting and production planning for high seasonal demand situations had been explored by Yenradee, Pinnoi, and Charoenthavornying (2001). Three forecasting techniques, Holt-Winter's, decomposition ARIMA are applied to this study.

Hence, our research is concerned with the relationship between the Dow Jones Industrial Average and the KLCI, so as to assist traders in predicting changes in the KLCI based on extreme movements in the Dow Jones. This will help KLCI traders manage their shares when confronted with extreme movements in the Dow Jones, so as to be well-prepared to face a likely extreme movement in the same direction in the KLCI. Our research will also examine the extent and magnitude of extreme movements in the KLCI triggered by similar movements in the Dow Jones.

3. Research Questions

The purpose research questions are as follows:

a) What are the relationship between the Dow Jones Industrial Average and the Kuala Lumpur Composite Index, in particular when there are extreme movements in the Dow Jones.
b) What are the extension and magnitude of extreme movements in the KLCI as triggered by extreme movements in the Dow Jones.

4. Purpose of the Study

Since both of the countries are members of Trans Pacific Partnership Agreement (TPPA) country. It will show that the movement stock market for both countries. The objective of this study is to examine the relationship between the DJIA and the KLCI. Furthermore, extreme movements in the DJIA and KLCI are compared and we investigate the extent and magnitude of extreme movements in the KLCI as triggered by extreme movement in the Dow Jones.

Thus, with unstable economic situation nowadays, this can affect to the stock market. When the stock price is decreasing, it can give bad assumption to the government. Indirectly, it can shrink the economy.

This research will provide valuable information to the investors to predict what happen to local stock market. Therefore, they can improve their company strategy. At the same time, they can increase profit for their company.

5. Research Methods

5.1. Obtaining the data:

The data obtained from Blomberg website for KLCI and DJIA[i]. Both indices were secondary data and were exported into Microsoft Excel. There is time difference between USA and Malaysia. New York is 12 hours behind Kuala Lumpur. Therefore to see how KLCI is influenced by changes in DJIA, we compared KLCI with DJIA a day earlier.

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5.2. Calculate the percentage return.

Due to the difference in the ranges of the KLCI and DJIA indices, percentage return is a more appropriate comparison. Below is the formula to calculate rate of return where V_f is final value for the indices and V_i is initial value for the indices:

$$t = \frac{v_f - v_i}{v_i} \times 100\%$$

We divide the percentage return into six group based on values.

5.3. Find the Pearson's correlation (R^2).

Using the percentage returns of both indices we find R^2. It is important to measure the relationship between two variables. According to Boslaugh (2016), the Pearson correlation coefficient is a measure of linear association between two interval- or ratio-level variable. Values closer to +1 indicate a positive linear relationship. Values closer to -1 indicate a negative linear relationship.

5.4. Linear Equation Method.

Linear equation is used to fit data to obtain a mathematical relationship between two variables *x* and *y*. Only data with larger R^2 values are chosen for least-squares linear fitting

5.5. Hypothesis testing

Hypothesis testing is used here to compare extreme movements in returns of KLCI and DJIA. The test procedure is as below:

a) State the hypotheses.

i. Null hypothesis; $H_0 : p_1 - p_2 = 0$

ii. Alternative hypothesis; $H_1 : p_1 - p_2 \neq 0$

Where;

p_1: First proportion of sample to be tested

p_2: Second proportion of sample to be tested

b) Formulate an analysis plan.

i. Using sample data earlier we complete the following computations to find the test statistic and its associated *p*-value. Equation is given as below:-

$$\hat{p} = \frac{N_1 p_1 + N_2 P_2}{N_1 + N_2}$$

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Where;

p_1: First proportion of sample to be tested

p_2: Second proportion of sample to be tested

N_1: Sample size of first percentage return

N_2: Sample size of opposite percentage return

ii. Next we need to find the standard deviation. Compute the standard deviation (s_d) of the sampling distribution for difference between two proportions.

$$s_d = \sqrt{\hat{p}(1-\hat{p}) \times (\frac{1}{N_1} + \frac{1}{N_2})}$$

iii. Then we can make a test statistic. The test statistic is a *z*-score (*z*) defined by the following equation.

$$z = \frac{p_1 - p_2}{s_d}$$

When the *z*-value is greater than 5% significance level, reject the null hypothesis.

5.6. Test the null hypothesis $H_0: p = 0.5$ against the alternative hypothesis $H_1: p > 0.5$ (at $\alpha = 0.05$) for various filter sizes of t.

a) State the hypotheses.

Null hypothesis; $H_0: p = 0.5$

Alternative hypothesis; $H_1: p > 0.5$

where p is the proportion of sample with the same direction for both DJIA and KLCI

b) Formulate an analysis plan.

$$\sigma_{\hat{p}} = \sqrt{\frac{p_0 q_0}{N}}$$

$$z = \frac{\hat{p} - p_0}{\sigma_{\hat{p}}}$$

where

p_0: The proportion of sample with the same direction for both DJIA and KLCI

q_0: The proportion of sample with the opposite direction for both DJIA and KLCI

$\hat{p}$: Observed sample proportion (number of success divided sample size)

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q: The proportion of sample with opposite direction for both DJIA and KLCI

N: sample size where both DJIA and KLCI are in the same filter size of percentage return (t)

After all the calculation complete, we can make a test statistic. When the z-value is greater than 5% significance level, reject the null hypothesis.

6. Findings

Table below describe the percentage return for each group and all the value.

Table 01. Percentage return and frequency for both stocks.

Filter size of percentage return of DJIA(*t*)	**Frequency for DJIA**
$t \geq 2$	72
$1 \leq t < 2$	118
$0 \leq t < 1$	418
$-1 \leq t < 0$	307
$-2 \leq t < -1$	122
$t < -2$	84
Total	1121

Table 02. Pearson's coefficient for percentage returns of KLCI Vs DIJA.

Filter size *t*	R^2	**Strength of Relationship**
All t	0.373	Moderate
$t \geq 2$	-0.081	Very Weak
$1 \geq t > 2$	0.043	Very Weak
$0 \geq t > 1$	0.16	Weak
$-1 \geq t > 0$	0.084	Very Weak
$-2 \geq t > -1$	0.016	Very Weak
$t < -2$	0.232	Weak

Table 2 shows the result from SPSS for R^2 values. There is only one filter size that has moderate relationship. When all t is calculated together, the result shows it has moderate relationship. While the rest shows that there is week relationship between the two variables.

We only choose top two highest R^2 to do fitting of linear equation, i.e. $t < -2$ and all t.

Table 03. Linear equation for the selected filter size.

Filter size	**Linear equation**	**Error**
All t	$y = 0.0221 + 0.2346x$	29.8741
$t < -2$	$y = -0.3801 + 0.1795x$	8.9522

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Table 3 shows the result from the Matlab expression. Linear equation for all data shows a linear equation with positive gradient. For filter size $t < -2$ it also shows a linear equation with positive gradient but with a smaller slope. Graph for both filter sizes are shown below.

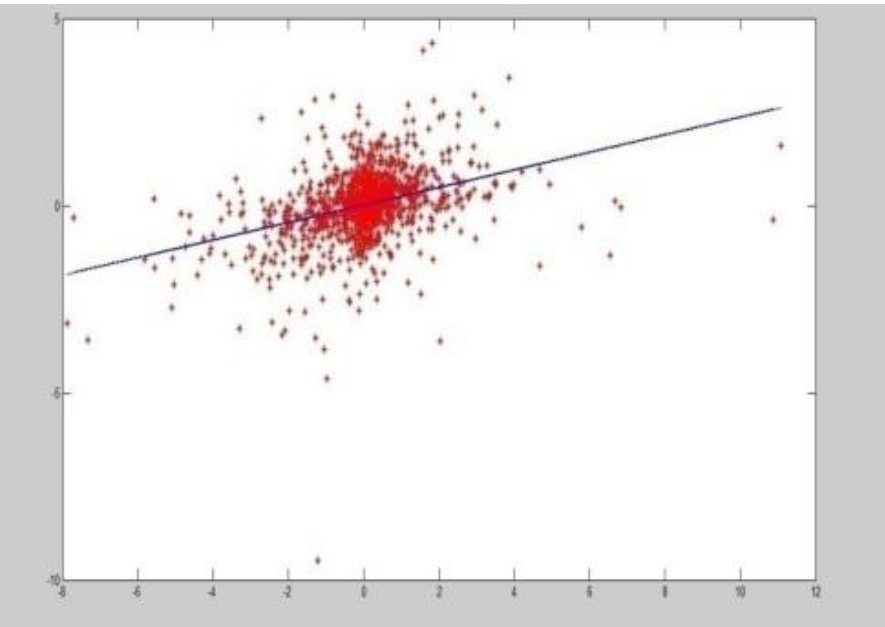

Figure 01. linear equation for all t

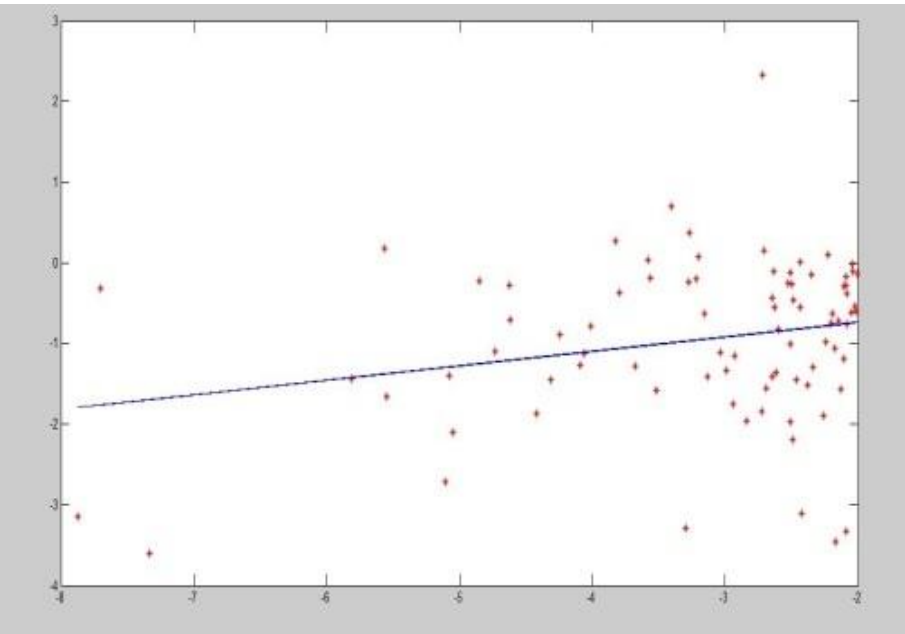

Figure 02. linear equation for $t < -2$

Figure 1 and 2 shows the scatter plot for all percentage return as well as the graph of the best fit linear equation.

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Result from testing of null hypothesis $H_0: p_1 - p_2 = 0$ against the alternatives hypothesis $H_1: p_1 - p_2 \neq 0$ (at $\alpha = 0.05$) for various filter sizes of t.

From the earlier calculations involving two-tailed tests comparing the two indices, we saw that for the cases of positive return and opposite direction return, we did not reject any of the null hypotheses. This means that if it is known that both the DJIA and the KLCI have positive returns or returns in opposite directions, we have no statistical evidence to predict a particular KLCI return magnitude as being more likely, at 5% significance level. But, when there is negative return, we can make the deductions listed below, meaning that the following proportions differ significantly at α=0.05 between the Dow Jones Industrial Average and the Kuala Lumpur Composite Index.

1. $t > 3$ versus $0 < t < 1$ with both DJIA and KLCI having negatives rates of returns.
2. $2 < t < 3$ versus $0 < t < 1$ with both DJIA and KLCI having negatives rates of returns.
3. $1 < t < 2$ versus $0 < t < 1$ with both DJIA and KLCI having negative rates of returns.

In particular, we can further deduce that when both DJIA and KLCI have negative returns, it is far less likely that KLCI will have a change of magnitude of less than 1%.

Result from testing null hypothesis $H_0: p_1 = 0.5$ against the alternatives hypothesis $H_1: p_1 > 0.5$ (at $\alpha = 0.05$) for various filter sizes of t.

From the calculations involving upper-tailed tests investigating the relative frequency at which the two indices moved in the same direction as compared to movement in opposite directions, with respect to different filter sizes based on the rate of return, we found that the null hypothesis was rejected for all of 4 cases. This means that regardless of the magnitude of change, the two indices move in the same direction more frequently than in opposite directions. This conclusion is useful for KLCI traders trying to predict directional changes in the KLCI with respect to changes in the DJIA.

7. Conclusion

This research was undertaken to see the comparison between the DJIA and KLCI. The research findings provide important information for KLCI stock holders to manage their stock.

From the finding of study, this data will help to investors in order to know the relationship between KLCI and DJIA. This is very important because since Malaysia government with US government agreed in the Trans Pacific Partnership Agreement (TPPA). TPPA is a trade agreement between Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, the United States (until 23 January 2017) and Vietnam.

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