CHAPTER 4

EMPIRICAL RESULTS AND DISCUSSION

4.1 ANALYSIS OF DATA

The results of the analysis of data from the various tests outlined in Chapter 3 will be presented here. The analysis is conducted for the whole period of this study ,i.e. from January 1984 to December 1995 for the selected stocks as well as the Kuala Lumpur Composite Index. A cross country comparison is made against the Hang Seng Index, Australian All Ordinaries Index, Dow Jones Industrial Average, Financial Times Stock Exchange 100 Index and the Nikkei Index.

Discussion on the results will centre on the main objective of this study, i.e., to test the existence of month-of-the-year seasonality.

4.2 MONTHLY MEAN RETURN DISTRIBUTION

The monthly mean returns are shown in Table 1. The returns are computed based on the monthly closing prices of the individual sample stocks.

The results show that of the 32 stocks analysed, 2 of them (Pelangi and Kulim) have their lowest (and negative) returns on January, 10 (Genting, Hong Leong, KLI, M.Cement, NSTP, Perlis, YHS, AMDB, Selangor Properties, Selangor Dreging) have their lowest (and negative) returns on March, 2 (IOI,

Public Bank) have their lowest (and negative) returns on April, EAC has its lowest (and negative) returns in June, 4 (Alcom, G.Kent, T.Chong, KLK) have their lowest (and negative) returns on August, 2 (Shell, F.Merlin) have their lowest (and negative) returns on September , 2 (CCM, MOX) have their lowest (and negative) returns on October, 8 (Boustead, Hume, Magnum, Palmco, Rothmans, Sime, UMW, IGB) have their lowest (and negative) returns on November and Bandaraya has its lowest (and negative) returns on December.

On the other hand, 2 (MOX, Shell) of the sample stocks were found to have their highest (and positive) returns on January, 13 (CCM, EAC, G.Kent, Hong Leong, Magnum, Palmco, YHS, AMDB, F.Merlin, B'Raya, IGB, Pelangi, Selangor Properties) have their highest (and positive) returns on February, 3 (KLI, NSTP, T.Chong) have their highest (and positive) returns on April, 5 (Alcom, Genting, Hume, Public Bank, Selangor Dredging) have their highest (and positive) returns on May, UMW has it's highest (and positive) returns on June, 2 (IOI, M.Cement) have their highest (and positive) returns on August and 6 (Boustead, Perlis, Rothmans, Sime Darby, KLK, Kulim) have their highest (and positive) returns on December. Table 7 summarizes the highest and lowest returns for the securities.

Table 2 shows the distribution of the monthly returns for the Kuala Lumpur Composite Index (KLCI), the Dow Jones Industrial Average (DJIA), the Hang Seng Index, the Nikkei Stock Index (Nikkei), the Australian All Ordinaries Index and the Financial Times 100 Index (FTSE 100) for the period from January 1984 to December 1995.

The results indicated that of the six indices analysed, two of them (Hang Seng, Nikkei) have their lowest (and negative) returns on June, three of them (KLCI, DJIA, Australian All Ordinaries Index) have their lowest (and negative) returns in October and the Financial Times Stock Exchange 100 Index has its lowest (and negative) returns in December.

On the other hand, two of the indices (Hang Seng, Nikkei) were found to have their highest (and positive) returns on January and two (KLCI, DJIA) have their highest (and positive) returns on December, whilst the Australian All Ordinaries Index has its highest (and positive) returns on July and the Financial Times Stock Exchange 100 Index has its highest (and positive) returns on November. The summary of the highest and lowest returns for the six indices can be obtained from Table 8.

4.3 RESULTS OF THE ONEWAY ANALYSIS OF VARIANCE (ANOVA)

Table 3 contains results of the Oneway Anova test conducted to determine the existence of the month-of-the-year seasonality. The F statistic associated with the test revealed that of the 32 sample stocks tested, only 4 stocks (KLI, Rothmans, UMW, Pelangi) rejected the null hypothesis of equal means across the trading months of the year. The rejection of the null hypothesis infers that at least one of the means is significantly different from the means of the other months. Based on the results, 4 stocks (KLI, Rothmans, UMW, Pelangi) demonstrate the-month-of-the-year seasonality.

The 4 sample stocks were then subjected to the Tukey HSD test to determine the pairs of months which are significantly different in the monthly mean. The results of the Tukey's test are tabulated in Table 3. Only 3 stocks (KLI, Rothmans, UMW) have pair (s) of months which are significantly different.

The six indices were similarly tested for the month-of-the-year seasonality and the F statistics indicated that none of the indices appear to exhibit the month-of-the-year seasonality. Thus the six sampled indices were not subjected to the Tukey HSD test.

4.4 RESULTS OF T-TESTS

The difference in the mean return of each month to the mean return for the other 11 months of the year for the thirty two stocks were determined using the t statistic and the results are tabulated in Table 1.

Of the 10 lowest (and negative) March returns, 3 of them (Hong Leong, AMDB, Selangor Dreging) are significantly negative at a 5% significance level. Of the 4 lowest (and negative) August returns, 2 of them (Alcom, KLK) are significantly negative at a 5% significance level. Of the 5 lowest (and negative) November returns, only IGB is significantly negative at a significant level of 5%. The lowest (and negative) returns in December is significantly negative at a 5% significance level.

On the other hand, out of the 13 highest (and positive) February returns, 3 of them (EAC, Magnum, AMDB) are significantly positive at a 5% significant level. Of the 6 highest (and positive) December returns, 3 of them (Rothmans, Sime Darby, KLK) are significantly positive at a 5% significance level.

Based on the results it can be seen that where the month-of-the-year effect exists in the stocks (based on the F statistic), the contributing factor seems to be the significant difference in the mean returns between February or March and the other months of the year. The returns on February are generally high (and positive) whilst the March returns are generally low (and negative).

Similarly, the difference in the mean return of each month to the mean return for the other 11 months of the year for the six indices were determined using the t statistic and the results are tabulated in Table 2.

Of the lowest (and negative) returns, only the Nikkei Stock Index is significantly negative at a 5% significance level in the month of June. On the other hand, of the highest (and positive) returns, two of them were found to be significantly positive at a 5% significance level, i.e. one (Nikkei) on July and the other (DJIA) on December.

Based on the results of the t-tests on the six indices, it can be concluded that the existence of the month-of-the-year effect in the indices cannot be globalized across regions.

4.5 RESULTS OF THE BARTLETT BOX TESTS

Table 3 shows the results of the Bartlett Box test. The results indicate that out of the 32 stocks, the variances of distribution of the returns of only 11 stocks were found to be homogeneous (Alcom, Genting, G.Kent, H.Leong, Hume, Magnum, MOX, NSTP, Palmco, Shell, Selangor Properties).

Of the 4 stocks (KLI, Rothmans, UMW, Pelangi) found to exhibit the month-of-the-year effect, none was found to satisfy the assumption that the distributions of stock returns have homogeneous variances. Clearly the validity of the results from the F statistic for the 4 stocks should be reviewed. Due to this non-satisfaction of the assumptions for ANOVA, these stocks together with the remaining 28 stocks will be further subjected to the Kruskal-Wallis Test (a non-parametric equivalent of the parametric Oneway ANOVA) to test the homogeneity of monthly returns.

The results of the Bartlett Box test for the homogeneity of variances of the six indices are tabulated in Table 4. The results indicate that the distribution of the monthly returns of only the Nikkei Stock Index has homogeneous variances. Thus all the six indices are subjected to the Kruskal-Wallis test.

4.6 RESULTS OF THE MANN-WHITNEY U TESTS

The difference in the mean return of each month to the mean return of the other eleven months for the year were also determined for the thirty two stocks using the non-parametric equivalent of the t-test.

The results of the Mann-Whitney U test for the thirty two securities are tabulated in Table 5. The results show that of the 32 stocks analysed, Pelangi has it's lowest mean rank on January, five (EAC, NSTP, Sime Darby, Faber, Kulim) have thier lowest mean rank on March, Yeo Hiap Seng has its lowest mean rank on April, seven (Alcom, CCM, Hume, MOX, Perlis, Tan Chong, KLK) have their lowest mean rank on August, four (IOI, Rothmans, Shell, Bandaraya) have their lowest mean rank on September, fourteen (Boustead, Genting, George Kent, Hong Leong, KLI, Magnum, M.Cement, Palmco, UMW, AMDB, Public Bank, IGB, Selangor Properties, Selangor Dredging) have their lowest mean rank on November.

The stock (Pelangi) with the lowest mean rank on January, is significantly low at a 5 % significance level . Of the five stocks with their lowest mean rank on March, four of them (EAC, Sime Darby, Faber, Kulim) are significantly low at a significance level of 5 %. The stock (Yeo Hiap Seng) with the lowest mean rank on April, is significantly low at a 5 % significance level. Of the seven stocks with their lowest mean rank on August, four of them (Alcom, Hume, Tan Chong, KLK) are significantly low at a significance level of 5 %. Of the four stocks with their lowest mean rank on September, only two of them (Rothmans, Bandaraya) are significantly low at a significance level of 5 %. Of the fourteen stocks with their lowest mean rank on November, ten of them (George Kent, Hong Leong, KLI, Magnum, Palmco, AMDB, Public Bank, IGB, Selangor Properties, Selangor Dredging) are significantly low at a 5 % significance level.

On the other hand, three of the stocks (MOX, NSTP, Shell) have their highest mean rank on January, sixteen (Alcom, EAC, Hume, KLI, Magnum, Palmco, Perlis, Rothmans, Tan Chong, Yeo Hiap Seng, AMDB, Faber, IGB, Pelangi, Selangor Properties, Selangor Dredging) have their highest mean rank in February, two (George Kent, Public Bank) have their highest mean rank in May, four (Boustead, M.Cement, UMW, Bandaraya) have their highest mean rank on June, two (CCM, IOI) have their highest mean rank on July, five (Genting, Hong Leong, Sime Darby, KLK, Kulim) have their highest mean rank on December.

Of the sixteen stocks with their highest mean rank on February, four of them (Alcom, EAC, Rothmans, Pealngi) are significantly high at a significance level of 5%. Both the stocks with their highest mean rank on July are significantly high at a significance level of 5%. Of the five stocks with their highest mean rank on December, only two of them (Sime Darby, KLK) are significantly high at a significance level of 5%.

Based on the results, it can be seen that where the month-of-the-year effect exists in the stocks, the contributing factor seems to be the significant difference in the mean returns between February or March or November and the other months of the year. The returns on February are generally high whilst the March and November returns are generally low.

The results of the Mann-Whitney U tests on the six indices are tabulated in table 6. Of the six indices analysed, the Hang Seng Index has its lowest mean rank on

March, the Australia All Ordinaries Index and the Nikkei Stock Index have their lowest mean rank on June, the Kuala Lumpur Composite index has its lowest mean rank on August, the Dow Jones Industrial Average and the Financial Times Stock Exchange 100 Index have their lowest mean rank on September. Only two of the indices (Australian All Ordinaries Index, Dow Jones Industrial Average) have mean rank that are significantly low at a significance level of 5%.

On the other hand, the Hang Seng Index and the Kuala Lumpur Composite Index have their highest mean rank on May, the Australian All Ordinaries Index has its highest mean rank on July, the Financial Times 100 Index has its highest mean rank on November, the Dow Jones Industrial Average and the Nikkei Stock Index have their highest mean rank on December. Only two of the indices (Australian All Ordinaries Index, Hang Seng Index) have mean rank that are significantly high at a significance level of 5%.

4.7 RESULTS OF THE KRUSKAL-WALLIS TESTS

The means of the monthly returns for a particular stock are compared using a non-parametric equivalent of the ANOVA test to check for the existence of the month-of-the-year seasonality.

Table 3 portraits the results of the Kruskal-Wallis tests which shows that only 3 stocks out of the 32 stocks indicated a significant month-of-the-year seasonality. The said stocks are Rothmans, Public Bank and Kulim. Based of the results, one

can safely conclude that the month-of-the-year seasonality cannot be generalized across the KLSE main board stocks.

The results of the Kruskal-Wallis tests for the six indices are tabulated in Table 4. The results indicated that none of the indices have a significant month-of-the-year seasonality.