Chapter 3  Data And Methodology

3.0  Introduction

This chapter encompasses the research hypothesis and methodology used in the study. They include a discussion on the data used in this study, data source, data collection procedures, research hypothesis, bivariate correlation, research instruments and statistical analysis techniques used to analyze the research data.

3.1  Data and Source of Data

The data used in this study consists of daily stock prices and volume recorded in the Kuala Lumpur Stock Exchange Composite Index, KLSE Daily Diary and Bloomberg daily price records extraction. Besides, various issues of journals namely Journal of International Business study, Journal of Economics, Journal of Monetary Economic, Quarterly Journal of Economic, Econometrica, Journal of Banking and Finance, Journal of Finance Economics, The American Economic Review and various local daily newspapers such as New Strait Times and The Star are sourced for relevant information. The purpose of this study is to investigate whether there is a association between volatility of trading volume and stock price for the domestic companies listed in KLSE Main Board in the Technology Sector.
The daily closing price and volatility of volume traded for the eleven (11) counters of Technology sector for the period of 2000 until 2002. The companies selected are

i. AIC Corporation Berhad
ii. AKN Technology Berhad
iii. Eng Technology Berhad
iv. Globetronics Technology Berhad
v. Heitech Padu Berhad
vi. Lityan Holding Berhad
vii. Malaysian Pacific Industries Berhad
viii. Mesiniaga Berhad
ix. Patimas Computer Berhad
x. Sapura Telecommunications Berhad
xi. Unisem Holding Berhad

The closing price and the volatility of volume for the eleven (11) counters of technology sector is used as a proxy in stock price and volatility of volume for the Technology Sector. The volatility of trading volume is represented by the standard deviation volume of trade with 5 lags, and is represented by \( \text{Volatile} \). \( \text{Volatile} \) is used as a proxy to measure volatility in the volume of trade, adapted from Hall and Noble (1987). Hall and Noble (1987) used the Granger causality test to show that volatility Granger cause velocity. They implemented causality tests using levels of the volatility variable, assuming implicitly that the level of money growth volatility is a stationary time series. Thus, in this case, \( \text{volatile} \) is found to be a stationary time series.

Where,

\[
\text{Volatile}_t = \sqrt{\frac{1}{5} \sum_{i=1}^{5} (\Delta \text{Vol}_{t-i} - \bar{\Delta \text{Vol}}_t)^2}
\]

where \( \bar{\Delta \text{Vol}}_t \) is the natural logarithm of volume of trade at any time \( t \) with 5 lags, \( \bar{\Delta \text{Vol}}_t = \frac{1}{5} \sum_{t=1}^{5} \Delta \text{Vol}_{t-i} \).
3.2 Methodology

The study makes use of t-test to examine the extent of simple correlation relationship between the variables, which is the closing price (Tech) with the volatility of trading volume (Volatile), to observe any significant association between them at 5% and 1% acceptance levels. In this study, the sample observations are obtained by selecting a random sample of the units of association and by taking on each a measurement of X and a measurement of Y. There are 573 pair of data of each company used as sample size while AKN having 495 pairs of observations and HeiTech having 407 pairs of observations.

Table: Data of observation of this study for the period from June 2000 until June 2002:

<table>
<thead>
<tr>
<th>Companies</th>
<th>Data of Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 AIC Corporation Berhad</td>
<td>537</td>
</tr>
<tr>
<td>2 AKN Technology Berhad</td>
<td>495</td>
</tr>
<tr>
<td>3 Eng Technology Berhad</td>
<td>537</td>
</tr>
<tr>
<td>4 Globetronics Technology Berhad</td>
<td>537</td>
</tr>
<tr>
<td>5 Heitech Padu Berhad</td>
<td>407</td>
</tr>
<tr>
<td>6 Lityan Holding Berhad</td>
<td>537</td>
</tr>
<tr>
<td>7 Mesiniaga Berhad</td>
<td>537</td>
</tr>
<tr>
<td>8 Malaysian Pacific Industries Berhad</td>
<td>537</td>
</tr>
<tr>
<td>9 Patimas Computer Berhad</td>
<td>537</td>
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<tr>
<td>10 Sapura Telecommunications Berhad</td>
<td>537</td>
</tr>
<tr>
<td>11 Unisem Holding Berhad</td>
<td>537</td>
</tr>
</tbody>
</table>

3.3 Bivariate Correlation

The coefficient of correlation is used to describe the strength of the correlation relationship between variables that puts both in on an equal footing, and does not distinguish between them by referring to one as dependent and the other as the independent variable. Designated p, it is refer as the Pearson product
Moment correlation. However, the relationship between the two variables only show that an increase or decrease of one variable will cause changes in the other variable, it does not indicate the magnitude of change of variables (the changes of one variable will cause another variable to increase or decrease). Thus, correlation coefficient is only a measure of linear association between two variables on how strongly the variables are linearly related.

The sample correlation coefficient, $r$, describes the relationship between the sample observations on two variables. The coefficient of determination (the $r$-squared, $r^2$) measures the strength of the linear relationship between $X$ and $Y$. Researchers interested in the association between two interval variables $X$ and $Y$ often wish to test the null hypothesis $H_0: P_{XY} = 0$. Since the coefficient of determination takes on values between 0 and 1 inclusive, $P_{XY}$ may assume any value between $-1$ and $+1$. If $P_{XY} = 1$ there is a perfect direct linear correlation between the two variables, while $P_{XY} = -1$ indicates perfect inverse linear correlation. If $P_{XY} = 0$, that mean the two variables are not correlated.

We are usually interested in knowing if we may conclude that $P_{XY} \neq 0$, which indicate that $x$ and $y$ are correlated. Since $P_{XY}$ is usually unknown, we draw a random sample from the population of interest, compute $r$, the estimator of $P_{XY}$, and test $H_0: P_{XY} = 0$ against the alternative $P_{XY} \neq 0$.

The test statistic for the hypothesis $H_0: P_{XY} = 0$ can be written entirely in terms of $r$ and $n$, so we can perform the test without having to fit the straight line. The test statistic is given by the formula:

$$T = r \sqrt{\frac{n-2}{1-r^2}}$$

which has the $t$ distribution with $n-2$ degrees of freedom when the null hypothesis $H_0: P_{XY} = 0$ is true.
The level of significance ($\alpha$) was set at 0.05 and 0.01 for two-tailed test; that is the difference between the variables will be considered as actual (not resulted by chance) if there is only a 5% and/or 1% or less possibility that the difference occur by chance.

### 3.4 Formulation of Hypothesis

A simple correlation is used to describe the extent of relationship between the two series of variables: closing stock price (tech) and volatility of trade volume (volatile). The sample correlation coefficient $r$, is a value computed from a random sample of $n$ pairs of data. The different random samples of size, taken from the same population will generally produce different values of $r$.

The main concern in this research is to investigate whether there is a significant association between volatility of trading volume (volatile) and closing stock price (tech) for the period of June 2000 till June 2002, hence the hypothesis is as following:

Null hypothesis:

$$H_0 : P_{xy} = 0 \text{ (There exists no significant association between the closing stock price (tech) and volatility of trading volume (volatile) on Technology Sector of KLSE Main Board for the period of June 2000 to June 2002).}$$

against the alternative hypothesis:

$$H_1 : P_{xy} \neq 0 \text{ (There exists significant association between the closing stock price (tech) and volatility of trading volume (volatile) on Technology Sector of KLSE Main Board for the period of June 2000 to June 2002).}$$
3.5 Data Analysis Techniques

The data analysis process here involved editing, coding, carrying out checks and finally summarizing the findings. The statistical package E-Views version 3.0 was used mainly in data analysis. E-Views is useful in providing sophisticated data analysis, regression, and forecasting tools on Window-based softwares.

The first test of the data analysis is to examine whether there is a correlation relationship between the closing stock price and volatility volume of trade. The tests employed including simple correlation and the t-statistic.

The level of significance was set at 5% and 1% are the difference between the variables will be considered as actual (not resulted by chance) if there is only a 5% or 1% or less possibility that the difference occur by chance. If the null hypothesis is rejected, it means that the probability in making a Type 1 error is at most 5 in 100. Thus, the firm can be at least 100 (1-\( \alpha = 0.95 \)) or 95% confident of having the correct decision. Eventually, the conclusion is drawn based on the implications to the Efficient Market Hypothesis.