4.0 Introduction

This chapter presents the results of the study obtained from the application of statistical methods to test the hypothesis. It start with the analysis of results which based on the bivariate correlation and the use of the t-test, then follow by the discussion of the findings and the implication of Efficient Market Hypothesis in Malaysia stock market. This study is conducted to define whether there is significant association between changes in closing stock price and the volatility of trading volume.

4.1 Findings and Results

The findings and results of 11 companies listed in Technology Sector of KLSE Main Board will be discussed separately. The first part discuss the correlation coefficient between the closing stock price and volatility of trading volume and to find out whether there is a positive association between the two variables. The second part discuss the significance association between the stock price and the volatility of trading volume with the use of t-test.
Table 4.1: Correlation Coefficients and t-tests for Association between Closing Stock Price and Volatility of Volume for the period from June 2000 until June 2002:

<table>
<thead>
<tr>
<th>Companies</th>
<th>Correlation coefficient, r</th>
<th>t-test</th>
<th>Significance at 0.05 (1.96)</th>
<th>Significance at 0.01 (2.57)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIC</td>
<td>0.003000</td>
<td>0.972524</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
<tr>
<td>AKN</td>
<td>0.025768</td>
<td>0.572156</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
<tr>
<td>ENG</td>
<td>0.282860</td>
<td>6.82113</td>
<td>Significant</td>
<td>Significant</td>
</tr>
<tr>
<td>GLOTRONIC</td>
<td>0.121182</td>
<td>2.823773</td>
<td>Significant</td>
<td>Significant</td>
</tr>
<tr>
<td>HEITECH</td>
<td>0.335859</td>
<td>7.175839</td>
<td>Significant</td>
<td>Significant</td>
</tr>
<tr>
<td>LITYAN</td>
<td>0.058958</td>
<td>1.3661</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
<tr>
<td>MESINIAGA</td>
<td>0.020833</td>
<td>0.481956</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
<tr>
<td>MPI</td>
<td>0.134108</td>
<td>3.13018</td>
<td>Significant</td>
<td>Significant</td>
</tr>
<tr>
<td>PATIMAS</td>
<td>0.020833</td>
<td>0.481853</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
<tr>
<td>SAPURA</td>
<td>0.084196</td>
<td>1.954358</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
<tr>
<td>UNISEM</td>
<td>0.024393</td>
<td>0.564172</td>
<td>Not Significant</td>
<td>Not Significant</td>
</tr>
</tbody>
</table>

4.1.1 AIC Corporation Berhad (AIC)

A. Introduction

AIC was Incorporated as a private limited company on 6 March 1990 in Malaysia and converted into a public company on 26 February 1994. On 14 December 1994, AIC was listed on KLSE Second Board and transferred to Main Board (Technology) on 31 July 2000.

AIC was formed to oversee the management, marketing, financial and technical development of all companies within the AIC Group. The Group is principally involved in the

(a) assembly and testing of integrated circuits (IC)
(b) IC design and provision of systems solution
(c) Information Technology integration

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(d) manufacturing of automation systems, precision tools, moulds and die sets
for the semiconductor industry, metal stamping and high precision
engineering plastics and moulding for the automotive, telecommunication and
computer industries
(e) distribution of electronic and semiconductor components for power supply,
computers, electrical and communication industries.

B. Result for Hypothesis Testing
The correlation coefficient, r, between the closing stock price and volatility of
trading volume is 0.003. This shows that there exists a positive association
between the stock price (X) and the volatility of volume (Y) but there is a weak
association between the two variables.

The t-test is then used to conduct a formal test to test for the significant
association between the two variables. The results of the t-test is at 0.972524
clearly indicates that there does not exist any significant association between
variables of the stock price (Tech) with the volatility of trading volume (Volatile) at
both 1% and 5% level of significance. Thus, the null hypothesis should not be
rejected and the general conclusion would be there is no co-relationship between
the two variables.

4.1.2 AKN Technology Berhad (AKN)
A. Introduction
AKN was incorporated as a private limited company in Malaysia on 8 September
1984 and converted to a public limited company on 7 May 1997. AKN was listed
on KLSE Second Board (Technology) on 2 September 1998 and transferred to
Main Board (Technology) on 26 September 2001.

The Group's operations are divided into two distinct divisions, namely the
manufacturing division and the service division.
The principal products are manufacturing of
(a) stamped leadframes
(b) electroplating
(c) electropolishing
(d) thermal coating and anti-reflective coating

The main services are designing, engineering and distribution of
(a) programmable logic devices, communication interface devices
(b) protection and interface devices, and development of application systems
(c) power management
(d) semiconductor chips

The Group carries out operations in Malaysia, Singapore, South Korea, Hong Kong, China and India with representative offices in the Philippines, Thailand and the US. The Group has three manufacturing plants located at Bayan Lepas Industrial area in Penang. Through its associate company, is also involved in providing designing and fabrication of anti-reflective (AR) vacuum coating machines in Hong Kong and provision of AR coating services in Guangzhou, China.

The Group's current markets for the manufacturing division are Malaysia, Singapore, Philippines, Indonesia, China and Thailand. Current markets for the design, engineering and distribution division are China, South Korea, Southeast Asia and India.

B. Result for Hypothesis Testing
The correlation coefficient, r, between the closing stock price and volatility of trading volume is 0.025768. This shows that there exists a positive association between the stock price (X) and the volatility of volume (Y) but there is a weak association between the two variables.
The results of the t-test is at 0.572156 clearly shows that there does not exist any significant association between variables of the stock price (Tech) with the volatility of trading volume (Volatile) at both 1% and 5% level of significance. Hence, the null hypothesis should not be rejected and the general conclusion would be there is no co-relationship between the two variables.

4.1.3 ENG Technology Holding Berhad (ENG)

A. Introduction

ENG was incorporated as a public company in Malaysia on 24 February 1992. ENG was listed on KLSE Second Board on July 1993 and transferred to Main Board (Technology) on 23 December 1999.

The principal business of the Group remains focused in the manufacturing activities of precision mechanical components and related assemblies. The Company was incorporated as part of the restructuring of three companies involved in the mould and die/high precision engineering industry viz. Eng Hardware Engineering Sdn Bhd, Eng Teknologi Sdn Bhd and Micro Tooling Sdn Bhd. In 1988, the group ventured into the hard disk drive industry in actuator production. In subsequent years, it expanded further into precision stamping and contract equipment. The Group has also ventured overseas to countries such as China, Hong Kong, Philippines and Thailand via subsidiaries established there.

The main products of the group are
(a) hard disk drive components and assemblies; actuators and assemblies; spindle motors components; voice coil magnet plates and base plates.
(b) data storage products : tape drive components and assemblies.

B. Result for Hypothesis Testing

The correlation coefficient, r, between the closing stock price and volatility of trading volume is 0.282860. This shows that there exists a positive association
between the stock price (\(X\)) and the volatility of volume (\(Y\)), and there is weak association between the two variables.

The results of the t-test is at 6.82113 clearly indicates that there does exist significant association between variables of the stock price (\(Tech\)) with the volatility of trading volume (\(Volatile\)) at both 1% and 5% level of significance. Thus, the null hypothesis should be rejected and the general conclusion would be there is co-relationship between the two variables.

### 4.1.4 Globetronics Technology Berhad

#### A. Introduction

Globetronics was incorporated as a public company in Malaysia on 18 November 1996. The company was listed on KLSE Second Board on 3 November 1997 and transferred to Main Board (Technology) on 18 January 2001.

The company's operations are based locally as well as in the Philippines, Hong Kong and Shanghai. The Group's factories in Malaysia are located in Bayan Lepas, Penang and Jitra, Kedah.

Globetronics and its Group of Companies provide integrated specialized and advanced technology-based electronic manufacturing services, particularly in the integrated circuit and related products and services sub-sector. The integrated circuit production activities include the manufacture of technical ceramic substrates and packages, assembly of integrated circuits, burn-in and visual mechanical check services. In addition, the Group provides sub-contracted services in precision electroplating, solder plating, post mould baking, trimming and forming, and full inspection of electronic components.

The primary market for the products and services of the group is local established multinational manufacturers of integrated circuits, electronic and
electrical products. These encompass computers (and PC multimedia products), automotive and household appliances, military products, space technological products and telecommunication products. In the upstream market, the technical ceramic packages, organic-based substrates, and ceramic piece-parts produced are used for end products in the primary market for the global electronics and semiconductor industry.

B. Result for Hypothesis Testing
The correlation coefficient $r$, between the closing stock price and volatility of trading volume is at 0.121182. This indicates that there exists a positive association between the stock price ($X$) and the volatility of volume ($Y$) but there is weak association between the two variables.

The results of the t-test at 2.823773 clearly indicates that there does exist significant of association between variables of the stock price ($Tech$) with the volatility of trading volume ($Volatile$) at both 1% and 5% level of significance. Therefore, the null hypothesis should be rejected and the general conclusion would be there is co-relationship between the two variables.

4.1.5 HeiTech Padu Berhad
A. Introduction
HeiTech was incorporated as a private limited company in Malaysia on 5 August 1994 and it was converted into a public limited company on 24 March 2000. It was listed on KLSE Main Board (Technology) on 20 November 2000.

HeiTech is principally involved in providing total business solutions in IT which include system integration, application development, data centre management, and network and business recovery services.
Products sold by HeiTech as value added re-sellers are Centura, Bank trade, Fair Isaac and teaching-learning software from Jostens Learning Corporation. Heitech has executed an agreement with the government for the system maintenance of Jabatan Pengangkutan Jalan Malaysia (JPJ) for years 2000 and 2001. The agreement is by way of providing maintenance and technical support services in respect of the computer hardware, equipment and operations of JPJ.

B. Result for Hypothesis Testing
The correlation coefficient, r, between the closing stock price and volatility of trading volume is at 0.335859. This shows that there exists a positive association between the stock price (X) and the volatility of volume (Y) but there is weak association between the two variables.

The results of the t-test is at 7.173839 clearly indicates that there does exist significant of association between variables of the stock price (Tech) with the volatility of trading volume (Volatile) at both 1% and 5% level of significance. Thus, the null hypothesis should be rejected and the general conclusion would be there is co-relationship between the two variables.

4.1.6 Lityan Holdings Berhad
A. Introduction
Lityan was incorporated as a public limited company in Malaysia on 30 March 1993. Lityan was listed on KLSE Second Board on 1 March 1994 and transferred to Main Board on 1 November 1999.

Lityan’s core activities are in Information Technology and telecommunication. It has succeeded in the implementation and management of three telecommunication networks, namely, a wireless data network in Malaysia (Wavenet), a GSM network in Madagascar and a payphone network in Philippines.
In year 2000, Lityan moved into Internet business in JV with Chariot Internet Ltd, one of Australia’s leading internet service providers, to develop commercial ISPs in South East Asia. Its first venture is a high reliability network (HRN) in Philippines. LHB’s E-business division was established in 2000 and its services include Internet strategy consultancy, the development and integration of internet applications, web portal development, multimedia design and content management.

B. Result for Hypothesis Testing
The correlation coefficient, r, between the closing stock price and volatility of trading volume is at 0.058958. This shows that there exists a positive association between the stock price (X) and the volatility of volume (Y) but there is a weak association between the two variables.

The results of the t-test is at 1.3661 clearly explains that there does not exist any significant of association between variables of the stock price (Tech) with the volatility of trading volume (Volatile) at both 1% and 5% level of significance. Therefore, the null hypothesis should not be rejected and the general conclusion would be there is no co-relationship between the two variables.

4.1.7 Mesiniaga Berhad
A. Introduction
Mesiniaga was incorporated as a private limited company on 17 December 1981 in Malaysia and converted into a public company on 24 December 1996. It was listed on KLSE Main Board (Technology) on 17 November 1999.

Mesiniaga’s business activities can be broadly categorised into two, i.e. (a) the provision of IT products (b) the provision of IT and IT-related services
The combination of Mesiniaga as both the providers of IT products and IT services places Mesiniaga as a one-stop IT provider for the integration of IT for its customers' business solutions. The Mesiniaga Group, through its dealerships with various IT suppliers representing major brand names such as IBM, Lotus, Microsoft, Novell, 3Com, Tivoli, SAP, Peregrine and Avaya, offers an extensive range of IT products, which includes servers, desktops, workstations and peripherals; systems software, database and application software packages; network, helpdesk, system and infrastructure/asset management software; workgroup, imaging and content/document management packages; network and structured cabling products; E-business software suite; and IT Security Products.

B. Result for Hypothesis Testing
The correlation coefficient, r, between the closing stock price and volatility of trading volume is at 0.020833. This shows that there exists a positive association between the stock price (X) and the volatility of volume (Y) but there is a weak association between the two variables.

The results of the t-test is at 0.481956 clearly indicates that there does not exist any significant of association between variables of the stock price (Tech) with the volatility of trading volume (Volatile) at both 1% and 5% level of significance. Hence, the null hypothesis should not be rejected and the general conclusion would be there is no co-relationship between the two variables.

4.1.8 Malaysia Pacific Industries Berhad (MPI)
A. Introduction
MPI was incorporated on 5 October 1962 in Malaysia and converted into a public company on 21 April 1969. MPI was listed on KLSE Main Board (Technology) on 29 September 1983.
MPI Group is principally engaged in the manufacture and sale of integrated circuits, semiconductor devices, electronic components and leadframes to customers world-wide. The Holding companies of MPI are Hong Leong Industries Bhd and ultimate - Hong Leong Company (Malaysia) Bhd.

B. Result for Hypothesis Testing
The correlation coefficient, r, between the closing stock price and volatility of trading volume is at 0.134108. This shows that there exists a positive association between the stock price(X) and the volatility of volume (Y) but there is a weak association between the two variables.

The results of the t-test is at 3.13018 clearly indicates that there does exist significant of association between variables of the stock price (Tech) with the volatility of trading volume (Volatile) at both 1% and 5% level of significance. Thus, the null hypothesis should be rejected and the general conclusion would be there is co-relationship between the two variables.

4.1.9    PATIMAS Computer Berhad
A. Introduction
Patimas was incorporated as a private limited company in Malaysia on 15 July 1992 and converted into a public company on 7 March 1997. Patimas was listed on KLSE Main Board (Technology) on 23 December 1997.

The principal activities of the company are
(a) investment holding, management of subsidiary companies and provision of computer equipment rental
(b) the distribution and provision of a comprehensive range of computer hardware
(c) customer focused application software solutions and services which include providing specialized application software solutions and related hardware
(d) implementation services to meet the IT requirements of certain industries and companies, e.g. stock brooking, banking and finance, manufacturing, general insurance, logistics and distribution; and providing customer support and service maintenance.

The Patimas Group’s distributorships and partnerships are with various IT suppliers such as Hewlet Packard, Sun MicroSystems, IBM, Lotus, Microsoft, Oracle, Computer Associates, Tivoli and Cognos, amongst others. Marketed principally in local markets, the Group’s operations are located in Kuala Lumpur, Penang, Singapore and Philippines.

B. Result for Hypothesis Testing
The correlation coefficient, r, between the closing stock price and volatility of trading volume is at 0.020833. This shows that there exists a positive association between the stock price (X) and the volatility of volume (Y) but there is a weak association between the two variables.

The results of the t-test is at 0.481853 clearly shows that there does not exist any significant of association between variables of the stock price (Tech) with the volatility of trading volume (Volatile) at both 1% and 5% level of significance. Thus, the null hypothesis should not be rejected and the general conclusion would be there is no co-relationship between the two variables.

4.1.10 Sapura Telecommunications Berhad
B. Introduction
Sapura was incorporated as a private limited company in Malaysia on 21 February 1974 and converted into a public limited company on 15 May 1996. Sapura was listed on KLSE Main Board (Technology) on 3 December 1990.
SHB's investments in the automotive metal industries were regrouped under SMB. SMB is an investment holding company while its subsidiaries are manufacturers of component parts for the automotive and electronic industries. The Group sources about 85% of its raw materials from Japan.

The Group is also a manufacturer of fabricated telecommunication products as well as a supplier of completed payphone booths to Uniphone Sdn Bhd. Year 2000 marked SMB's diversification in its product range through the addition of two products and expansion of its customer base. Commencing October 2000, the first product, brake caliper assembly for Perodua, was achieved through a Technical Assistance Agreement between SMB and Sumitomo (SEI) Brake Systems, Inc of Japan.

The second product, 'rack bars' for power steering by subsidiary Sapura Machining Corporation Sdn Bhd, is manufactured for T & K Autoparts Sdn Bhd, a subsidiary of Toyota. The rack bars are exported to Asean countries. Also, in August 2000, the Group through subsidiary Sapura Automotive Industries, began supplying strut assemblies for Proton Waja cars, as a tier one supplier.

B. Result for Hypothesis Testing
The correlation coefficient, r, between the closing stock price and volatility of trading volume is at 0.084196. This shows that there exists a positive association between the stock price(X) and the volatility of volume (Y) but there is a weak association between the two variables.

The results of the t-test is at 1.954358 clearly indicates that there does not exist any significant of association between variables of the stock price (Tech) with the volatility of trading volume (Volatile) at both 1% and 5% level of significance. Thus, the null hypothesis should not be rejected and the general conclusion would be there is no co-relationship between the two variables.
4.1.11 UNISEM Holding Berhad

A. Introduction
UNISEM was incorporated as a private limited company in Malaysia on 19 June 1989 and converted into a public limited company on 26 June 1997. UNISEM was listed on KLSE Main Board (Technology) on 30 July 1998.

Unisem is involved in the
(a) manufacture, assembly and packaging of integrated circuits and other semiconductor devices
(b) provides final testing services, general and customised packing including tape and reel operations, as well as drop-shipment services.

Unisem thereby enables subcontract manufacturing on a "one-stop" integrated turnkey basis. Approx. 65% of Unisem's products are directly exported to the US, Canada, Europe, Japan and Asia. The balance is exported to MNCs located in various free trade/industrial zones in Malaysia. Its factories are situated in Pulai Jaya Industrial Area, Ipoh, Perak.

B. Result for Hypothesis Testing
The correlation coefficient, r, between the closing stock price and volatility of trading volume is at 0.024393. This shows that there exists a positive association between the stock price (X) and the volatility of volume (Y) but there is a weak association between the two variables.

The results of the t-test is at 0.564172 clearly indicates that there does not exist any significant of association between variables of the stock price (Tech) with the volatility of trading volume (Volatile) at both 1% and 5% level of significance. Hence, the null hypothesis should not be rejected and the general conclusion would be there is no co-relationship between the two variables.
4.2 Discussion of the Findings

The 11 companies as per discussed above can be divided into two main categories. First category are the companies which their core business is
a) manufacturing and assembly of semiconductor or
b) selling computer and/or telecommunication product and services

The second category are the companies which their core business is
a) manufacturing and selling semiconductor or
b) manufacturing and/or assembly high technology base product and services

<table>
<thead>
<tr>
<th>manufacturing and assembly semiconductor</th>
<th>selling computer and telecommunication product and services</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIC Corporation Berhad</td>
<td>Lityan Holding Berhad</td>
</tr>
<tr>
<td>AKN Technology Berhad</td>
<td>Mesiniaga Berhad</td>
</tr>
<tr>
<td>Unisem Holding Berhad</td>
<td>Patimas Computer Berhad</td>
</tr>
<tr>
<td></td>
<td>Sapura Telecommunications Berhad</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>manufacturing and selling semiconductor</th>
<th>manufacturing and assembly high technology base product and services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysian Pacific Industries Berhad</td>
<td>Eng Technology Berhad</td>
</tr>
<tr>
<td></td>
<td>Globetronics Technology Berhad</td>
</tr>
<tr>
<td></td>
<td>Heitech Padu Berhad</td>
</tr>
</tbody>
</table>
Companies categorized in the first category indicate that there do not exist significance association between the closing price (\textit{Tech}) with the volatility of trading volume (\textit{Volatile}). The turnover of these companies are unpredictable due to the high speed of changing technology and stiff competition in the marketplace. The performance of these companies are uncertain, thus it has effected the stock prices become unpredictable.

Companies categorized in the second category show that there exist significant association between the closing price (\textit{Tech}) with the volatility of trading volume (\textit{Volatile}). These are the companies which able to diversify their business into high technology based products/services and niche market. Hence, they are able to reduce investment risk and to sustain growth capability. Therefore, these companies gain a favorable condition in the stock market with increasing trading activities. This explains the stronger associations between the two variables, the more intensity of trading volume will strengthen the correlation on stock prices (Annuar, Jamaluddin and Shamser 1995).

4.3 Price-to-Volatility of Volume Relationship and EMH

The results from the test run have been gathered and discussed in the above section. Overall, the significance association between the closing price (\textit{Tech}) with the volatility of trading volume (\textit{Volatile}) of Technology Sector of KLSE Main Board are mixed. There are four counters (approximate 36.7% of the test result) indicate significance association between price and volatility of trading volume while remaining seven counters (approximate 63.3% of the test result) do not exist significance association between closing stock price and volatility of trading volume. The correlation coefficient showed that there is a weak association between the two variables. These findings clearly suggest that volatility of volume does not have association with closing stock price during this period (June 2000 – June 2002). Therefore, technical analysts should not be able to take advantage
from the volume of trade to predict the present stock prices. The result of this study is consistent with the research findings on price behavior on the New York Stock Exchange by Fama (1965), which reported that there is no evidence of important dependence on past stock price series with volume of stock. Hence, the past history of the price series cannot be used to increase the investor's expected profits.

In general, this study reveals that the Malaysian stock market is weak form efficient, which is consistent with the research results by Ariff, Annuar and Shamser (1991). Thus it is not economically viable to design profitable trading strategies to beat the market since past information including price and volume data is already fully reflected in the present price.

In a nutshell, KLSE is weak form efficient which implies that investors cannot consistently beat the market by using past market information. However, this does not preclude that the possibility of investors earning abnormal gains based on insider information, which is the long run moves the market towards efficiency.