MALAYSIAN EVIDENCE ON THE ROBUSTNESS OF THE DAY-OF-THE-WEEK EFFECT

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ABSTRACT

The day-of-the-week effect is an empirical anomaly that has attracted substantial attention. Following the work of Connolly (1989) it is necessary to revisit previous empirical work. In this paper, we examine the day-of-the-week effect in Malaysia over the period 1986-1993. The period spans some institutional changes in the Malaysian market, *ie*, abandoning the open outcry system of trading and severing links with the Singapore exchange. In addition to the usual tests, a GARCH model incorporating daily dummies in both the mean equation and the variance equation is presented. We are able to show that once the time varying volatility of the KLSE is modelled there is no day-of-the-week effect.

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The detection of empirical regularities has become a favourite pastime of finance academics. The importance of detecting these regularities is that it allows us to draw inferences as to the validity of the efficient markets hypothesis, various asset pricing models and even integration in international capital markets. The day-of-the-week effect has spawned a massive literature. In the context of US markets, it is defined by Jaffe and Westerfield (1985:433) as the Friday return being abnormally high and the Monday return being abnormally low with the Monday return being, on average, negative. It was first documented by Cross (1973) and popularised by French (1980) and Gibbons and Hess (1981). To date, the cause of this effect is unknown or at least, not agreed upon. Potential causes such as a closed market effect, settlement period effect and the length of the weekend have been investigated and rejected. Recently, the analysis of the day-of-the-week effect has been complicated by Connolly's (1989) paper suggesting that the evidence supporting the effect is often a function of statistical technique, sample period and return measure.

This paper examines the existence of the day-of-the-week effect on the Kuala Lumpur Stock Exchange (KLSE) for the period 1986-1993. The choice of this market is made for two reasons. Firstly, we believe that previous studies have not exhausted the scope of research methods that can be employed. Most of the studies investigating the KLSE employ non-robust estimation techniques, the exception being Chang, Pinegar and Ravichandran (1993:503) who report no statistically significant day-of-the-week effect. Secondly, our sample period spans some interesting developments in the history of the KLSE. In November of 1989, the KLSE abandoned the open outcry system of trading in favour of a semi-automated system of trading. An examination of the pattern of daily returns will allow us to speculate on whether the day-of-the-week effect is related to or determined by the trading mechanism. In January of 1990, the KLSE severed its historical links with the Stock Exchange of Singapore. This will provide valuable insight into the KLSE as a "stand alone" market.

Given that the usual tests employed in the literature dealing with Malaysia suffers from deficiencies identified by Connolly (1989), a number of tests are employed including GARCH model specifications. The layout of the paper is as follows: the next section reviews previous literature. The third section contains our method and results. A conclusion follows.

PREVIOUS STUDIES

Jaffe and Westerfield (1985:441) have argued that international investors face a day-of-the-week effect in various markets independent of the US effect. They, however, did not employ robust techniques in their analysis. Connolly (1989:133) has argued that seemingly significant results may be an artefact of the underlying (and, often, implicit) statistical assumptions employed in the analysis. Specifically the assumptions that relate to normality, zero autocorrelation and homoscedasticity are not met in financial markets. Using data drawn from the CRSP tapes Connolly (1989) investigates the impact these assumptions have on the results of empirical investigations into the day-of-the-week effect and concludes a resulting bias in favour of finding an empirical regularity. Specifically, he argues that significance levels must be downwardly revised due to a large sample bias (the so-called Lindley paradox). In addition, Connolly (1989:161) specifies a GARCH model with a Monday dummy in the conditional variance equation. An inspection of his Table 11 (Connolly 1989:166-167), however, appears to indicate that his estimated GARCH model does not include the Monday dummy. The GARCH test provides weak evidence of a Monday effect in the data. However, this effect appears to vanish in the mid-1970's.

In contrast Easton and Faff (1994) find, after employing the techniques and adjustments suggested by Connolly (1989), that the day-of-the-week effect persists in the pattern of Australian data over the period 1974-1985. In fact, their robust results are similar to results from the classic style tests for a day-of-the-week effect. In Australia, however, both Jaffe and Westerfield (1985) and Easton and Faff (1994) report a Tuesday effect in the data. Using data from a later period, December 1985 through April 1992, Chang, Pinegar and Ravichandran (1993:503) report no statistically significant *Monday effect* in the data.

There are three previous studies specifically investigating the day-of-the-week effect on the KLSE viz. Nasir and Mohamed (1987), Wong, Hui and Chan (1992) and Ho and Cheung (1994). Nasir and Mohamed (1987) investigated the Monday effect using daily returns from the New Straits Times Industrial Index. Three null hypotheses were tested: The daily return is not different from zero; the average return for Monday is not different from other days; and, there are no differences in mean return across the five trading days (Nasir and Mohamed 1987:102). t-tests and F-tests were employed to test these hypotheses for the period July 1975 to December 1985. Nasir and Mohamed (1987:105) report that the Monday and Tuesday returns are significantly negative and that the highest average return occurs on Friday. This paper would obviously suffer from the deficiencies identified by Connolly (1989). Consequenty this result needs to be verified.

As part of an investigation into a number of Asian stock markets, Wong, Hui and Chan (1992) found a Monday effect in the KLSE Industrial and Commercial Index. Given that the data is not normally distributed, they employed non-parametric tests (specifically the Mann-Whitney test) to investigate the returns over the period 1975-1988. The null hypothesis tested was that there is no difference in the returns across the days of the week. They report that Monday and Tuesday results, while not different from each other, appear to be different from the other days of the week (Wong *et al.* 1992:51). This result is similar to that of Jaffe and Westerfield (1985) in the case of Australia and Japan.

Ho and Cheung (1994) investigate whether there is an effect, similar to the day of the week, in the volatility of returns for a number of Asian markets over the period 1975 - 1989. They, however, simply compute the unconditional variance (standard deviations) and determine whether they are significantly different over the days of the week. In the case of Malaysia, they report (in Table 1) that the highest mean return occurs on Friday (consistent with a day-of -the-week effect) and the highest volatility occurs on a Monday, the lowest mean return occurs on a Tuesday.

It should be noted that these studies employ data ending in the 1980's and that none of them incorporate the Connolly (1989) method or make use of time varying analysis. Even if a day-of-the-week effect were present in the data, it does not follow that this effect (net of transaction costs) would persist over time. In a reasonably efficient market, we might expect that profitable investment rules would eliminate pricing anomalies.

METHOD AND RESULTS

In this section, we show firstly that the return distributions of the daily returns of the KLSE are not normally distributed. We then investigate whether each day of the week's return is similar to other days of the week. Here we employ both parametric and non-parametric tests. Finally we apply both standard regression analysis as well as time-varying volatility models to investigate the possible presence of the Monday effect in the first and second moment of the returns.

A feature of many financial time series is the presence of time-varying volatility. This result has been confirmed for many markets and financial commodities (Bollerslev, Chou and Kroner 1992). The presence of time-varying volatility has been shown to render the returns distribution leptokurtic. The implication being that reliance upon standard assumptions of normality must be made with great caution. It has been shown by Baillie and Bollerslev (1989) that as the sampling frequency becomes finer the presence of time-varying volatility becomes increasingly significant and needs to be accounted for. The data used in this paper is of daily frequency and it would be expected *a priori* that leptokurtosis and time-varying volatility would both be present.

Data was drawn from the PACAP database for the period 1986-1993 for the KLSE Composite Index. The data was divided into two sub-periods, viz. 1986-1989 and 1990-1993. Returns were calculated as follows: $r_t = \ln(p_t/p_{t-1})$.

Descriptive statistics for each of the days in the week and each sub-sample were calculated (see

Table 1). Returns are calculated from the close of the previous day. The Monday return then is calculated as being the three day holding return from the close on the previous Friday. In addition to the usual parameters the data was tested for normality using the Jarque-Bera test.

TABLE 1: Descriptive statistics

Data was drawn from the PACAP database for Malaysia over the period 1986-1993. The table shows summary statistics for the days of the week over the entire period and over two sub-periods, 1986-1989 and 1990-1993. In every case it is possible to reject the null hypothesis of normality. a = variable should be multiplied by 10^{-2}. ** = statistically significantly different from 0 at $p < 0.05$. *= statistically significantly different from 0 at $p < 0.01$.

	MEAN[a]	STANDARD DEVIATION[a]	SKEWNESS		EXCESS KURTOSIS N	Jarque-Bera
		1986-1993				
Monday	- 0.09877	1.87837	- 1.34441	15.8413	384	4130.8
Tuesday	0.01297	1.54581	- 3.37702	39.7478	399	27024.0
Wednesday	0.20218**	1.28135	- 2.26288	22.0864	395	8365.6
Thursday	0.18053*	1.42242	0.76149	14.7978	402	3706.7
Friday	0.12685*	1.16487	- 1.50676	16.0742	395	4402.0
		1986-1989				
Monday	- 0.15126	2.27563	- 1.43854	13.6019	190	1530.2
Tuesday	- 0.00298	1.95250	- 3.39162	30.3953	200	8082.4
Wednesday	0.27958*	1.52658	- 2.68603	21.7058	197	4104.2
Thursday	0.25575*	1.62798	1.30265	14.0568	200	1703.2
Friday	0.00831	1.31007	- 2.18554	19.3966	197	3245.0
		1990-1993				
Monday	- 0.04736	1.38753	- 0.24899	5.8003	194	274.0
Tuesday	0.05598	0.98385	0.57072	2.6152	199	67.5
Wednesday	0.12518	0.97632	- 0.41131	4.0995	198	144.2
Thursday	0.10605	1.18378	- 0.87521	10.4657	202	947.7
Friday	0.17039*	1.00122	0.19489	1.6305	198	23.2

As can be seen from Table 1, Monday returns are negative and display the highest standard deviations. For the periods 1986-1993 and 1986-1989 Wednesday's return was the highest for the week. These results are different from those of Nasir and Mohamed (1987), Wong *et al* (1992) and Ho and Cheung (1994). Nasir and Mohamed (1987:104) report that Monday's standard deviation is always the highest, but the Monday return is not always the lowest of the week, or negative for that matter. Wong *et al* (1992:51) report that Wednesday's standard deviation is the highest for the week.

The data is not normally distributed indicating that reliance upon the classic parametric tests may not be well founded. For the sake of completeness, t-tests were performed on the data to determine whether the mean returns for Monday and every other day were identical or not.

TABLE 2: t-tests of equality of means between days

t-tests are employed to determine whether the means of each day of the week are identical to that of every other day. All statistics shown are p-levels. The statistics shown in the first column assume equal variances in the t-tests and statistics in the second column assume unequal variances. The column titled F-TEST shows the p-level results of a F-test for equal variances.

T-TEST DAY	T-TEST (EQUAL VARIANCE)	F-TEST (UNEQUAL VARIANCE)	
1986-1993			
Monday and			
Tuesday	0.3626	0.3644	0.0001
Wednesday	0.0088	0.0092	0.0000
Thursday	0.0184	0.0192	0.0000
Friday	0.0433	0.0446	0.0000
Tuesday and			
Wednesday	0.0606	0.0603	0.0002
Thursday	0.1104	0.1105	0.0968
Friday	0.2414	0.2408	0.0000
Wednesday and			
Thursday	0.8214	0.8213	0.0376
Friday	0.3873	0.3873	0.0589
Thursday and			
Friday	0.5604	0.5597	0.0001

T-TEST DAY	T-TEST (EQUAL VARIANCE)	F-TEST (UNEQUAL VARIANCE)	
1986-1989			
Monday and			
Tuesday	0.5711	0.5726	0.0335
Wednesday	0.0282	0.0293	0.0000
Thursday	0.0414	0.0431	0.0000
Friday	0.2124	0.2166	0.0000
Tuesday and			
Wednesday	0.0789	0.0783	0.0006
Thursday	0.1121	0.1121	0.0107
Friday	0.4993	0.4980	0.0000
Wednesday and			
Thursday	0.8805	0.8804	0.3668
Friday	0.1704	0.1704	0.0328
Thursday and			
Friday	0.2448	0.2440	0.0024
1990-1993			
Monday and			
Tuesday	0.3934	0.3954	0.0000
Wednesday	0.1538	0.1552	0.0000
Thursday	0.2359	0.2374	0.0263
Friday	0.0743	0.0753	0.0000
Tuesday and			
Wednesday	0.4818	0.4818	0.9140
Thursday	0.6454	0.6449	0.0093
Friday	0.2508	0.2509	0.8060
Wednesday and			
Thursday	0.8602	0.8599	0.0068
Friday	0.6492	0.6492	0.7240
Thursday and			
Friday	0.5576	0.5570	0.0186

An examination of Table 2 indicates that the mean return for Monday is different from that of Wednesday, Thursday and Friday for the entire period, but not so in the period 1990-1993. In the period 1986-1989, the mean Monday return is different from that of Wednesday and Thursday, but not Friday. The variance for Monday is always different from that of the other days. Given, however, the non-normality of the data, we cannot rely on this result. Table 3 shows the results of this exercise using the Mann-Whitney test for goodness of fit.

TABLE 3: Mann-Whitney-tests for goodness of fit

Data used in Table 2 is not normal and non-parametric tests may be more appropriate. Here the Mann-Whitney test is performed. All figures reported are p-levels. * denotes a difference between t-test shown in Table 2 and the Mann-Whitney test shown here.

DAY	1986-1993	1986-1989	1990-1993
Monday and			
Tuesday	0.4112	0.6441	0.4823
Wednesday	0.0006	0.0035	0.0676
Thursday	0.0168	0.0539	0.1518
Friday	0.0267	0.2528	0.0433*
Tuesday and			
Wednesday	0.0026*	0.0034*	0.2031
Thursday	0.0023*	0.1032	0.4355
Friday	0.1062	0.4250	0.1164
Wednesday and			
Thursday	0.2095	0.1924	0.6062
Friday	0.1399	0.0188*	0.6921
Thursday and			
Friday	0.8383	0.3157	0.4476

In Table 3 we see similar results to those in Table 2. In fact, the non-parametric specification does not seem to add much to the analysis. With regard to Monday returns, the only difference is in the period 1990-1993, where the t-test rejects the null hypothesis ($p = 0.0743$) and the Mann-Whitney test fails to reject the null hypothesis ($p = 0.0433$).

Following Connolly (1989:136) and Chang, Pinegar and Ravichandran (1993:502), we employ a simple regression model to investigate the day-of-the-week effect:

$$r_{it} = \beta_0 + \beta_1 Mon + \varepsilon_{it}$$

where r_{it} = return on the index, Mon is a dummy variable = 1 if the return occurs on a Monday and = 0 on every other day, β_0 and β_1 are regression estimates. The null hypothesis of no Weekend effect is $\beta_1 = 0$. In addition, equation (1) is augmented by dummy variables D_1 and D_2 as follows:

$$r_{it} = \beta_0 + \beta_1 Mon + \beta_2 D_1 Mon + \beta_3 D_2 Mon + \varepsilon_{it} \qquad (1a)$$

where $D_1 = 1$ for the period November 1989 to 1993 and $D_2 = 1$ for the period January 1990 to 1993. D_1 and D_2 should capture the impact of any structural changes in the KLSE as a result of abandoning the open outcry system and severing links with the Stock Exchange of Singapore. Consistent with Chang, Pinegar and Ravichandran (1993:502) we report (approximate) Bayesian t-statistics calculated as follows:

$$t^* = \sqrt{(T - k)\,(T^{1/T} - 1)}$$

where T = the number of observations and k = the number of parameters to be estimated. The results of this exercise can be seen in Table 4 below.

Table 4: Results of regression test of weekend effect.

Panel A shows the results of the regression $r_{it} = \beta_0 + \beta_1 Mon + \varepsilon_{it}$ and reports the absolute value of the t-statistics in parenthesis. It also contrasts the reported t and F statistics with the calculated Bayesian values. Panel B shows results of the regression $r_{it} = \beta_0 + \beta_1 Mon + \beta_2 D_1 Mon + \beta_3 D_2 Mon + \varepsilon_{it}$ and reports the absolute value of the t-statistics in parenthesis. In both panels, LM_{ARCH} report p-values of a test for ARCH effects. White (1980) adjustments for heteroskedasticity have been performed.

Panel A	1986-1993	1986-1989	1990-1993	Panel B
β_0	0.0013	0.0015	0.0011	0.0013
	(3.8209)	(2.7344)	(2.8792)	(3.8190)
β_1	-0.0023	-0.0031	-0.0014	-0.0029
	(2.2552)	(1.8685)	(1.2819)	(1.6825)
β_2				0.0031
				(1.2254)
β_3				-0.0020
				(0.9212)
F	7.4583	5.2380	2.2852	2.7421
t*	2.7559	2.6271	2.6285	2.7546
LM_{ARCH}	0.0000	0.0000	0.0000	0.0000

Consistent with the evidence in Chang *et al.* (1993:503), the parameter estimates in all three periods are negative and small. This provides "visual" evidence of a Monday effect, but this may not be statistically significant. For the overall period, classical t-tests indicate that a day-of-the-week effect is present in the data. The two sub-periods, however, shows no such effect. An examination of the Bayesian statistics indicates that the null hypothesis should not be rejected in any period. Panel B shows that there appears to be no Monday effect and the changes in November 1989 and January 1990 had no effect on that result. The LM tests for ARCH effects, however, indicate that there is time varying volatility effects present in the data and these effects have to be modelled before any conclusions can be drawn.

To further investigate the presence of a day-of-the-week effect it is necessary to describe the return generating process. Given that distributional assumptions may bias the results in favour of accepting the presence of anomalies in the time series of returns we explicitly include the time-varying nature of volatility into our model. To accomplish this goal we employ a version of the GARCH model suggested by Bollerslev (1986).

The general GARCH (p,q) formulation is:

$$r_t = \mu + \varepsilon_t$$

$$\varepsilon_t = z_t\sqrt{h_t}\,;\ \varepsilon_t \sim (o,h_t),\ z_t \sim iid(0,1)$$

$$h_t = \alpha_0 + \sum_{j=1}^{q} \alpha_j \varepsilon_{t-j}^2 + \sum_{i=1}^{p} \beta_i h_{t-i}$$

This methodology allows us to not only model the return generating process, but also the volatility generating process. We begin our analysis by estimating GARCH (1,1) models, which have been shown by Bollerslev, Chou and Kroner (1992) to be adequate representations of many time series. We then perform the LM test for ARCH effects. If the LM test reports that no further ARCH effects are present in the data we report that result. If, however, ARCH effects are still present in the data, we estimate higher order models until all the ARCH effects are explained by the model.

We first investigate the day-of-the-week effect in the mean equation. The specification of the model, incorporating both the return generating process and the time-varying volatility is as follows:

$$r_t = a + b_1Mon + b_2Tue + b_3Thu + b_4Fri + \varepsilon_t \qquad (2)$$

$$h_t = \alpha_0 + \alpha_1\varepsilon^2_{t-1} + \beta_1 h_{t-1}$$

This equation is similar to that of Connolly (1989:166-167). Equation (2) is then augmented similarly to equation (1) as follows:

$$r_t = a + b_1Mon + b_2Tue + b_3Thu + b_4Fri + b_5D_1Mon + b_6D_2\,Mon + \varepsilon_t \quad (2a)$$

$$h_t = \alpha_0 + \alpha_1\varepsilon^2_{t-1} + \beta_1 h_{t-1}$$

Table 5: Results of GARCH regressions (2) and (2a):

Panel A shows the results of:

$$r_t = a + b_1D_{MON} + b_2D_{tue} + b_3D_{THU} + b_4D_{FRI} + \varepsilon_t$$

$$h_t = \alpha_0 + \alpha_1\varepsilon^2_{t-1} + \beta_1 h_{t-1}$$

Absolute value of t-statistic is shown in (.).

Panel B shows the results of:

$$r_t = a + b_1D_{MON} + b_2D_{tue} + b_3D_{THU} + b_4D_{FRI} + b_5D_1Mon + b_6D_2\,Mon + \varepsilon_t$$

$$h_t = \alpha_0 + \alpha_1\varepsilon^2_{t-1} + \alpha_2\varepsilon^2_{t-2} + \beta_1 h_{t-1}$$

Absolute value of t-statistic is shown in (.).

Panel A	1986-1993	1986-1989	1990-1993	Panel B
a	0.00167	0.00291	0.00086	0.00163
	(2.85849)	(2.90806)	(1.33610)	(2.79134)
Mon	-0.00274	-0.00465	-0.00085	-0.00418
	(3.67119)	(3.70104)	(1.03714)	(4.82755)
Tue	-0.00114	-0.00202	-0.00064	-0.00139
	(1.32037)	(1.36275)	(0.72340)	(1.57928)
Thu	0.00043	-0.00037	0.00102	0.00024
	(0.53587)	(0.24793)	(1.26581)	(0.29867)
Fri	-0.00038	-0.00171	0.00083	-0.00090
	(0.46928)	(1.20194)	(0.97906)	(1.14980)
D_1Mon				0.00766
				(0.98900)
D_2Mon				-0.00558
				(0.71954)
α_0	0.00003	0.00003	0.00002	0.00002
	(15.10373)	(10.50909)	(6.66850)	(6.03510)
ε^2_{t-1}	0.28114	0.24643	0.35585	0.39059
	(15.35121)	(9.51700)	(8.98323)	(13.11381)
ε^2_{t-2}				-0.19743
				(4.82530)
h_{t-1}	0.61380	0.63907	0.48444	0.73920
	(29.17525)	(20.78951)	(10.54770)	(19.13100)
F	1.52609	1.18253	0.26894	1.01401
t*	2.75170	2.61910	2.62050	2.74965
LM_{ARCH}	0.64391	0.58410	0.80925	0.88575

It can be seen from Table 5 (Panel A) that the ARCH and GARCH estimates are highly significant in every period and sub-period. The evidence on the day-of-the-week effect, however, is mixed. For the overall period and the first sub-period, at a classical significance level and the Bayesian significance level, the Monday dummy is significant. The second sub-period shows no statistically significant evidence of a Monday effect at either the classical or Bayesian levels of significance. Turning our attention to panel B, we see that for the entire period, there does appear to be a Monday effect and the structural changes of 1989 and 1990 have no impact on that effect.

Given that the unconditional variance on Monday is different from every other day of the week, we hypothesise that there may be a "Monday volatility effect" in the pattern of the data. This phenomenon is explicitly considered in our analysis by including daily dummy variables in both the mean equation and in the conditional volatility equation. This, we believe, is a distinguishing aspect of this paper. If volatility is different on Monday from other trading days then we would expect a bias in the results of (2) and (2a). We estimate the following model:

$$r_t = a + b_1Mon + b_2Tue + b_3Thu + b_4Fri + \varepsilon_t \quad (3)$$

$$h_t = \alpha_0 + \alpha_1\varepsilon^2_{t-1} + \beta_1h_{t-1} + \phi_1Mon + \phi_2Tue + \phi_3Thu + \phi_4Fri$$

As in the cases of equations (1) and (2), we augment (3) with D_1 and D_2 as follows:

$$r_t = a + b_1Mon + b_2Tue + b_3Thu + b_4Fri + b_5D_1Mon + b_6D_2Mon + \varepsilon_t \quad (3a)$$

$$h_t = \alpha_0 + \alpha_1\varepsilon^2_{t-1} + \beta_1h_{t-1} + \phi_1Mon + \phi_2Tue + \phi_3Thu + \phi_4 Fri + \phi_5D_1Mon + \phi_6 D_2Mon$$

Table 6: Results of GARCH regressions (3) and (3a):

Panel A shows the results of:

$$r_t = a + b_1Mon + b_2Tue + b_3Thu + b_4Fri + \varepsilon_t$$

$$h_t = \alpha_0 + \alpha_1\varepsilon^2_{t-1} + \beta_1h_{t-1} + \phi_1Mon + \phi_2Tue + \phi_3Thu + \phi_4 Fri$$

Absolute value of t-statistics is shown in (.).

Panel B shows the result of:

$$r_t = a + b_1Mon + b_2Tue + b_3Thu + b_4Fri + b_5D_1Mon + b_6D_2Mon + \varepsilon_t$$

$$h_t = \alpha_0 + \alpha_1\varepsilon^2_{t-1} + \beta_1h_{t-1} + \phi_1Mon + \phi_2Tue + \phi_3Thu + \phi_4 Fri + \phi_5D_1Mon + \phi_6 D_2Mon$$

Absolute value of t-statistics is shown in (.).

Panel A	1986-1993	1986-1989	1990-1993	Panel B
a	0.00200 (4.58550)	0.00311 (4.73359)	0.00118 (2.10371)	0.00209 (4.66115)
Mon	-0.00263 (3.48571)	-0.00416 (3.21053)	-0.00103 (1.16900)	-0.00244 (1.97774)
Tue	-0.00120 (1.87944)	-0.00207 (1.77391)	-0.00071 (1.03653)	-0.00147 (2.47984)
Thu	-0.00004 (0.07761)	-0.00029 (0.35085)	-0.00078 (0.95372)	0.00011 (0.17893)
Fri	-0.00050 (0.79255)	-0.00203 (2.19125)	-0.00066 (0.82672)	-0.00054 (0.88838)
D_1Mon				0.00348 (1.45910)
D_2Mon				-0.00346 (1.59121)
a	0.00001 (2.27094)	0.00001 (0.88919)	0.00002 (3.11364)	0.00001 (1.71186)
ε_{t-1}	0.29791 (16.20262)	0.24676 (9.86870)	0.34204 (6.61722)	0.25842 (10.38428)
ε_{t-2}			-0.14466 (2.45938)	0.08726 (3.13895)
h_{t-1}	0.59755 (34.62159)	0.56070 (22.45725)	0.69928 (13.69831)	0.15355 (2.89384)
h_{t-2}				0.28967 (6.79990)
Mon	0.00010 (12.23812)	0.00025 (15.87581)	0.00003 (2.79101)	0.00020 (21.47988)
Tue	-0.00004 (5.33474)	0.00002 (1.18082)	-0.00005 (5.66870)	0.00000 (0.13344)
Thu	0.00001 (0.58047)	0.00001 (0.57167)	0.00001 (1.36509)	0.00003 (3.46415)
Fri	0.00000 (0.58268)	0.00003 (2.48243)	-0.00001 (1.44195)	0.00001 (1.03498)
D_1Mon				-0.00023 (14.23580)
D_2Mon				0.00007 (4.89010)
F	0.92364	0.70077	0.14487	0.57517
t*	2.74894	2.61371	2.61380	2.74475
LM_{ARCH}	0.98020	0.29221	0.75686	0.15399

The evidence in Table 6 (Panel A) is similar to that of Table 5 for the mean equation. For the overall period and the first sub-period, the Monday dummy is highly significant, but it is not significant in the second sub-period. Turning our attention to the variance equation in Panel A, we see that the Monday dummy is always highly significant, while the Tuesday dummy is significant for the overall period and the second sub-period. A Likelihood Ratio test for the joint significance of the daily dummies in the variance equation returns a p-value = 0.0000. Turning our attention to Panel B, we see that the Monday effect is absent from the data, only to be replaced by a Tuesday effect (at classical significance levels). What is of particular interest, however, is that the Bayesian critical value (2.74475) indicates that there is no Tuesday effect. In the variance equation, the Monday dummy is still highly significant. The dummy variables indicate a structural change in the conditional variance on Monday. The change from an open outcry to semi-automated trading system had a negative impact on Monday's volatility, while severing ties with the Stock Exchange of Singapore had a positive effect on Monday's volatility. What is particularly pleasing in panel B, is that while there appears to be a Monday volatility effect, there is no day-of-the-week effect in the mean equation.

CONCLUSION

We have investigated the weekend effect on the KLSE over the period 1986-1993. Evidence of an empirical anomaly is mixed. Employing robust empirical techniques suggested by Connolly (1989) and modelling the return generating process allows us to conclude that evidence in favour of a day-of-the-week effect (significantly negative Monday returns) is not present in the data. There does appear to be a variance effect associated with Mondays. In Table 2, we see that the Monday (unconditional) variances are different from every other day of the week and the Monday dummy in the conditional variance equations are constantly significant.

A potential rationale for the Monday volatility effect could be that trading on Monday is based upon three days of information, ie the weekend and Monday inclusive, whereas trading on all other days is based upon the same length of time. Given that there is no evidence to suggest the information on the weekends and Mondays are consistently positive or negative we anticipate that Monday would have greater informational content and would therefore be more volatile.

It appears, therefore, that there is no day-of-the-week effect at the KLSE and this result is unaffected by the change from the open outcry system or the KLSE severing its links with Singapore.

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