CHAPTER 3

Empirical Results And Discussion

3.1 Empirical Findings on Seasonality in Daily Trading Returns (TRs)

The descriptive statistics and results from statistical tests performed on the daily trading returns of the overall market, both Main Board and Second Board and the various sectors for the whole period from January 1994 to December 2000 are presented in Table 1 and Table 2 respectively. Results on sub-periods are tabulated in Tables 3 to 8.

3.1.1 Analysis on The Day-Of-The-Week Effects in Daily Trading Returns

i) Day-Of-The-Week Effects In Daily Trading Returns For Whole Period: January 1994 – December 2000

Descriptive statistics and t-statistics for the daily mean trading returns throughout the week are presented in Table 1. From the results, negative mean trading returns are discovered to be a main occurrence in a week with at least 3 out of 5 trading days in the week, namely Monday, Tuesday and Thursday. The Second Board and Construction sector have negative mean trading returns for all days in a week except Friday. The results further reveal that lowest mean trading returns for the overall market, the 2 boards and the various sectors falls on Monday. On the other hand, positive and also highest mean trading returns are exhibited on Friday. This is consistent with results obtained in most similar studies such as Kok and Ho (1997) on the Second Board, Ng (1999), Choudhry (2000) and Toh (2001) for the overall market. It is also interesting to

note an identical pattern in the whole market and sectors; all have lowest mean return on Monday that is followed by Thursday, Tuesday, Wednesday and finally, the highest mean return on Friday.

The significant *t*-statistics obtained indicate that the mean returns are significantly different from zero on a given day. Significant (at 1% significance level) negative Monday mean trading returns are observed for the whole market and the various sectors while significant negative Thursday mean trading returns are found in the Main Board and the Finance and Industrial Product sectors. The Second Board and the sectors of Consumer Products, Industrial Products and Plantation displayed significant positive Friday mean trading returns.

The various statistical results for the whole period are summarized in Table 2. The *F*-statistics for One-way ANOVA are utilized to confirm that at least two of the five mean trading returns are significantly different or, in other words, the existence of the day-of-the-week effects. The results disclosed that the overall market, both Main Board and Second Board and the various sectors do not have equal means across the trading days of the week.

Multiple comparison tests i.e. Tukey's test and Scheffe's test are utilised to determine the pair(s) of days that are significantly different in the daily mean. From the Tukey's test, the overall market, the 2 boards and the various sectors are found to have at least one pair of days with significantly different means. The pairings are mainly between Monday mean trading returns with Wednesday (for the Main Board and all sectors except Finance, Industrial and Consumer Products) and Friday (for whole

market and all sectors) mean trading returns respectively. Other pairings consist of pairings between mean trading returns of Monday with Tuesday (for Industrial Products and Properties sectors), Monday with Thursday (for Properties sector) and Thursday with Friday mean trading returns (for Consumer Products and Industrial Products sectors). The combination in the pairing of days reduces under the more stringent Scheffe's test. The pairing between Monday mean trading returns and Friday mean trading returns remains the same as the result from Tukey's test with the exception of the overall market and the Construction sector. Significant pairings between Monday and Wednesday are found in the Main Board and the sectors of Industrial Products, Plantation, Properties and Mining. Other combinations of Monday with Tuesday and Thursday with Friday are still found in the Properties sector and Industrial Products sector, respectively.

The Main Board, Second Board and Finance, Plantation, Industrial Products and Properties sectors have been found to reject the assumption of equal variances across the week using the Levene test. Meanwhile, the Kolmogorov-Smirnov statistics have been found to be statistically significant at 1% significance level for daily trading returns of the whole market and all the sectors, indicating that the distribution is not normal. This means that statistical analysis using parametric tests will not be appropriate, as the results may not be valid. Thus, the non-parametric test, Kruskal-Wallis test, should be utilised for conducting statistical analysis on the trading return series.

Similar results as under the F-test were obtained using the Kruskal-Wallis test. Highly significant results in indicating the day-of-the-week effects are found in the overall market, both Main Board and Second Board and all the sectors.

The results generally indicate that Monday effect exists in the Malaysian stock market for the whole period from January 1994 to December 2000. It is obvious that mean trading returns on Monday are significantly negative and are the lowest trading return in the week. Friday effect is also discovered although it is not as prominent as the Monday effect. It seems that the market ends on a higher note before the trading week ends but falls on the first day the market resumes its trading. This finding is consistent with the findings of a similar study by Kok and Ho (1997) and Ng (1999) but differs from the findings by Toh (2001) in which the overall market does not indicate significant day-of-the-week effects.

ii) Day-Of-The-Week Effects In Daily Trading Returns For Sub-Period 1: January 1994 to July 1997

Table 3 contains descriptive statistics for the daily mean returns for the first sub-period from January 1994 to July 1997. Similar results as for the whole period were obtained. The overall market, both Main Board and Second Board and all 9 sectors display negative mean returns on Monday, Tuesday (with the exception of the Construction sector) and Thursday. Lowest mean trading returns are again found on Monday. For this sub-period, the whole market and the various sectors show positive mean trading returns on Wednesday and Friday. Highest mean trading returns is found on Friday with the exception of the overall market and the sectors of Industrial, Trading/Services and Construction, in which the highest mean trading returns is found on Wednesday.

Highly significant t-statistics are again discovered for the Monday mean trading returns in the overall market, the 2 boards and the 9 sectors. Other significant negative

mean trading returns are found on Thursday for the Industrial Products, Trading/Services and Properties sectors. The Second Board together with the Consumer Products, Plantation, Industrial Products and Properties sectors reveal significant positive Friday mean trading returns.

Other statistical evidence obtained for this sub-period is given in Table 4. As in the findings on seasonality for the whole period, the *F*-statistics of the One-Way ANOVA are significant for the whole market and all sectors. This result became more pronounced in this sub-period as all rejection of equal mean trading returns across the week occurs at 1% significance level.

The Tukey's and Scheffe's tests further confirm the results obtained from the One-way ANOVA. Under the former test, the pairings of the combination of Wednesday and Friday with Monday respectively are discovered for the overall market, the 2 boards and various sectors. In this sub-period, the pairing of Monday with Tuesday is revealed in the Main Board, the sectors of Industrial Products, Properties and Construction while the pairing of Thursday and Friday is found in the Industrial Products and Properties sectors. Under the latter test, the most common pairs of days with daily returns that are significantly different are Monday with Wednesday and Friday, respectively. Clearly, the difference of mean returns between Monday and Friday and difference of mean returns between Monday and Wednesday are very pronounced as they can be detected in both tests at 5% significance level. As for Industrial Products and Properties sectors, all have pairings of significantly different mean trading returns between Monday with Tuesday.

With the exception of the Main Board, Second Board and the Properties sector, the Levene test revealed that the whole market and all sectors satisfy the assumption of homoscedasticity in this sub-period. So, parametric test (the One-way ANOVA) is sufficient for examining the difference among daily mean returns. Nevertheless, the Kruskal-Wallis test is also utilised due to the non-normal distribution of the trading return series.

The Kruskal-Wallis test was found to give similar results to the One-way ANOVA. The overall market, both Main Board and Second Board and the various sectors have significantly different daily mean trading returns across the week at 1% significance level.

Generally, day-of-the-week effects are found to be very pronounced in this sub-period. Monday, Thursday and Friday effects are found in the whole market and all sectors with Monday effect the most prominent. Although Toh (2001) found evidence of seasonality in mean trading returns for some stocks in both the KLSE Main Board and Second Board for the same sub-period, the KLCI failed to indicate the same.

Table 1: Descriptive and t-statistics of Mean Trading Return (TR) Across the Day-of-the-Week for Whole Period Jan 1994 - Dec 2000

Indices	Monday (n = 332)			Tuesday (n = 352)			Wednesday (n = 346)			Thursday (n = 344)			Friday (n = 351)		
	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic
KLCI	-0.3331	1.9166	-3.0534 **	-0.0983	2.2623	-0.7597	0.0435	1.6910	0.4463	-0.1762	1.7522	-1.9443	0.0954	1.6132	1.1648
EMAS	-0.4473	1.9899	-3.9288 **	-0.1089	2.1335	-0.9065	0.0133	1.6499	0.1409	-0.2138	1.8444	-2.1909 *	0.1241	1.5750	1.5336
SBI	-0.5049	2.9304	-2.9825 **	-0.1513	2.3318	-1.2344	-0.0491	2.0475	-0.4451	-0.1786	2.2954	-1.4513	0.2285	1.9875	2.1438 *
FINANCE	-0.4080	2.3140	-3.1489 **	-0.1057	2.4223	-0.7990	0.0115	1.9977	0.1026	-0.2329	2.0421	-2.1283 *	0.1678	1.8201	1.7887
PLANTATION	-0.4215	2.0401	-3.5247 **	-0.1174	2.1153	-1.0153	0.0431	1.6651	0.4469	-0.1937	1.8508	-1.8847	0.1659	1.5439	1.9952 *
MINING	-0.8067	3.7223	-3.8731 **	-0.1378	3.8919	-0.6328	0.0935	3.0050	0.5405	-0.2495	2.8887	-1.6070	0.2327	3.1207	1.3473
INDPROD	-0.5432	2.1541	-4.3684 **	-0.1257	2.2850	-0.9768	0.0305	1.7018	0.3143	-0.3025	1.9105	-2.9758 **	0.1696	1.6199	2.0462 *
INDUSTRIAL	-0.3405	1.7082	-3.4878 **	-0.1142	2.0845	-0.9428	0.0161	1.5875	0.1778	-0.1685	1.6225	-1.9515	0.1309	1.5954	1.6592
TRAD/SERV	-0.4086	2.0088	-3.6109 **	-0.0882	2.2280	-0.6975	0.0198	1.8222	0.1924	-0.1568	1.9745	-1.5383	0.0738	1.7006	0.8512
PROPERTIES	-0.7709	2.7113	-4.9304 **	-0.1182	2.5098	-0.8671	-0.0924	2.1399	-0.7884	-0.2317	2.3483	-1.8767	0.1765	1.9965	1.6749
CONPROD	-0.2889	1.6442	-3.0757 **	-0.1150	1.8999	-1.0714	0.0157	1.2778	0.2161	-0.1598	1.5454	-1.9219	0.1849	1.5315	2.4489 *
CONSTRUCTION	-0.5021	2.4876	-3.5259 **	-0.1165	2.6594	-0.7633	0.0263	2.2960	0.2026	-0.2146	2.6409	-1.5753	0.0775	2.2668	0.6552

** and * indicate significance at 1% and 5% respectively

Table 2: Results of Statistical Tests for Mean Trading Return (TR) for Whole Period Jan 1994 - Dec 2000

Indices	F-Statistic	Tukey's	Scheffe's	Levene test	Kruskal-Wallis	KS
KLCI	2.9154 *	1&5*		1.270	24.815 **	4.504 **
EMAS	4.8012 **	1&3*, 1&5**	1&3*, 1&5**	2.626 *	38.997 **	4.040 **
SBI	4.3495 **	1&5**	1&5**	5.766 **	39.718 **	3.654 **
FINANCE	3.6870 **	1&5**	1&5*	2.423 *	29.901 **	4.399 **
PLANTATION	5.0420 **	1&3*, 1&5**	1&3*, 1&5**	2.423 *	33.424 **	4.189 **
MINING	4.8610 **	1&3**, 1&5**	1&3*, 1&5**	1.700	38.887 **	4.924 **
INDPROD	7.0149 **	1&2*, 1&3**, 1&5**, 4&5*	1&3**, 1&5**, 4&5*	2.604 *	55.145 **	4.053 **
INDUSTRIAL	3.6850 **	1&5**	1&5*	0.664	25.555 **	4.223 **
TRAD/SERV	3.1529 *	1&3*, 1&5*	1&5*	1.309	25.163 **	3.830 **
PROPERTIES	7.4436 **	1&2**, 1&3**, 1&4*, 1&5**	1&2*, 1&3**, 1&5**	3.746 **	58.622 **	4.280 **
CONPROD	4.4073 **	1&5**, 4&5*	1&5**	1.440	26.777 **	4.221 **
CONSTRUCTION	2.9287 *	1&3*, 1&5*		1.464	21.830 **	4.931 **

** and * indicate significance at 1% and 5% respectively

Indices	Monday			Tuesday			Wednesday			Thursday			Friday		
	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic
KLCI	-0.3102	1.1562	-3.6071 **	-0.0507	1.1048	-0.6310	0.0969	1.2150	1.0358	-0.1653	1.2271	-1.7166	0.0916	1.0701	1.1788
EMAS	-0.4577	1.2990	-4.6643 **	-0.0821	1.2333	-0.9043	0.0938	1.3164	0.9082	-0.2064	1.3651	-1.9072	0.1426	1.0762	1.7818
SBI	-0.5627	1.7975	-4.0635 **	-0.1555	1.7346	-1.2046	0.2225	1.6366	1.7002	-0.0832	1.7653	-0.6175	0.3128	1.3397	3.1266 **
FINANCE	-0.3578	1.3340	-3.5990 **	-0.0352	1.3392	-0.3532	0.0835	1.4138	0.7483	-0.1297	1.4063	-1.1657	0.1621	1.1135	1.9274
PLANTATION	-0.6125	1.8434	-4.1621 **	-0.1171	1.8729	-0.8433	0.1398	1.6138	1.0675	-0.2431	2.0102	-1.5378	0.2476	1.4103	2.3467 *
MINING	-0.8216	2.5032	-4.2585 **	-0.1984	2.4184	-1.1026	0.1061	2.3100	0.5754	-0.3102	2.1804	-1.8013	0.2618	1.7855	1.8951
INDPROD	-0.5925	1.4250	-5.3264 **	-0.1320	1.3411	-1.3152	0.0438	1.3745	0.3993	-0.2474	1.4300	-2.2225 *	0.1839	1.1260	2.1913 *
INDUSTRIAL	-0.3227	1.1439	-3.7493 **	-0.0316	1.0475	-0.4060	0.1355	1.1796	1.4647	-0.1654	1.2402	-1.6935	0.1333	1.0511	1.7691
TRAD/SERV	-0.3469	1.2479	-3.7702 **	-0.0803	1.1096	-0.9993	0.0955	1.3130	0.9605	-0.2048	1.2988	-2.0076 *	0.0503	1.1184	0.6192
PROPERTIES	-0.8177	1.9769	-5.4254 **	-0.1153	1.6793	-0.9170	0.0907	1.8735	0.6081	-0.3212	1.8977	-2.1532 *	0.2536	1.4128	2.3349 *
CONPROD	-0.3403	1.1421	-4.0286 **	-0.0928	1.1842	-1.0813	0.1049	1.0833	1.2181	-0.1171	1.2852	-1.1417	0.1988	1.0843	2.4909 *
CONSTRUCTION	-0.4287	1.4776	-3.8088 **	0.0259	1.5374	0.2212	0.1498	1.4818	1.3207	-0.1168	1.6755	-0.8822	0.0807	1.3715	0.7658

** and * indicate significance at 1% and 5% respectively

Table 4: Results of Statistical Tests for Mean Trading Return (TR) for Sub-Period Jan 1994 - July 1997

Indices	F-Statistic	Tukey's	Scheffe's	Levene test	Kruskal-Wallis
KLCI	3.9361 **	1&3*, 1&5*	1&3*, 1&5*	1.622	17.116 **
EMAS	6.4487 **	1&2*, 1&3**, 1&5**	1&3**, 1&5**	2.510 *	30.349 **
SBI	7.5722 **	1&3**, 1&5**	1&3**, 1&5**	3.068 *	31.235 **
FINANCE	4.0627 **	1&3*, 1&5**	1&5**	1.480	20.439 **
PLANTATION	6.4420 **	1&3**, 1&5**	1&3**, 1&5**	1.384	38.157 **
MINING	6.0503 **	1&3**, 1&5**	1&3**, 1&5**	1.754	28.115 **
INDPROD	8.5615 **	1&2*, 1&3**, 1&5**, 4&5*	1&2*, 1&3**, 1&5**	1.730	41.302 **
INDUSTRIAL	5.2693 **	1&3**, 1&5**	1&3**, 1&5**	1.131	23.846 **
TRAD/SERV	3.8803 **	1&3**, 1&5*	1&3*	2.206	15.312 **
PROPERTIES	9.5315 **	1&2**, 1&3**, 1&5**, 4&5*	1&2**, 1&3**, 1&5**	3.328 *	46.135 **
CONPROD	5.7359 **	1&3**, 1&5**	1&3*, 1&5**	1.060	31.888 **
CONSTRUCTION	3.9659 **	1&2*, 1&3**, 1&5*	1&3*, 1&5*	1.133	16.008 **

** and * indicate significance at 1% and 5% respectively

iii) Day-Of-The-Week Effects In Daily Trading Returns For Sub-Period 2: August 1997 to August 1998

The descriptive statistics of daily mean trading returns for the second sub-period from July 1997 to July 1998 are provided in Table 5. From the table, the overall market, both Main Board and Second Board and all the 9 sectors show negative mean returns on all days except for the Friday mean trading return of Trading/Services sector. Lowest mean trading returns are discovered on Thursday with the exception of the Mining and Trading/Services sectors on Monday and Properties sector on Tuesday. The overall market, the 2 boards and 8 out of 9 sectors still exhibit the highest mean trading returns on Friday although most of the returns are negative. The Mining sector has the highest mean trading return on Tuesday.

Compared to results in the previous sub-period, only the Construction and Industrial sectors continue to have significant *t*-statistics for Monday mean trading returns. Other significant results of t-statistics are observed on Tuesday in the Properties and Construction sectors, Wednesday in the Second Board and Properties sector, and Thursday in the Second Board and the sectors of Finance, Consumer Products, Industrial Products and Industrial.

Results of statistical tests performed are presented in Table 6. Contrary to the previous sub-period, the overall market, both Main Board and Second Board and the various sectors do not display unequal mean returns across the days of the week. Hence, the multiple comparison tests are not performed to identify the pair(s) of days having significant difference in mean trading returns.

The Levene test conducted to test the assumption of homogenous variances revealed that the overall market, both Main Board and Second Board and the various sectors satisfied the assumption of equal variances.

Consistent with the results of *F*-test, the Kruskal-Wallis test results imply that there are equal mean trading returns across the days of the week. Thus, the results indicate that the day-of-the-week effects do not exist in this sub-period. Although the results indicate that the overall market, both Main Board and Second Board and the various sectors have homogenous variances and that there are no day-of-the-week effects, this result should be treated with caution as this sub-period is considerably short.

iv) Day-Of-The-Week Effects In Daily Trading Returns For Sub-Period 3: September 1998 to December 2000

Table 7 presents the descriptive statistics of daily mean trading returns for the sub-period from September 1998 to December 2000. The results revealed that the whole market and almost all sectors have positive mean trading returns for all days except for Monday where the mean trading returns are negative. Similar to the findings for whole period, lowest mean trading returns are recorded on Monday while highest mean trading returns are recorded on Friday with the exception of the Trading/Services sector which have it on Thursday.

In general, the t-statistics in this sub-period are found to be not significant. In fact, only 2 sectors have significant results at 5% significance level, namely Properties (significantly negative Monday mean trading returns) and Consumer Products (significantly positive Friday mean trading returns).

The statistical results for this sub-period are given in Table 8. The results of the *F*-test of one-way ANOVA reveal that the overall market, both Main Board and Second Board and the various sectors have equal mean daily trading returns across the week. Hence, the multiple comparison tests are not performed in this sub-period.

The Second Board and the sectors of Consumer Products, Properties and Plantation are discovered to have violated the assumption of equal variances. Non-parametric test will be utilised as violation of this assumption renders parametric test invalid and unreliable.

The Kruskal-Wallis test, a non-parametric test, is utilised to check whether day-of-the-week effects persist in this sub-period. Results indicate that there are unequal daily mean trading returns across the week for the Second Board and Industrial Products, Properties and Mining sectors.

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Table 5: Descriptive and t-statistics of Mean Trading Return (TR) Across the Day-of-the-Week for Sub-Period Aug 1997 - Aug 1998

Indices	Monday			Tuesday			Wednesday			Thursday			Friday		
	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic
KLCI	-0.7330	2.7534	-1.9263	-0.5243	2.7133	-1.4141	-0.3127	2.6071	-0.8891	-0.7686	2.8841	-1.9075	-0.1168	2.3408	-0.3724
EMAS	-0.7221	2.6838	-1.9493	-0.5619	2.6538	-1.5537	-0.4019	2.3481	-1.2703	-0.8259	2.9963	-1.9687	-0.1220	2.1717	-0.4224
SBI	-0.6584	3.8302	-1.2401	-0.7918	3.0486	-1.9054	-0.9114	2.5875	-2.6431 **	-1.0634	3.2704	-2.3320 *	-0.3648	2.8168	-0.9711
FINANCE	-0.9188	3.5940	-1.8617	-0.8913	3.5328	-1.8501	-0.4977	3.4046	-1.0860	-1.0515	3.4388	-2.1758 *	-0.2505	2.5996	-0.7356
PLANTATION	-0.3649	2.0122	-1.3041	-0.3545	2.4529	-1.0679	-0.2290	2.0659	-0.8266	-0.4885	2.3193	-1.5038	-0.0530	2.1503	-0.1827
MINING	-0.8401	4.7680	-1.2777	-0.3240	5.0159	-0.4671	-0.7202	3.8981	-1.3680	-0.4629	3.9723	-0.8379	-0.7704	4.4349	-1.2776
INDPROD	-0.7334	2.7297	-1.9437	-0.3153	2.5799	-0.8996	-0.2709	2.0125	-0.9942	-1.0537	3.1835	-2.3621 *	-0.1399	2.3064	-0.4562
INDUSTRIAL	-0.6108	2.1303	-2.0611 *	-0.5735	2.1773	-1.9195	-0.3522	2.3642	-1.1031	-0.7133	2.3496	-2.1590 *	-0.1106	2.0317	-0.4093
TRAD/SERV	-0.8126	3.0458	-1.9288	-0.4957	2.8037	-1.2936	-0.3821	2.9534	-0.9610	-0.6916	3.2360	-1.5334	0.0384	2.4636	0.1160
PROPERTIES	-0.8001	3.0997	-1.8753	-0.8861	3.0964	-2.1012 *	-0.6724	2.5622	-1.9742 *	-0.5325	3.7101	-1.0326	-0.3116	2.4999	-0.9398
CONPROD	-0.3311	1.9738	-1.2120	-0.3816	2.5470	-1.0930	-0.4017	1.6992	-1.7436	-0.8126	2.4446	-2.3939 *	-0.1755	2.0007	-0.6581
CONSTRUCTION	-0.9207	3.2623	-2.0437 *	-1.0367	3.3343	-2.2702 *	-0.3667	3.4237	-0.7938	-1.1695	4.3846	-1.9091	-0.2944	3.0343	-0.7336

** and * indicate significance at 1% and 5% respectively

Table 6: Results of Statistical Tests for Mean Trading Return (TR) for Sub-Period Aug 1997 - Aug 1998

Indices	F-Statistic	Tukey's	Scheffe's	Levene test	Kruskal-Wallis
KLCI	0.5839	-	-	0.546	4.395
EMAS	0.6221	-	-	0.822	5.703
SBI	0.3884	-	-	0.415	4.077
FINANCE	0.5453	-	-	1.138	5.710
PLANTATION	0.3010	-	-	0.663	2.012
MINING	0.1300	-	-	0.208	1.695
INDPROD	1.1459	-	-	0.607	7.217
INDUSTRIAL	0.6396	-	-	0.595	3.524
TRAD&SERV	0.6895	-	-	0.936	6.151
PROPERTIES	0.3060	-	-	0.558	5.060
CONPROD	0.6378	-	-	0.650	1.345
CONSTRUCTION	0.6997	-	-	1.020	4.107

** and * indicate significance at 1% and 5% respectively

Table 7: Descriptive and t-statistics of Mean Trading Return (TR) Across the Day-of-the-Week for Sub-Period Sept 1998 - Dec 2000

Indices	Monday			Tuesday			Wednesday			Thursday			Friday		
	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic	Mean	Std. Dev.	t-statistic
KLCI	-0.1783	2.3393	-0.7685	0.0200	3.1788	0.0651	0.1308	1.7434	0.7704	0.0749	1.7226	0.4763	0.2020	1.8793	1.1828
EMAS	-0.2999	2.4536	-1.2243	0.0535	2.8399	0.1963	0.0888	1.6820	0.5474	0.0518	1.7605	0.3219	0.2121	1.8694	1.2465
SBI	-0.3413	3.7763	-0.9080	0.1385	2.6985	0.5781	-0.0480	2.2039	-0.2137	0.0678	2.4133	0.3267	0.3736	2.3027	1.7831
FINANCE	-0.2429	2.7115	-0.8984	0.1391	2.9915	0.4962	0.1429	1.8223	0.8146	-0.0220	1.9586	-0.1197	0.3750	2.2028	1.8768
PLANTATION	-0.1490	2.3152	-0.6520	-0.0110	2.3056	-0.0512	0.0289	1.5265	0.1970	0.0158	1.2544	0.1336	0.1428	1.3978	1.1039
MINING	-0.7674	4.6758	-1.6634	0.0387	5.0207	0.0819	0.4513	3.3581	1.3967	-0.0600	3.2628	-0.1949	0.6632	3.8434	1.8017
INDPROD	-0.3752	2.7306	-1.3811	-0.0310	3.1485	-0.1022	0.1506	1.9543	0.8033	-0.0480	1.7216	-0.3008	0.2943	1.8584	1.7580
INDUSTRIAL	-0.2395	2.1665	-1.1187	-0.0350	3.0213	-0.1177	0.0136	1.6461	0.0875	0.0731	1.6976	0.4741	0.2418	2.0120	1.3279
TRAD/SERV	-0.3125	2.3327	-1.3471	0.0827	3.0658	0.2808	0.0961	1.7688	0.5588	0.1589	2.0509	0.8472	0.1270	2.0000	0.7002
PROPERTIES	-0.6834	3.4395	-1.9803 *	0.2222	3.1484	0.7539	-0.0890	2.2566	-0.4296	0.0419	2.1785	0.2102	0.2883	2.4401	1.2948
CONPROD	-0.1882	2.0922	-0.9050	-0.0290	2.3975	-0.1257	0.0795	1.2866	0.6505	0.0696	1.3084	0.5879	0.3342	1.8286	2.0268 *
CONSTRUCTION	-0.4173	3.2253	-1.3056	0.0784	3.4908	0.2335	0.0295	2.6025	0.1188	0.0867	2.7456	0.2664	0.2487	2.8796	0.9494

** and * indicate significance at 1% and 5% respectively

Table 8: Results of Statistical Tests for Mean Trading Return (TR) for sub-period Sept 1998 - Dec 2000

Indices	F-Statistic	Tukey's	Scheffe's	Levene test	Kruskal-Wallis
KLCI	0.4629	-	-	1.182	7.170
EMAS	0.8651	-	-	1.682	8.926
SBI	1.0563	-	-	5.268 **	12.342 *
FINANCE	1.0418	-	-	1.535	8.832
PLANTATION	0.3727	-	-	2.670 *	3.994
MINING	2.0442	-	-	1.169	16.532 **
INDPROD	1.2912	-	-	2.199	13.695 **
INDUSTRIAL	0.7289	-	-	0.769	6.665
TRAD&SERV	0.7934	-	-	1.108	7.771
PROPERTIES	2.2395	-	-	2.466 *	17.288 **
CONPROD	1.2234	-	-	2.408 *	6.774
CONSTRUCTION	0.7613	-	-	0.926	6.384

** and * indicate significance at 1% and 5% respectively

3.2 Empirical Findings on Seasonality in Daily Stock Volatility

The existence and persistency of the day-of-the-week effects on stock volatility will be examined in this section. The descriptive statistics of the daily volatility (SDs) of the overall market, both Main Board and Second Board and the various sectors for the whole period from January 1994 to December 2000 are reported in Table 9 and Table 10 respectively. Results on sub-periods are given in Tables 11 to 16.

3.2.1 Analysis On The Day-Of-The-Week Effects In Daily Stock Volatility

i) Day-Of-The-Week Effects In Daily Stock Volatility For Whole Period: January 1994 – December 2000

The descriptive statistics for the overall market, both Main Board and Second Board and the various sectors for the whole period from January 1994 to December 2000 are presented in Table 9. Findings revealed that mean daily SDs are lowest on Friday for the overall market, the 2 boards and the various sectors. Highest mean daily SDs are found on Monday for both Main Board and Second Board and the sectors of Finance, Consumer Products, Properties, Industrial Products, Plantation and Mining. The overall market and the Industrial and Trading/Services sectors have the highest volatility on Thursday while it is Wednesday for the Construction sector.

From Table 10, the *F*-statistics for One-way ANOVA disclose that only the Second Board and the Properties sector have one day's mean SDs that differ significantly from each of the other days' means. Further analysis using the Tukey's test shows significant pairing of Monday with Wednesday (for Second Board only) and Friday (for both Second Board and Properties sector) respectively. Under the Scheffe's test, only the pair with the combination of Monday and Friday is identified.

The Kolgomorov-Smirnov statistics have been found to be statistically significant for daily SDs of the overall market, both Main Board and Second Board and the various sectors, indicating that the stock volatility is not normally distributed. Further, the Levene test results disclose that only the Second Board and the Plantation sector violate the assumption of homoscedasticity. This implies that statistical analysis using non-parametric tests will be more relevant as the results of parametric tests may not be valid.

More instances of significant findings are discovered using the Kruskal-Wallis test as compared to its parametric equivalent. Both Main Board and Second Board and the sectors of Consumer Products, Industrial Products, Properties, Plantation and Mining displayed day-of-the-week effects in the mean daily SDs.

In general, the results indicate that seasonality exist in the volatility of the Malaysian stock market for the whole period from July 1995 to December 2000. The findings are similar to results from Ho and Cheung (1994), Choudhry (2000) and Toh (2001). However, it is in contrast with findings by Clare et al. (1997) that the Malaysian market experiences highest volatility on Tuesday and lowest on Monday. It also differs from Berument and Kiymaz (2001) where the highest and lowest mean volatilities are on Friday and Wednesday respectively for the S&P500.

ii) Day-Of-The-Week Effects In Daily Stock Volatility For Sub-Period 1: January 1994 to July 1997

Tabulated in Table 11 are the descriptive statistics on the daily stock volatility of the overall market, both Main Board and Second Board and the 9 sectors for the period

from January 1995 to July 1997. Friday still remains as the day with lowest mean daily SDs except for the Industrial and Trading/Services sectors where the day with lowest mean daily SDs falls on Tuesday. On the other hand, the distribution of days with the highest mean daily SDs is more scattered. For the Second Board and the Consumer Products, Industrial Products, Properties, Plantation and Mining sectors, the highest mean daily SDs fall on Monday. The overall market, the Main Board and the Finance, Trading/Services and Construction sectors have the highest volatility on Wednesday while that for the Industrial sector is on Thursday.

Based on the findings in Table 12, the *F*-statistics are significant for the Second Board and the Properties and Mining sectors, implying unequal daily mean SDs across the week. Similar to results for whole period, Tukey's test identifies the combination of Monday and Friday as the pair of days with significantly different means. Only the pair identified in the Properties sector remains significant under the more stringent Scheffe's test.

On examining the conformity to the assumption of homogeneity in variances, results from Levene test disclosed that the overall market, both Main Board and Second Board and all the sectors, except MINING, satisfied the assumption.

As the distribution of stock volatility has been found to be not normal, the Kruskal-Wallis test, a non-parametric test, is performed to examine the persistency of day-of-the-week effects in this sub-period. Similar results to the whole period are again obtained. Both Main Board and Second Board and the 2 sectors of Industrial Products

and Properties are observed to give significant results at the 1% significance level while the Plantation and Mining sectors indicate significant result at the 5% significance level.

In general, seasonal variations on volatility are found in the Second Board and the Properties and Mining sectors using both parametric and non-parametric tests. The findings on the overall market are in line with the results obtained by Toh (2001).

Table 9: Descriptive statistics of Daily Volatility (SD) Across the Day-of-the-Week for Whole Period July 1994 - Dec 2000

Indices	Monday		Tuesday		Wednesday		Thursday		Friday	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
KLCI	0.0191	0.0176	0.0190	0.0209	0.0192	0.0144	0.0192	0.0171	0.0174	0.0148
EMAS	0.0191	0.0180	0.0185	0.0190	0.0184	0.0140	0.0184	0.0168	0.0162	0.0142
SBI	0.0264	0.0239	0.0236	0.0201	0.0220	0.0172	0.0225	0.0192	0.0203	0.0176
FINANCE	0.0224	0.0213	0.0221	0.0213	0.0217	0.0184	0.0214	0.0191	0.0194	0.0167
PLANTATION	0.0200	0.0170	0.0191	0.0197	0.0184	0.0169	0.0185	0.0164	0.0164	0.0131
MINING	0.0365	0.0325	0.0357	0.0372	0.0340	0.0262	0.0327	0.0257	0.0312	0.0279
INDPROD	0.0209	0.0185	0.0197	0.0212	0.0191	0.0148	0.0191	0.0169	0.0171	0.0143
INDUSTRIAL	0.0183	0.0153	0.0180	0.0192	0.0185	0.0140	0.0188	0.0159	0.0175	0.0141
TRAD/SERV	0.0213	0.0185	0.0209	0.0204	0.0216	0.0150	0.0218	0.0188	0.0200	0.0158
PROPERTIES	0.0269	0.0233	0.0246	0.0225	0.0243	0.0187	0.0238	0.0201	0.0210	0.0182
CONPROD	0.0168	0.0142	0.0161	0.0179	0.0153	0.0114	0.0158	0.0139	0.0147	0.0130
CONSTRUCTION	0.0267	0.0227	0.0266	0.0237	0.0268	0.0202	0.0266	0.0244	0.0243	0.0202

Table 10: Results from statistical tests for Daily Volatility (SD) for Whole Period Jan 1994 - Dec 2000

Indices	F-Statistic	Tukey's	Scheffe's	Levene test	Kruskal-Wallis	KS
KLCI	0.7205			0.490	7.942	7.358 **
EMAS	1.6746			1.069	14.020 **	7.056 **
SBI	4.5206 **	1&3*, 1&5**	1&5**	3.263 *	22.698 **	6.774 **
FINANCE	1.2883			1.285	7.631	7.124 **
PLANTATION	2.1854			2.403 *	13.271 *	7.816 **
MINING	1.7601			1.168	14.715 **	6.980 **
INDPROD	2.1312			1.077	18.386 **	7.540 **
INDUSTRIAL	0.3091			0.452	3.608	7.464 **
TRAD/SERV	0.5230			0.490	6.650	6.736 **
PROPERTIES	3.6055 **	1&5**	1&5**	1.647	26.636 **	6.817 **
CONPROD	1.0874			1.460	11.090 *	7.595 **
CONSTRUCTION	0.7548			0.860	5.132	6.913 **

** and * indicate significance at 1% and 5% respectively

Table 11: Descriptive statistics of Daily Volatility (SDs) Across the Day-of-the-Week for Sub-Period Jan 1994 - July 1997

Indices	Monday		Tuesday		Wednesday		Thursday		Friday	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
KLCI	0.0125	0.0077	0.0118	0.0078	0.0131	0.0108	0.0125	0.0094	0.0116	0.0090
EMAS	0.0133	0.0091	0.0122	0.0094	0.0134	0.0129	0.0127	0.0107	0.0110	0.0092
SBI	0.0197	0.0123	0.0186	0.0122	0.0181	0.0129	0.0181	0.0120	0.0158	0.0108
FINANCE	0.0144	0.0092	0.0134	0.0097	0.0144	0.0129	0.0137	0.0104	0.0126	0.0090
PLANTATION	0.0183	0.0144	0.0170	0.0162	0.0170	0.0196	0.0171	0.0171	0.0142	0.0142
MINING	0.0267	0.0192	0.0245	0.0185	0.0256	0.0223	0.0242	0.0171	0.0208	0.0139
INDPROD	0.0153	0.0098	0.0135	0.0103	0.0144	0.0134	0.0139	0.0108	0.0122	0.0091
INDUSTRIAL	0.0127	0.0075	0.0121	0.0075	0.0131	0.0124	0.0132	0.0092	0.0125	0.0085
TRAD/SERV	0.0142	0.0084	0.0130	0.0076	0.0151	0.0110	0.0141	0.0096	0.0131	0.0089
PROPERTIES	0.0210	0.0141	0.0184	0.0135	0.0194	0.0177	0.0189	0.0146	0.0160	0.0116
CONPROD	0.0126	0.0074	0.0116	0.0094	0.0118	0.0106	0.0124	0.0099	0.0112	0.0086
CONSTRUCTION	0.0172	0.0099	0.0167	0.0115	0.0181	0.0129	0.0172	0.0120	0.0163	0.0106

Table 12: Results of Statistical Tests for Daily Volatility (SD) for Sub-Period Jan 1994 - July 1997

Indices	F-Statistic	Tukey's	Scheffe's	Levene test	Kruskal-Wallis
KLCI	0.8625			0.718	8.163
EMAS	1.5037			0.633	14.394 **
SBI	2.5045 *	1&5*		1.247	13.790 **
FINANCE	0.8508			0.454	6.741
PLANTATION	1.5994			1.324	11.349 *
MINING	2.6157 *	1&5*		2.472 *	12.082 *
INDPROD	2.0091			0.674	19.484 **
INDUSTRIAL	0.4853			0.832	1.408
TRAD/SERV	1.5327			1.144	8.342
PROPERTIES	2.7204 *	1&5*	1&5*	1.146	20.653 **
CONPROD	0.6448			0.672	7.490
CONSTRUCTION	0.6297			0.366	5.355

** and * indicate significance at 1% and 5% respectively

iii) Day-Of-The-Week Effects In Daily Stock Volatility For Sub-Period 2: August 1997 to August 1998

This sub-period coincides with the sharp downturn of the Malaysian stock market due to the Asian financial crisis.

As shown in Table 13, the descriptive statistics for the daily stock volatility reflect a different trend in the highest and lowest values of the mean daily SDs in this sub-period. The overall market, the Main Board and all sectors, except Finance and Mining, have highest mean daily SDs on Thursday. Highest mean SDs for the Second Board and the Finance and Mining sectors fall on Tuesday. Lowest mean daily SDs in the week are found on Monday (for the overall market and the sectors of Industrial, Trading/Services, Plantation and Mining), Wednesday (for the Second Board and the sectors of Consumer Products and Industrial Products) and Friday (for the Main Board and the sectors of Finance, Properties and Construction).

Results on statistical analysis performed are tabulated in Table 14. The *F*-test results of the one-way ANOVA reveal that the overall market, the 2 boards and the various sectors show non-significant results indicating equal volatility across the days of the week. As such, multiple comparison tests are not performed for this sub-period.

Non-significant results of the Levene test are obtained for the overall market, both Main Board and Second Board and the various sectors, implying equal variances of the daily SDs.

Results from the Kruskal-Wallis test further reinforce the parametric test results that the whole market and all sectors do not display day-of-the-week effects in this sub-period. These results are consistent with the results obtained by Toh (2001).

iv) Day-Of-The-Week Effects In Daily Stock Volatility For Sub-Period 3: September 1998 to December 2000

Descriptive statistics on stock volatility across the days of the week for the period starting from September 1998 to December 2000 are reported in Table 15. This period corresponds with the implementation of selective capital control in order to contend with the financial crisis. Results similar to the whole period are reflected in this sub-period. Highest and lowest mean daily SDs in the week fall on Monday and Friday, respectively, with some exceptions; for the overall market and the Trading/Services sector, highest mean daily SDs falls on Tuesday while for the Mining and Consumer Products sectors, lowest mean daily SDs falls on Thursday.

Results of various statistical tests conducted are tabulated in Table 16. Only the Second Board gives significant result for the *F*-test, implying that day-of-the-week effects do not persist in this period.

Based on the Tukey's test, the pairs of days that have significantly different mean daily SDs are between Monday with Wednesday, Thursday or Friday for the Second Board. The number of pairs remains constant under the Scheffe's test although there is a slight drop in the significance level from 1% to 5%.

The Levene test discloses that the Second Board and the Industrial Products, Properties and Plantation sectors violate the assumption of homoscedasticity which is vital for parametric tests result to be valid.

The Kruskal-Wallis test again shows that there are more significant results on the persistency of seasonality in this sub-period. Besides the Second Board, unequal volatility across the week is found in the Consumer Products, Properties and Mining sectors. The results are consistent with those obtained by Toh (2001).

Table 13: Descriptive Statistics of Daily Volatility (SD) Across the Day-of-the-Week for Sub-Period Aug 1997 - Aug 1998

Indices	Monday		Tuesday		Wednesday		Thursday		Friday	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
KLCI	0.0309	0.0200	0.0325	0.0182	0.0330	0.0148	0.0366	0.0247	0.0312	0.0179
EMAS	0.0282	0.0199	0.0298	0.0187	0.0288	0.0139	0.0329	0.0257	0.0269	0.0179
SBI	0.0340	0.0297	0.0351	0.0273	0.0313	0.0221	0.0341	0.0322	0.0319	0.0270
FINANCE	0.0374	0.0213	0.0403	0.0213	0.0392	0.0184	0.0401	0.0191	0.0334	0.0167
PLANTATION	0.0239	0.0137	0.0263	0.0185	0.0246	0.0151	0.0271	0.0203	0.0252	0.0176
MINING	0.0486	0.0390	0.0541	0.0444	0.0498	0.0308	0.0502	0.0318	0.0505	0.0342
INDPROD	0.0289	0.0186	0.0299	0.0211	0.0268	0.0143	0.0317	0.0286	0.0275	0.0187
INDUSTRIAL	0.0255	0.0157	0.0275	0.0160	0.0285	0.0148	0.0323	0.0240	0.0274	0.0165
TRAD/SERV	0.0339	0.0234	0.0348	0.0200	0.0365	0.0171	0.0406	0.0276	0.0346	0.0199
PROPERTIES	0.0349	0.0231	0.0362	0.0258	0.0340	0.0180	0.0367	0.0319	0.0324	0.0247
CONPROD	0.0230	0.0137	0.0239	0.0208	0.0228	0.0113	0.0274	0.0222	0.0235	0.0159
CONSTRUCTION	0.0406	0.0264	0.0432	0.0234	0.0423	0.0259	0.0483	0.0375	0.0393	0.0258

Table 14: Results of Statistical Tests for Daily Volatility (SD) for Sub-Period Aug 1997 - Aug 1998

Indices	F-Statistic	Tukey's	Scheffe's	Levene test	Kruskal-Wallis
KLCI	0.7387	-	-	2.157	2.724
EMAS	0.7096	-	-	2.258	3.008
SBI	0.1804	-	-	0.892	1.202
FINANCE	0.7104	-	-	1.285	3.909
PLANTATION	0.3045	-	-	1.076	0.409
MINING	0.1745	-	-	0.496	0.484
INDPROD	0.4805	-	-	1.845	0.902
INDUSTRIAL	1.0689	-	-	1.962	3.772
TRAD&SERV	0.7934	-	-	2.217	2.741
PROPERTIES	0.2617	-	-	2.061	2.471
CONPROD	0.6129	-	-	1.651	0.907
CONSTRUCTION	0.7913	-	-	1.568	3.801

** and * indicate significance at 1% and 5% respectively

Table 15: Descriptive Statistics of Daily Volatility (SD) Across the Day-of-the-Week for Sub-Period Sept 1998 - Dec 2000

Indices	Monday		Tuesday		Wednesday		Thursday		Friday	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
KLCI	0.0239	0.0225	0.0241	0.0297	0.0216	0.0137	0.0216	0.0160	0.0199	0.0156
EMAS	0.0241	0.0235	0.0232	0.0256	0.0208	0.0125	0.0207	0.0149	0.0190	0.0152
SBI	0.0333	0.0307	0.0262	0.0233	0.0234	0.0183	0.0241	0.0181	0.0217	0.0178
FINANCE	0.0277	0.0263	0.0271	0.0263	0.0242	0.0147	0.0247	0.0170	0.0232	0.0190
PLANTATION	0.0209	0.0213	0.0191	0.0240	0.0176	0.0125	0.0166	0.0114	0.0157	0.0107
MINING	0.0461	0.0403	0.0447	0.0482	0.0387	0.0248	0.0380	0.0282	0.0383	0.0335
INDPROD	0.0258	0.0252	0.0245	0.0294	0.0223	0.0146	0.0214	0.0138	0.0198	0.0154
INDUSTRIAL	0.0237	0.0202	0.0230	0.0281	0.0215	0.0123	0.0211	0.0152	0.0205	0.0164
TRAD/SERV	0.0265	0.0222	0.0269	0.0276	0.0242	0.0131	0.0251	0.0180	0.0239	0.0162
PROPERTIES	0.0325	0.0313	0.0288	0.0284	0.0270	0.0182	0.0257	0.0176	0.0234	0.0201
CONPROD	0.0207	0.0197	0.0193	0.0237	0.0168	0.0105	0.0159	0.0116	0.0160	0.0149
CONSTRUCTION	0.0348	0.0281	0.0343	0.0301	0.0321	0.0199	0.0313	0.0237	0.0298	0.0228

Table 16: Results of Statistical Tests for Daily Volatility (SD) for Sub-period Sept 1998 - Dec 2000

Indices	F-Statistic	Tukey's	Scheffe's	Levene test	Kruskal-Wallis
KLCI	0.8623			1.327	5.229
EMAS	1.3106			1.712	5.978
SBI	4.6621 **	1&3**, 1&4*, 1&5**	1&3*, 1&4*, 1&5**	5.760 **	12.658 *
FINANCE	0.9816			0.976	5.107
PLANTATION	1.6904			3.291 *	5.000
MINING	1.3553			1.033	9.750 *
INDPROD	1.5173			2.599 *	7.446
INDUSTRIAL	0.5362			1.267	4.690
TRAD&SERV	0.5233			1.050	2.030
PROPERTIES	2.3768			3.269 *	9.811 *
CONPROD	1.8542			2.108	9.716 *
CONSTRUCTION	0.7959			1.100	3.482

** and * indicate significance at 1% and 5% respectively

3.3 Analysis On The Day-Of-The-Week Effects on Volatility Using Different Statistical Methodologies

The Levene test results on equality of mean trading returns can be compared to the results from the *F*-test of the one-way ANOVA and Kruskal-Wallis test on the daily stock volatility. The objective is to facilitate analysis of the two methodologies in examining the presence of day-of-the-week effects in the volatility of stocks. The comparisons on the above for the whole period and three sub-periods are presented in Table 17. The results of Kruskal-Wallis test will take precedence over F-test for comparison against the Levene test as the distributions of both daily trading returns and daily stock volatility are not normal.

For the whole period, the Levene test has identified that both Main Board and Second Board and the sectors of Finance, Industrial Products, Properties and Plantation have violated the assumption of homoscedasticity. Meanwhile, the *F*-test gives significant result for the Second Board and the Properties sector while the Kruskal-Wallis test gives significant results for all except the overall market and the sectors of Finance, Trading/Services, Industrial, Construction and Mining. Common findings, between Kruskal-Wallis test and Levene test, are observed for the 2 boards and the Plantation, Industrial Products and Properties sectors.

In sub-period 1, only both boards and the Properties sector give significant result under the Levene test. Similar results as those obtained in the whole period are found for the *F*-test and Kruskal-Wallis test. Unequal mean variances across the week are commonly identified in both Main Board and Second Board and the Properties sector.

The overall market, both Main Board and Second Board and the various sectors are found to satisfy the assumption of homogenous variances in sub-period 2. Both *F*-test and the Kruskal-Wallis test also show equal mean daily SDs across days of the week. Thus, comparison between the test methodologies yields fully compatible results for this sub-period.

In the last sub-period, the Second Board and the Consumer Products, Properties and Plantation sectors are found to violate the assumption of equal variances. Only the Second Board gives significant *F*-test results. Under the Kruskal-Wallis test, the day-of-week effects are found in the Second Board and the sectors of Consumer Products, Properties and Mining for this sub-period. The Second Board and the Properties and Consumer Products sectors are found to share common results.

Based on the above results, we can conclude that the test for seasonal variation in stock volatility using the Parkinson extreme value method does provide reasonably consistent results with the analysis obtained by using the Levene test on the trading returns. It appears that the Parkinson extreme value method is less sensitive in detecting unequal mean volatility across the days of the week using the F-test but more sensitive using the Kruskal-Wallis test as compared to utilising the Levene test on trading returns. The finding on the overall market is basically similar to the findings by Toh (2001).

Table 17: Comparison of Results of ANOVA (F-Tests) and Kruskal-Wallis with Levene Tests on Seasonality of Volatility

Indices	Whole Period			Sub-Period 1			Sub-Period 2			Sub-Period 3		
	Est. SDs		Returns	Est. SDs		Returns	Est. SDs		Returns	Est. SDs		Returns
	F-Test	Kruskal-Wallis	Levene Test	F-Test	Kruskal-Wallis	Levene Test	F-Test	Kruskal-Wallis	Levene Test	F-Test	Kruskal-Wallis	Levene Test
KLCI	0.7205	7.9420	1.2700	0.8625	8.1630	1.6220	0.7387	2.7240	0.5460	0.8623	5.2290	1.1820
EMAS	1.6746	14.0200 **	2.6260 *	1.5037	14.3940 **	2.5100 *	0.7096	3.0080	0.8220	1.3106	5.9780	1.6820
SBI	4.5206 **	22.6980 **	5.7660 **	2.5045 *	13.7900 **	3.0680 *	0.1804	1.2020	0.4150	4.6621 **	12.6580 *	5.2680 **
FINANCE	1.2883	7.6310	2.4230 *	0.8508	6.7410	1.4800	0.7104	3.9090	1.1380	0.9816	5.1070	1.5350
PLANTATION	2.1854	13.2710 *	2.4230 *	1.5994	11.3490 *	1.3840	0.3045	0.4090	0.6630	1.6904	5.0000	2.6700 *
MINING	1.7601	14.7150 **	1.7000	2.6157 *	12.0820 *	1.7540	0.1745	0.4840	0.2080	1.3553	9.7500 *	1.1690
INDPROD	2.1312	18.3860 **	2.6040 *	2.0091	19.4840 **	1.7300	0.4805	0.9020	0.6070	1.5173	7.4460	2.1990
INDUSTRIAL	0.3091	3.6080	0.6640	0.4853	1.4080	1.1310	1.0689	3.7720	0.5950	0.5362	4.6900	0.7690
TRAD/SERV	0.5230	6.6500	1.3090	1.5327	8.3420	2.2060	0.7934	2.7410	0.9360	0.5233	2.0300	1.1080
PROPERTIES	3.6055 **	26.6360 **	3.7460 **	2.7204 *	20.6530 **	3.3280 *	0.2617	2.4710	0.5580	2.3768	9.8110 *	2.4660 *
CONPROD	1.0874	11.0900 *	1.4400	0.6448	7.4900	1.0600	0.6129	0.9070	0.6500	1.8542	9.7160 *	2.4080 *
CONSTRUCTION	0.7548	5.1320	1.4640	0.6297	5.3550	1.1330	0.7913	3.8010	1.0200	0.7959	3.4820	0.9260

** and * indicate significance at 1% and 5% respectively

3.4 Empirical Finding On Relationship Between Stock Volatility And Trading Return

In general, the principle of investment states that returns and risk have a direct relationship. The higher the risk one is willing to bear, the more the returns one will receive as compensation. In this section, the relationship between trading returns and stock volatility will be examined by analysing the results obtained from sections 3.1 and 3.2.

Looking at the overall period findings, highest mean daily trading returns found on Friday corresponds with lowest mean daily SDs for the overall market, both Main Board and Second Board and the various sectors. Meanwhile, lowest mean daily trading returns found on Monday corresponds with highest mean daily SDs for all except the overall market and the Industrial, Trading/Services and Construction sectors. It seems that the returns have an inverse relationship with volatility.

For sub-period 1, similar results as the whole period are obtained with the exception of the overall market and the Trading/Services and Construction sectors. The highest daily mean trading returns coincides with the highest mean daily stock volatility in the week, which is Wednesday, for the overall market and these 2 sectors.

For sub-period 2, results indicate that the overall market, the Main Board and the sectors of Consumer Products, Constructions, Industrial Products, Industrial and Plantation have the lowest mean daily trading returns and the highest mean daily stock volatility on the same day; Thursday. Meanwhile, the Main Board and the Finance, Construction and Properties sectors that have the highest mean daily trading returns on

Friday have the lowest mean daily SDs in a week. Thus, inverse relationship on returns and risk is found in the Main Board and the Construction sector. However, 2 sectors are found to adhere to the general principle of investment, namely, Mining and Trading/Services. The former has lowest mean trading returns and lowest mean SDs on Monday while having both highest mean trading returns and highest mean daily SDs on Tuesday. The latter only indicates that the lowest mean trading returns and SDs falls on Monday.

Similar results as obtained for whole period are recorded in sub-period 3. Lowest mean trading returns on Monday supported by the highest mean daily stock volatility in the week are found in both Main Board and Second Board, and all the sectors except in the overall market and the Trading/Services sector. Meanwhile, highest mean trading returns with the lowest stock volatility on Friday are recorded in the overall market, both Main Board and Second Board and all sectors except Consumer Products, Trading/Services and Mining.

All these findings seem to point out that the general principle of higher risk being associated with higher returns is false for the Malaysian stock market! It is however consistent with the findings by Ho and Cheung (1994), Clare et al. (1997) and Toh (2001) which suggested that risk (as proxied by unconditional volatility) and return have an inverse relationship. Past findings suggested that the reason that might account for the break from the general rule in investment is the flow of information. In a situation where private information is available throughout the week while public information is available during weekdays, traders are bound to exercise the private information accumulated during the weekends by trading more intensely at the

beginning of the week when the market re-opens. Arrival of information over the weekend may also cause traders to be more sensitive to changes in order flow at the beginning of the week. All these lead to increase in activity in the market and consequently a bigger variance in the price changes.

Result of positive risk premium on stock price is found from the study by Song et al. (1998).

3.5 Empirical Findings On Causal Relationship Between Daily Volatility And Trading Returns

3.5.1 Findings From Test On Stationarity

The results of the test on stationarity using ADF test for daily trading returns and daily SDs are tabulated in Table 18 and Table 19, respectively. Results are obtained with up to 5 lags of change of daily trading returns and daily SDs.

Results indicate that ADF statistics of all lags for the overall market, both Main Board and Second Board and the various sectors are significant at 1% significance level. This establishes that both daily trading returns and daily SDs series are stationary at all 5 lags, thus, paving the way for the next step of analysis on the relationship between the daily trading returns and daily SDs.

3.5.2 Findings On Causal Relationship Between Daily Volatility And Trading Returns

In this study, the Vector Auto Regressive (VAR) models of the daily trading returns and daily SDs for 5 lags are constructed. Selections of the optimal model for each index are done based on the Bayesian Schwarz Information Criterion (SIC) where the model with the lowest SIC value is utilised for the study on the causal relationship between the daily trading returns and daily SDs.

The Akaike Information Criterion (AIC) and SIC of the VAR models of daily SDs and trading returns using lag 1 to lag 5 are reported in Table 20. Five lags are selected for the VAR model for the overall market and the sectors of Consumer Products, Industrial, Trading/Services, Plantation and Mining while four lags are

:cted for the Main Board and the Finance sector. The Second Board and the sectors ndustrial Products and Properties select models with 2 lags while Construction sector ect model with 3 lags. The optimal models selected are used to facilitate the study on causal relationship on trading returns and stock volatility.

Table 21 presents the VAR model on daily SDs with the optimal lag length for e overall market, both Main Board and Second Board and the various sectors. A gnificant t-statistic of the lag variables means that daily SDs can be explained by its vn lag variable or the lag variable of the daily trading returns. Results reveal that the aily SDs for the whole market and all 9 sectors is significantly explained by the lag ariables of daily SDs. The findings further disclose that, except for Construction sector, aily trading returns do Granger-cause daily stock volatility at the 5% significance level.

The VAR model on daily trading returns with the optimal lag length for the overall market, both Main Board and Second Board and the various sectors are given in Table 22. The results disclose that lag variable(s) of the daily trading returns manage to explain the current daily trading returns for the overall market, the 2 boards and all sectors except the Industrial Products sector. The Industrial Products sector seems to be significantly explained by the constant term only. Compared to the results where daily SDs is the dependent variable, only the overall market, the Main Board and the sectors of Finance, Consumer Products, Construction, Industrial, Trading/Services and Plantation indicate daily stock volatility Granger-causes daily trading returns.

Overall, we can conclude that causal relationship exists between daily trading returns and daily stock volatility. For the overall market, the Main Board and the Finance, Consumer Products, Industrial, Trading/Services and Plantation sectors, the relationship is bidirectional. In other words, the daily SDs Granger-causes the daily trading returns and vice versa. Unidirectional causality is observed for all the remaining sectors where daily trading return Granger-causes daily SDs, for the Second Board and the Mining, Industrial Products and Properties sectors, and daily SDs Granger-causes daily trading returns for the Construction sector. It is to be noted that the findings are quite similar to the study conducted by Toh (2001).

Table 18: Results of Unit Root Test (ADF Test) on Daily Trading Returns (TRs) for whole period Jan 1994 - Dec 2000

Indices	ADF Test Statistics				
	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
KLCI	-28.4380	-23.9705	-22.6459	-18.0536	-17.4736
EMAS	-27.4387	-22.6207	-20.7292	-17.1740	-17.1479
SBI	-26.0459	-20.9440	-17.7883	-16.2176	-16.2300
FINANCE	-26.0943	-21.3459	-19.4507	-17.1048	-17.2249
PLANTATION	-29.6211	-22.8884	-19.9284	-16.2186	-15.7452
MINING	-30.3762	-23.8083	-20.7308	-17.1857	-15.8384
INDPROD	-28.3802	-22.2718	-20.1072	-16.6942	-16.7080
INDUSTRIAL	-29.5673	-24.2582	-21.8914	-17.6265	-17.0941
TRAD/SERV	-27.8778	-24.0106	-22.6271	-18.4939	-18.0402
PROPERTIES	-27.4336	-21.7624	-19.0778	-16.5835	-16.8090
CONPROD	-28.1110	-23.1940	-20.9763	-17.5113	-16.8581
CONSTRUCTION	-26.6103	-22.6544	-20.6185	-17.5056	-17.5341

All significant at 1% significance level

Table 19: Results of Unit Root Test (ADF Test) on Daily Volatility (SDs) for whole period Jan 1994 - Dec 2000

Indices	ADF Test Statistics				
	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
KLCI	-12.9718	-11.0224	-9.7561	-9.0124	-9.0337
EMAS	-13.8602	-11.9334	-10.7525	-9.7962	-9.4604
SBI	-16.3427	-14.4181	-11.9276	-11.0119	-9.9768
FINANCE	-14.0795	-12.3223	-10.8382	-9.6547	-8.8079
PLANTATION	-15.6416	-13.3142	-11.5759	-10.3771	-9.3811
MINING	-17.1232	-13.7295	-12.0129	-10.6027	-9.5396
INDPROD	-14.6978	-12.5269	-10.9140	-9.9461	-9.6467
INDUSTRIAL	-13.7815	-11.5631	-10.3643	-9.7262	-9.4214
TRAD/SERV	-13.1851	-11.0924	-9.9218	-9.1404	-9.0945
PROPERTIES	-15.2410	-13.1871	-11.7044	-10.4201	-9.2881
CONPROD	-15.3784	-12.8880	-11.1948	-10.0175	-9.9293
CONSTRUCTION	-14.0001	-12.1659	-11.2746	-10.1842	-9.1434

All significant at 1% significance level

Table 20: AIC & SIC Statistics of VAR Models on Daily Volatility and Trading Returns

Indices	AIC					SIC				
	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5
KLCI	-1.9014	-1.9524	-1.9685	-1.9994	-2.0294	-1.8824	-1.9208	-1.9242	-1.9424	-1.9597
EMAS	-1.8978	-1.9377	-1.9504	-1.9664	-1.9773	-1.8788	-1.9061	-1.9060	-1.9093	-1.9076
SBI	-0.9560	-0.9710	-0.9756	-0.9935	-0.9901	-0.9370	-0.9393	-0.9313	-0.9365	-0.9204
FINANCE	-1.3288	-1.3663	-1.3835	-1.3987	-1.4049	-1.3099	-1.3347	-1.3392	-1.3417	-1.3352
PLANTATION	-1.8242	-1.8471	-1.8584	-1.8715	-1.8909	-1.8052	-1.8154	-1.8141	-1.8145	-1.8212
MINING	0.7221	0.7002	0.6825	0.6742	0.6433	0.7410	0.7319	0.7269	0.7312	0.7130
INDPROD	-1.6339	-1.6648	-1.6724	-1.6868	-1.6969	-1.6149	-1.6332	-1.6281	-1.6297	-1.6272
INDUSTRIAL	-2.0641	-2.1312	-2.1450	-2.1635	-2.1978	-2.0452	-2.0996	-2.1007	-2.1065	-2.1281
TRAD&SERV	-1.6606	-1.7271	-1.7513	-1.7795	-1.7981	-1.6416	-1.6955	-1.7069	-1.7225	-1.7284
PROPERTIES	-0.8896	-0.9102	-0.9201	-0.9220	-0.9257	-0.8706	-0.8786	-0.8758	-0.8650	-0.8559
CONPROD	-2.3666	-2.3975	-2.4104	-2.4230	-2.4429	-2.3476	-2.3658	-2.3660	-2.3660	-2.3732
CONSTRUCTION	-0.7363	-0.7817	-0.7957	-0.8031	-0.8113	-0.7174	-0.7501	-0.7514	-0.7461	-0.7416

Table 21: VAR Model for Daily Volatiliy (SDs) and Daily Trading Returns (TRs) for Whole Period Jan 1994 - Dec 2000

Indices	Coefficients of											Conclusion
	Constant	SD(-1)	SD(-2)	SD(-3)	SD(-4)	SD(-5)	TR(-1)	TR(-2)	TR(-3)	TR(-4)	TR(-5)	TR G-causes SD
KLCI	0.0032 **	0.4901 **	0.1456 **	0.0640 *	0.0752 **	0.0527 *	0.0006 **	-0.0002	-0.0002	-0.0006 **	-0.0005 **	Yes
EMAS	0.0039 **	0.5107 **	0.1354 **	0.0647 *	0.0717 **		0.0005 **	-0.0002	-0.0002	-0.0005 **		Yes
SBI	0.0077 **	0.5340 **	0.1299 **				0.0004 **	-0.0002				Yes
FINANCE	0.0044 **	0.5281 **	0.1245 **	0.0392	0.1001 **		0.0007 **	-0.0003	-0.0002	-0.0006 **		Yes
PLANTATION	0.0045 **	0.5500 **	0.0321	0.0298	0.0799 **	0.0555 *	0.0003 *	-0.0007 **	-0.0001	-0.0002	-0.0006 **	Yes
MINING	0.0085 **	0.4187 **	0.0707 **	0.1051 **	0.0644 *	0.0853 **	0.0006 **	0.0000	-0.0002	-0.0005 **	-0.0011 **	Yes
INDPROD	0.0056 **	0.5267 **	0.1846 **				0.0006 **	0.0001				Yes
INDUSTRIAL	0.0038 **	0.4164 **	0.1816 **	0.0808 **	0.0740 **	0.0331	0.0005 **	-0.0001	-0.0004 **	-0.0005 **	-0.0007 **	Yes
TRAD/SERV	0.0036 **	0.4522 **	0.1666 **	0.0789 **	0.0710 **	0.0542 *	0.0004 **	-0.0003	-0.0002	-0.0005 **	-0.0004 **	Yes
PROPERTIES	0.0074 **	0.5513 **	0.1438 **				0.0006 **	-0.0002				Yes
CONPROD	0.0038 **	0.4439 **	0.1165 **	0.0516	0.0680 *	0.0741 **	0.0005 **	0.0000	-0.0006 **	-0.0003 *	-0.0007 **	Yes
CONSTRUCTION	0.0060 **	0.5168 **	0.1592 **	0.0951 *			0.0000	-0.0002	0.0000			

** and * indicate significance at 1% and 5% respectively

Table 22: VAR Model for Daily Volatiliy (SDs) and Daily Trading Returns (TRs) for Whole Period Jan 1994 - Dec 2000

Indices	Coefficients of											Conclusion
	Constant	SD(-1)	SD(-2)	SD(-3)	SD(-4)	SD(-5)	TR(-1)	TR(-2)	TR(-3)	TR(-4)	TR(-5)	SD G-causes TR
KLCI	-0.0742	7.5980 *	10.3748 *	-14.3162 **	15.3227 **	-19.5412 **	0.0323	0.0189	-0.0340	-0.0705 **	0.0856 **	Yes
EMAS	-0.1363	2.7092	9.5437 *	-17.9914 **	6.9317		0.0484 *	0.0439	-0.0015	-0.0368		Yes
SBI	-0.0557	-1.2065	-0.9455				0.1267 **	0.0450				
FINANCE	-0.0050	4.2816	5.9633	-18.5627 **	4.4101		0.0971 **	0.0541 *	0.0318	-0.0134		Yes
PLANTATION	-0.0783	-3.1787	14.6801 **	-12.1451 **	13.0091 **	-12.7411 **	0.0309	-0.0224	0.0449	0.0185	0 0844 **	Yes
MINING	-0.2979 *	-1.9544	8.4782 *	-2.8817	6.0499	-5.6519	-0.0376	-0.0229	0.0227	-0.0078	0.0690 **	
INDPROD	-0.2307 **	1.8429	2.4822				-0.0054	0.0281				
INDUSTRIAL	-0.0741	5.8363	5.9977	-4.1465	11.9614 **	-20.1286 **	0.0241	-0.0189	-0.0097	-0.0259	0.0814 **	Yes
TRAD/SERV	-0.1134	3.6973	12.1215 **	-19.1631 **	17.1739 **	-13.3653 **	0.0368	0.0348	-0.0471 *	-0.0730 **	0.0642 **	Yes
PROPERTIES	-0.1026	0.6113	-4.1989				0.0217	0.0448				
CONPROD	-0.0681	3.2682	2.2366	1.3539	5.3733	-11.6037 **	0.1066 **	-0.0133	0.0071	-0.0359	0.0592 *	Yes
CONSTRUCTION	-0.1747	18.2097 **	-0.5428	-15.7877 **			0.0675 **	0.0614 *	-0.0110			Yes

** and * indicate significance at 1% and 5% respectively

3.6 Empirical Findings For The Day-Of-The-Week Effect Using GARCH Model For Whole Period: January 1994 – December 2000

So far, the statistical results obtained from the analysis in the other sections are based on the assumption of equal variances. Estimation utilising the OLS is insufficient because, in reality, stock markets do exhibit varying volatility. Volatility of the market needs to be modeled in order to give a clearer picture on the seasonality in market returns.

By using the OLS method, significant mean trading returns on particular days, in the form of daily dummies, are identified and used as a part of the explanatory variables in the GARCH model. The GARCH analysis is then performed to determine whether the day-of-the-week effects in the market are due to seasonal variation in equity market volatility.

Statistical results for the conditional mean trading returns and conditional variance equation of mean returns under GARCH model are presented in Tables 23 and 24, respectively. Significant first lag in own returns, R_{t-1}, which indicates the existence of a strong first-order autoregressive process in the daily trading returns, is found in the overall market, both Main Board and Second Board and all sectors except MINING.

Deterministic daily seasonal dummies which remain significant in spite of the inclusion of the ARCH term, $h_t^{1/2}$, in the conditional mean will show that seasonality in the daily trading returns is not due to the variation in return volatility. Results from Table 23 reveal significant daily seasonal effects in the overall market, both Main Board and Second Board and the various sectors; significant Monday effect, for the whole

market and all the sectors, and Friday effect for the Second Board and Consumer Products sector. Generally, days with significant mean effects by the OLS method also have significant conditional mean effects.

If the inclusion of $h_t^{1/2}$ in the conditional mean renders the deterministic dummies in the mean equation insignificant, but significant in the equation for the conditional variance, it can be concluded that seasonality in the daily mean returns are due to variation in the variance of the stock market returns. As no positive finding is found, it means that seasonality in the returns of overall market, both Main Board and Second Board and the various sectors, with the exception of the Plantation sector, is not due to seasonality in the market volatility. It seems that the Friday effect in the Plantation sectors is due to variation in the variance of the trading returns.

Only the Second Board and the Consumer Products, Properties and Plantation sectors, with significant Monday effect in the conditional mean equation, are found to also have significant Monday effect in the conditional variance equation. This implies that the day-of-the-week effects generally, and the Monday effect specifically, are very pronounced in the Second Board and the Consumer Products, Properties and Plantation sectors as they could not be explained by the changes in return volatility.

From the results obtained, we can summarize that the overall market, both Main Board and Second Board and the various sectors have significant Monday effect while the Second Board and the Consumer Products sector also have Friday effect. These effects cannot be fully explained by the market return volatility. For the Second Board and the sectors of Consumer Products, Properties and Plantation, seasonality in the daily

trading returns persists even after the variation in return volatility had been taken into account.

The results are consistent with the study by Ho and Cheung (1994), Clare et al. (1997), Clare et al. (1998) and Choudhry (2000) for the weekend effect.

Table 23: Conditional Mean Returns Of GARCH Model For Whole Period Jan 1994 - Dec 2000

Indices	α_0	$h_t^{1/2}$	R_{t-1}	δ_1	δ_2	δ_3	δ_4	δ_5
KLCI	-0.0050 (-0.0660)	0.0346 (0.5197)	0.1239 (4.5554) **	-0.2902 (-4.2169) **	-	-	-	-
EMAS	0.0449 (0.6463)	0.0130 (0.2217)	0.1448 (5.2962) **	-0.3852 (-5.1299) **	-	-	-0.0758 (-0.9679)	-
SBI	-0.2964 (-3.0747) **	0.1365 (2.4399) *	0.1528 (5.2279) **	-0.5068 (-4.0547) **	-	-	-	0.1877 (2.1225) *
FINANCE	0.1465 (1.8349)	-0.0479 (-0.7925)	0.1815 (6.1651) **	-0.3634 (-4.1025) **	-	-	-0.1107 (-1.2293)	-
PLANTATION	0.1349 (2.0038) *	-0.0974 (-1.7380)	0.0989 (3.7401) **	-0.3826 (-5.6166) **	-	-	-	0.0215 (0.3396)
MINING	0.1183 (0.9703)	-0.0138 (-0.2495)	0.0346 (1.1406)	-0.5914 (-3.9933) **	-	-	-	-
INDPROD	-0.0566 (-0.8051)	0.0909 (1.7462)	0.1219 (4.4286) **	-0.4884 (-6.0933) **	-	-	-0.1615 (-1.8803)	0.1245 (1.6231)
INDUSTRIAL	0.0233 (0.3256)	0.0200 (0.3189)	0.0742 (2.6197) **	-0.3414 (-4.9953) **	-	-	-	-
TRAD&SERV	-0.0195 (-0.2633)	0.0202 (0.3325)	0.0793 (2.9882) **	-0.2927 (-3.7586) **	-	-	-	-
PROPERTIES	0.0733 (1.1359)	-0.0244 (-0.5221)	0.1012 (3.6843) **	-0.6493 (-6.9809) **	-	-	-	-
CONPROD	0.0043 (0.0759)	0.0029 (0.0643)	0.1610 (6.0942) **	-0.3013 (-4.1679) **	-	-	-	0.1886 (3.5588) **
CONSTRUCTION	0.1433 (1.5717)	-0.0600 (-1.0748)	0.0915 (3.1947) **	-0.4749 (-5.0198) **	-	-	-	-

The z-statistics are given in parentheses.
** and * indicate significance at 1% and 5% respectively

Table 24: Variance Equation Of Mean Returns Of GARCH Model For Whole Period Jan 1994 - Dec 2000

Indices	β_0	ξ_{t-1}^2	ξ_{t-2}^2	ξ_{t-3}^2	ξ_{t-4}^2	ξ_{t-5}^2	h_{t-1}	h_{t-2}	h_{t-3}	h_{t-4}	h_{t-5}	δ_1^*	δ_2^*	δ_3^*	δ_4^*	δ_5^*
KLCI	0.0702 (1.9326)	0.1178 (6.1353) **					0.8741 (54.0181) **					-0.2019 (-1.2868)				
EMAS	0.0424 (0.5587)	0.1269 (5.7778) **					0.8701 (49.4692) **					-0.0681 (-0.3332)			-0.0010 (-0.0047)	
SBI	0.1168 (1.1389)	0.3243 (6.4217) **					0.6475 (17.5207) **					1.3569 (3.1557) **				-0.0872 (-0.3603)
FINANCE	0.0113 (0.1097)	0.1442 (6.6016) **					0.8526 (45.7890) **					0.1287 (0.5248)			0.0431 (0.1379)	
PLANTATION	0.3056 (5.4167) **	0.1689 (8.4866) **	0.3092 (8.3366) **	0.1654 (8.3356) **			-1.0481 (-58.1543) **	0.5057 (15.7182) **	0.8010 (47.6837) **			-0.0673 (-3.0426) **				-0.0639 (-2.6790) **
MINING	-0.0761 (-0.5124)	0.1427 (6.8425) **					0.8627 (50.4104) **	0.9502 (1.0414)								
INDPROD	0.2303 (1.6358)	0.1911 (7.2579) **	0.3138 (17.8862) **	0.1106 (4.269) **			-0.7922 (-29.4242) **	0.4783 (23.0915) **	0.6975 (44.7186) **			-0.0525 (-0.2481)			0.0184 (0.0965)	-0.1184 (-0.3611)
INDUSTRIAL	0.0458 (1.5658)	0.1188 (7.3098) **					0.8771 (67.4918) **					-0.1064 (-0.7734)				
TRAD/SERV	-0.0026 (-0.832)	0.1297 (5.7807) **	-0.1285 (-5.792) **				1.8280 (65.1645) **	-0.8293 (-30.0987) **				0.0147 (0.8915)				
PROPERTIES	-0.0121 (-0.2663)	0.2124 (3.5295) **	0.1176 (1.5002)				0.2376 (1.1338)	0.4561 (2.4980) *				0.6244 (2.4158) *				
CONPROD	0.0765 (1.7257)	0.2513 (5.6626) **	-0.0544 (-1.8324)	-0.0611 (-1.7344)	0.0065 (0.2497)	0.2110 (6.3572) **	0.4917 (7.6766) **	0.3731 (5.2515) **	-0.2347 (-5.0001) **	-0.5211 (-18.1922) **	0.4926 (9.5544) **	0.2382 (2.2127) *				0.0980 (0.9177)
CONSTRUCTION	-0.0109 (-0.8186)	0.1956 (5.4525) **	-0.1915 (-5.3834) **				1.6696 (32.4209) **	-0.6740 (-13.2964) **				0.0642 (0.918)				

The z-statistics are given in parentheses.
** and * indicate significance at 1% and 5% respectively