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SEASONALITY IN EQUITY MARKET: NEW EVIDENCE FROM FOUR EMERGING MARKETS

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Abstract

This study investigates the existence of seasonality effect in Malaysia and its three neighboring markets− Indonesia, Singapore, and Thailand– using a sample of 24 selected sectoral and broad indexes over the period of January 1988 to December 2005. This study also examines the influence of trading activity on the market anomaly by dividing the 18-year sample period into thin and active trading sub-periods. The existence of seasonality effect is revealed using a non-parametric Mann-Whitney U test, which later is verified using time-series regression.

Considerable evidence in favor of February effect is obtained in Malaysia from the Mann-Whitney U tests in the full period and particularly in the active trading sub-period but it nearly disappears in the thin trading sub-period. While slight evidence of December effect is detected in Singapore and Indonesia, January effect is nearly non-existence in Thailand. In the meantime, the influence of trading activity on seasonality effect is only confined to the equity market of Malaysia. The results from time-series regressions are consistent with these findings. Given the fact that none of these emerging markets impose tax on capital gains, the existence of seasonality effect in month other than the tax-month provides additional evidence against the tax-loss selling hypothesis. Overall, the study concludes that while all except Thailand suggest the presence seasonality effect, from an investment perspective, only in the case of Malaysia the effect seems strong enough to command an exploitable strategy but even then, such rule should be of comfort only if applied in the active-trading period.

Keyword: *Seasonality Effect; February Effect; Trading Activity; Emerging Markets*

INTRODUCTION

The equity market seasonality, particularly the anomalous January effect, has long been an intriguing issue in empirical finance. To be more exact, for the past three decades since it was re-introduced in 1976, January effect has been the most closely examined anomaly of efficient market hypothesis. This is particularly true for major capital markets like the New York Stock Exchange (NYSE) where studies on this issue are both voluminous and lenient towards supporting the January effect anomaly (cf. Rozeff & Kinney 1976; Keim 1983; Haugen and Jorion 1996). Even though studies done on other stock markets are less rigorous, Gultekin and Gultekin (1983) still find existence of January effect among others in several European countries, Australia, Japan, and Singapore.

Several explanations exist for the January effect. The most compelling and tested explanation is tax-loss selling hypothesis which implies inexistence of seasonal month effect in the absence of tax on capital gains such as the case in Malaysia, Singapore, Indonesia, and Thailand. However, there are evidences of January effect in such systems (cf. Kato & Schallheim 1985; Jones et al. 1987) and there are evidences against January effect when the tax motivation applies (cf. Cox & Johnston 1998; Mehdian & Perry 2002). Combined, the evidence of other explanations to January effect beside tax-loss selling hypothesis, existence of January effect regardless of tax-motivation, and the fact that evidence on seasonality effect in Malaysia so far is conflicting (Yong 1991; Abd-Karim 2002; Pandey 2002; Abd-Rahim 2003; Abd-Rahim et al. 2005) motivate the present study to re-examine seasonality effect in four neighboring markets that not only share the same regional economic cycle but also another significant characteristic, i.e., tax exemption on capital gain. Beside adding new evidence, this study also contributes to the literature with the introduction of trading activity as a controlling factor on the existence of seasonality effect. In this study, this predisposition is examined using a sample of 24 indexes of four emerging equity markets, i.e. Malaysia, Singapore, Indonesia, and Thailand, over the period of 18 years from January 1988 to December 2005.

This study produces the following results. For Malaysia equity market, the considerable evidence of seasonality effect detected in the full period becomes more obvious in the active period but almost totally disappears in the thin-trading sub-period. Similar evidence is found for Singapore and Indonesia but only in the full period. For Thailand, seasonality effect seems to be absence in all periods. These results, which later are verified with the results from regression analyses, lead to the conclusion that seasonality effect exists regardless of tax motivation. Furthermore, not only is evidence of seasonality effect most pronounce in Malaysia, the effect of trading activity on seasonality effect is also a case unique to this market. The remainder of the article is organized as follows. Section 2 reviews the existing literature on January effect. Section 3 describes the data and methodology. Section 4 presents the results and discussion on the results while, section 5 concludes and discusses the implications.

LITERATURE REVIEW

One of the earliest and most important studies on January effect is done by Rozeff and Kinney (1976). Using the average monthly returns on the NYSE over a 70-year period between 1904 to1974, they find that except for the period of 1929 to 1940, the average return in January is higher than any other months. In a shorter study period between 1963 and 1979, Keim (1983) still finds evidence of January effect in a sample of securities traded in the NYSE. From 1926 until 1993, Haugen and Jorion (1996) find the January effect remains elegance with no significant sign of disappearing even after the reintroduction of the issue in 1976. This notion is very much supported by most recent evidence by Pietranico and Riepe (2004). On the other parts of the world, studies on January effect are relatively less rigorous but the market anomaly remains supported. For example, evidence by Gultekin and Gultekin (1983) could be the most comprehensive with respect to January effect as an international phenomenon. They found significantly unusual market activity in January in the US as well as in several other European countries, Australia, Japan, and Singapore. With evidence in support of January effect is sufficiently established, interest of the more recent studies shift toward the explanations of the market anomaly.

Of explanations offered for the January effect, the most frequently cited and tested is tax-loss selling hypothesis. On the surface of the tax-loss selling hypothesis alone Dyl (1977), Givoly and Ovadia (1983), Reinganum (1983), Keim (1983), Badrinath and Lewellen (1991), Dyl and Maberly (1992), Eakins and Sewell (1993), and Fant and Peterson (1995) argue that investors holding poor performing stocks will take short positions at the end of the year to reduce the net taxable capital gains. At the turn of the year stock prices rally as investors reenter the market creating upward price pressure and therefore, abnormal returns during the month.

The tax-loss selling hypothesis implies January or seasonality effect should not be the phenomenon in the absence of tax on capital gain as is the case in Malaysia, Singapore, Thailand, Indonesia, and many other countries. Using six sectoral indexes of the Bursa Malaysia, Yong (1991) finds results consistent with the tax-loss selling hypothesis as the market anomaly does not exist in Malaysian stock market. On the other hand, using more recent data of 1980 to 2004, three separate studies (Abd-Karim, 2002; Abd-Rahim, 2003; Abd-Rahim et al., 2005) find strong evidence in favor of January/February effect in the same market. This contradicting finding is not at all surprising because the link between January effect and tax-loss selling hypothesis is rather controversial. Kato and Schallheim (1985) find that January effect is presence in a sample of Japanese firms despite the no capital gains tax system in the country. Similarly, extending their search back to 1871 Jones et al. (1987) find the January effect in the US market has already existed since the pre-tax period. Evidence against tax-loss selling argument in a country with capital gains taxes is not negligible either. In a sample of firms listed in NYSE and American Stock Exchange (AMEX) over the period of 1888 to 1992, Cox and Johnston (1998) find that stocks with high potential for tax loss selling do not exhibit abnormal return in January. Similarly, using market indexes (Dow Jones Composite, NYSE Composite, and the S&P 500) Mehdian and Perry (2002) also find that after the 1987 market crash the January return is no more significantly different from returns of other months. Thus, this issue is still far from being solved because obviously there are other explanations to January effect besides tax-loss selling hypothesis.

Another frequently cited explanation of January effect is small firm hypothesis. When Keim (1983) finds support for January effect, he also finds that there is a stable negative relation between abnormal returns and firm size and it is more prominent in January. Similarly, Haugen and Jorion (1996) discover that the January effect magnifies in the smallest firm categories. In fact in almost all empirical studies of the tax-loss selling hypothesis, abnormal return in January is mainly contributed by returns of small firms. The common argument linking January effect and small firm is that because the flavor of the month when investors reenter the market is small thinly traded stocks, the larger impact of price pressure on such stocks exaggerate abnormal return in January. Others look at the behavior of fund managers during the turning point of the year to explain the market anomaly. For the purpose of "window dressing" or "performance hedging" these managers rebalance their portfolios to consist conservative, low risk stocks (normally of large companies) for performance evaluation at the end of the year.

The fact that there are evidences of January effect regardless of taxes on capital gains and there are other alternative explanations to January effect provide as motivations for the present study. That is, because none of the sample markets selected for this study imposes tax on capital gain, if evidence of seasonality effect were found, there must be other reasons beside tax motivation to explain seasonality effect in these stock markets. Also, motivated by the finding of two separate studies (Abd-Rahim, 2003; Abd-Rahim et al., 2005), this study sets as its second objective to determine whether trading activity stands a chance as potential explanation to seasonality effect. Specifically, whether or not the previous finding on the effect of trading activity on seasonality effect in Malaysia can be generalized to the other markets is examined in this study by including three other markets that in may ways are similar to Malaysia, i.e., Indonesia, Singapore, and Thailand.

DATA AND METHODOLOGY

Similar to the approach used by Rozeff and Kinney (1976), Yong (1991), Johnston and Cox (2002), Mehdian and Perry (2002), Abd-Rahim (2003), Gu and Simon (2003), and Al-Saad and Moosa (2005), the present study uses macro-level data to examine seasonality effect in the emerging stock markets. Among the advantages of this approach are it minimizes the microstructure problem introduced in individual and/or institutional stocks (Johnston and Cox, 2002), it allows seasonality to be more easily detectable (Pandey, 2002), and it avoids issues related to portfolio formation (Gun & Simon, 2004). The monthly closing indexes (in RM denomination), defined as the price index on the last trading day of the month, are drawn from Thompson Financial Datastream. Excluding indexes that do not have full 12-month year starting January 1988 leaves the study with a total of 24 indexes, detail of which are reported in Table 1.

Table 1: Descriptions of Indexes and Relevant Features of the Selected Emerging Equity Markets

Country	Indexes (Abbreviations)	Active Sub-Period	*Capital Gain Tax
Malaysia	**Sectoral Indexes**: Industrials (MIND), Finance (MFIN), Properties (MPROP), Tin and Mining (MTNMIN), and Plantations (MPLANT) **Broad Index**: Exchange Main Board All Shares (EMAS) and KLSE Composite Index (KLCI)	8 years: 1993-1997, 2000, 2004/05	Exempt
Indonesia	**Sectoral Indexes:** - **Broad Index:** Jakarta Composite Index (JCOMP)	7 years: 1990, 1996/97, 1999, 2003-2005	Exempt
Thailand	**Sectoral Indexes:** Automotive (TAUTO), Banking (TBANK), Commerce (TCOMM), Construction Materials (TCONS), Electric Products and Computers (TELCMP), Energy and Utilities (TENUTIL), Finance and Securities (TFINSEC), Food and Beverages (TFDBEV), Insurance (TINS), Mining (TMIN), Petroleum and Chemicals (TPTCHM), Professional Services (TPSERV), and Tourism and Leisure (TTOUR). **Broad Index:** Stock Exchange of Thailand Index (SET)	8 years: 1988, 1990-1996	Exempt
Singapore	**Sectoral Indexes:** - **Broad Index:** Singapore Straits Times (SGST) and Singapore All Equities (SGALL)	7 years: 1994-1996, 1999/00, 2004/05	Exempt

Notes: The active sub-period for each market is determined as follows: Malaysia (EMAS≥200), Indonesia (JCOMP≥500), Thailand (SET≥700), and Singapore (SGALL≥500). *Sourced from Lesmond (2005).

To investigate the influence of trading activity on the seasonality effect, the full study period is divided into two sub-periods based on level of trading activities. Trading activities are determined by the average monthly price index of the broadest index available in each market for each year from 1988 to 2005. As reported in Table 1, the results of quick cluster analyses indicate that for Malaysia and Thailand there are 8 years when the average monthly price index of EMAS is higher than 200 and SET is higher than 700, respectively whereas, for Indonesia and Singapore, there are 7 years when the average monthly price index of JCOMP and SGALL are higher than 500 and thus, are clustered in the "active-trading" sub-period. The remaining years have average monthly price indexes that are less than the respective cutoff points and therefore are clustered in another "thin-trading" sub-period. Throughout the study period, the monthly rate of return for the I^{th} index for month t in year *y* is given as;

$$R^{I}_{t,y} = \frac{PI^{I}_{t,y} - PI^{I}_{t-1,y}}{PI^{I}_{t-1,y}} x100\ \% \quad \text{...........} \quad (1)$$

Where $PI^{I}_{t,y}$ is the closing price index of index I on month *t* of year *y*. The average monthly return for month *t* is;

$$\overline{R}^{I}_{t} = \frac{\sum_{y=1}^{n} R^{I}_{t,y}}{n_I} \quad \text{......................................} \quad (2)$$

where:

y = year 1988,..., 2005,

t = month January, …, December

I = index 1, …, 24.

As the study proceeds with the hypothesis testing, let *s* be the seasonal month and *t* be the remaining months (i.e., $t_{1,\ 2,\ ...,\ 12} \neq s$) so that the test on seasonality effect is represented as follows;

$H1_0$: There is no particular pattern exists in the monthly returns, suggesting the absence of seasonality effect in any of the emerging equity markets. For the purpose of statistically testing this hypothesis:

a. Mann-Whitney U-Tests:
   H_0: $\tau_S = \tau_t$,
   H_1: $\tau_S > \tau_t$. for $t_{1,\ ...,\ 12} \neq s$.

b. Time-series regression (Eq. 11):
   H_0: $\beta_S = 0.00$,
   H_1: $\beta_S \neq 0.00$.

$H2_0$: Trading activity does not have any influence on seasonality effect, suggesting the absence of such influence of trading activity on seasonality effect in any of the emerging equity markets. For the purpose of statistically testing this hypothesis:

a. Mann-Whitney U-Tests:
   H_0: $\{\tau S,A=\tau t,A\}=\{\tau S,T=\tau t,T\}$
   H_1: $\{\tau_{SA}>\tau_{t,A}\} = \{\tau_{S,T} > \tau_{t,T}\}$ for $t_{1,\ ...,\ 12} \neq s$.

b. Time-series regression (Eq. 12):
   H_0: $\beta_{SxTA} = 0.00$,
   H_1: $\beta_{SxTA} \neq 0.00$.

Hypotheses involving comparisons between months (*s* versus *t* for t = 1, …, 12 ≠ s) are tested using non-parametric statistical methods to accommodate the distributions of the monthly returns that are not all normal. The normality of the distributions of the index monthly returns is based on Kolmogorov-Smirnov D-statistic which is the supremum over all x of the absolute value of the difference in empirical distribution $F_n(X)$ and specified distribution $F_0(X)$ (Hollander and Wolfe 1973) that is;

$$D = \sup_{-\infty<x<\infty} \left\{ \left| F_n(X) - F_0(X) \right| \right\} \quad \text{.........................} \quad (3)$$

The null hypothesis of normal distribution is rejected when $D \geq d_{\alpha}$. As reported in Table 2, there are 67 (23.3%) of the 288 month-indexes which distributions are not normal. Argument for using non-parametric tests is also supported by the fact the study has a relatively small sample (18 monthly return) particularly when testing the sub-periods where the sample can actually reduce to only 7 monthly returns. In addition, because parametric test is sensitive to outliers, employing non-parametric method provides us with the advantage of not falsely rejecting the null hypothesis when high mean is basically due to outliers.

Table 2: Results of the Normality of Distributions of Monthly Returns and the ADF Stationary Tests; January 1988 to December 2005

Mkt/Index	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	ADF
Malaysia													
KLCI	.132	.181	.108	.120	.096	.230*	.120	.182	.144	.132	.149	.156	-3.72**
EMAS	.186	.178	.115	.153	.100	.167	.115	.168	.139	.115	.198	.189	-3.77**
MFIN	.221*	.286*	.124	.183	.149	.192	.155	.142	.150	.140	.194	.261*	-3.86**
MIND	.151	.153	.152	.098	.115	.214*	.147	.162	.107	.182	.191	.162	-3.91**
MPLANT	.227*	.178	.236*	.141	.108	.130	.109	.192	.106	.214*	.207*	.332*	-3.46**
MPROP	.182	.128	.119	.119	.117	.159	.133	.153	.160	.159	.187	.165	-3.67**
MTNMIN	.118	.145	.142	.098	.155	.141	.174	.159	.207*	.103	.290*	.290*	-4.19**
Indonesia													
JKCOMP	.097	.176	.126	.101	.134	.142	.165	.163	.113	.122	.105	.341*	-4.22**
Thailand													
TAUTO	.111	.272*	.132	.106	.136	.173	.133	.109	.181	.160	.127	.250*	-3.27*
TBANK	.176	.122	.110	.305*	.150	.226*	.191	.165	.148	.298*	.171	.139	-3.87**
TCOMM	.197	.153	.103	.246*	.136	.229*	.212*	.178	.103	.130	.195	.105	-3.88**
TCONS	.154	.137	.122	.327*	.179	.180	.169	.200*	.117	.147	.163	.116	-3.30*
TELCMP	.120	.263*	.129	.133	.134	.176	.123	.185	.121	.176	.102	.134	-4.33**
TENUTIL	.191	.237*	.250*	.199	.170	.143	.170	.142	.144	.145	.126	.270*	-2.81
TFINSEC	.174	.192	.133	.139	.234*	.138	.270*	.125	.155	.253*	.086	.216*	-4.32**
TFDBEV.	.126	.190	.144	.252*	.133	.190	.231*	.155	.253*	.134	.251*	.143	-4.38**
TINS	.139	.176	.228*	.184	.150	.152	.242*	.177	.243*	.283*	.197	.267*	-3.11*
TMIN	.260*	.148	.151	.194	.132	.143	.227*	.106	.148	.176	.110	.235*	-3.78**
TPTCHM	.144	.198	.198	.240*	.111	.200*	.124	.174	.115	.168	.184	.241*	-4.16**
TPSERV	.182	.224*	.163	.364*	.218*	.208*	.206*	.174	.193	.236*	.095	.091	-3.61**
TTOUR	.144	.160	.331*	.282*	.105	.131	.304*	.182	.195	.206*	.125	.282*	-4.04**
BKALL	.167	.133	.134	.267*	.134	.104	.147	.211*	.120	.197	.171	.138	-3.77**
Singapore													
SGST	.219*	.271*	.208*	.194	.176	.154	.175	.176	.163	.166	.085	.149	-4.25**
SGALL	.174	.292*	.209*	.206*	.165	.172	.137	.148	.206*	.157	.109	.187	-4.37**
No. D ≥ d_α.	4	7	6	9	2	6	7	2	4	6	3	11	

Notes: In each test, d.f. = 18 months. * Significant at 5 percent level. No. D ≥ d_α = number of indexes which data is not normally distributed. The McKinnon critical values for 1%, 5%, and 10% significant levels are –3.4639, -2.8458, and –2.5743, respectively.

Similar to Lee et al. (1998) and Abd-Rahim (2003), the present study uses the U-statistic of Mann-Whitney (1947) to test if the average *s* month returns are significantly higher than the average returns of month *t*th. Mann-Whitney U-statistics, the nonparametric alternative to parametric t-test of equality of means for independent samples, tests the difference between two independent samples based on the sample locations (medians). It may be written as;

$$U = \sum_{i=1}^{n_i} \sum_{j=1}^{n_j} \phi\left(X_i, Y_j\right), \qquad (4)$$

where $\phi(X_i, Y_j) = \begin{cases} 1, & \text{if } X_i < Y_i \\ 0, & \text{otherwise} \end{cases}$, so that the statistic U is the sum the 1s.

This one-sided upper tailed-test of the null hypothesis H_0: $\tau_S = \tau_t$ is rejected if Mann-Whitney statistic $U \leq \tau_{\alpha,ns,nt}$. The large sample approximation for statistic U is the Z-statistic which is calculated as follows;

$$Z = \frac{U - E_0(U)}{\sqrt{Var_0(U)}} \qquad (5)$$

where

$$E_0(U) = \frac{n_S n_{t \neq S}}{2}, \text{ and}$$

$$Var_0(U) = \frac{n_S n_t (n_S + n_t + 1)}{12}.$$

In this case the null hypothesis is rejected if $|Z| \geq |Z| \mu_{\alpha/2}$.

Despite the small sample (18 monthly returns) time-series regressions are also employed in this study both for robustness check and also to provide us with results that can be compared directly to those found by Pandey (2002). Without rejecting the importance of normality distribution assumption in such test, this study focuses on the stationarity of the series because this assumption is more important in time-series analysis. The stationarity of the series is determined by computing the Augmented Dickey-Fuller (ADF) tests which involves estimating the following regression:

$$\Delta Y_t = \alpha + \gamma Y_{t-1} + \delta_i \sum_{i=1}^{p} \Delta Y_{t-1} + \varepsilon_t \qquad (6)$$

where $\Delta Y_t = Y_t - Y_{t-1}$,
α, γ, dan δ, = estimated parameters,
I = lag I, $I = 1, \ldots, p$, and
ε = white noise error.

The null hypothesis (H_0: $\gamma = 0$) that the series have a unit root is rejected if the ADF statistics is greater than the MacKinnon critical value.

The Augmented Dickey-Fuller (ADF) statistics, as reported in the last column in Table 2, indicate that the time-series data is suitable for time-series regression. With the exception of one index series (TENUTIL, which is still significant at 10 percent level), the ADF statistics are all significant at 5 percent level, indicating that all return series are stationary at levels. This study next form two varieties of time-series regression models which basically are an extension to the model used by Pietranico and Riepe (2004);

$$R^M_{I,t} = \alpha_I + \beta_I (D^M_{t,J}) + \varepsilon_{I,t}, \qquad (7)$$

where α_I = the intercept term,
β_I = beta coefficient,
$D^M_{I,J}$ = dummy variable, and
ε_I = white error term.

To be more specific, the dummy variable in Eq. 7 as it also applies in our first model is defined generally as follows;

$$D_S = \begin{cases} 1 & \text{if s month is the seasonal month for the respective market} \\ 0 & \text{otherwise} \end{cases} \qquad (8)$$

The first variation of our time-series regression model adds another dummy variable to test the possibility that trading activity has a role, separate from the seasonal month, in explaining returns;

$$D_{TA} = \begin{cases} 1 & \text{if month t and s are in active-trading years} \\ 0 & \text{otherwise} \end{cases} \quad \text{........ (9)}$$

To specifically examine the influence of trading activity on the anomaly in stock returns, a dummy variable that simultaneously capture the seasonal month and the trading activity is created. Essentially, the dummy variable is defined as;

$$D_{SxTA} = \begin{cases} 1 & \text{if s month occurs in active-trading period} \\ 0 & \text{otherwise} \end{cases} \quad . (10)$$

The resulting time-series regression models can be written in the following form;

$$R^M_{t,I} = \alpha^M_I + \beta^M_{I,S}(D^M_{t,I,S}) + \beta^M_{I,TA}(D^M_{t,I,TA}) + \varepsilon^M_{I,t}, \quad \text{.......... (11)}$$

$$R^M_{t,I} = \alpha^M_I + \beta^M_{I,sxTA}(D^M_{t,I,sxTA}) + \varepsilon^M_{t,I}, \quad \text{......... (12)}$$

where:

- α = intercept term,
- R_I = monthly returns on the index I = 1,… Nth index,
- M = studied equity markets = Malaysia,…, Singapore,
- t = 1, …, 216,
- β = beta coefficients,
- D = dummy variables as defined in equations (8) to (10), and
- ε = white error term.

Note that the regression model in Eq. 12 is a stricter test for the influence of trading activity on seasonality effect. The presence of seasonality effect should not be based on the coefficient of the dummy variable (D_{SxTA}) because it restricts the existence of seasonality only to the periods of active-trading. Thus, the need for simple test such as that in Eq. 11 to specifically test the presence of seasonality effect in the sample markets.

Another issue that needs to be resolved before this study could proceed with the tests is the identity of the *s* month which could vary from one market to another. The seasonality effect in Malaysia itself is less persistent with respect to the month when it occurs. It has shifted from January over the 1970 to 1988 period in Yong (1991) to January/February over the 1980 to 2000 period in Abd-Karim (2002), to February/December over the period of 1992 to 2002 in Pandey (2002) and to February over the 1988 to 2004 period in Abd-Rahim (2003) and Abd-Rahim et al. (2005). Overall, the tendency in this country is toward February effect to some extent because it is more easily associated with the Chinese New Year (henceforth, CNY) effect. The argument is that the abnormal returns in January and/or February are the results of the behavior of Chinese investors, whose role in the Bursa Malaysia is vital, around these months. This argument is compelling because for the last 18 years from 1988 to 2005 the CNYs had been celebrated in either one of the two months, mostly (67%) in February. The low average January returns are an initial indication of the CNY effect whereby these investors are cashing out for the celebration. At the beginning of the CNY, their enthusiasm when re-entering the equity market drives prices abnormally high, a reflection very much welcomed by the community as it indicates sign of fortune and prosperity in the New Year.

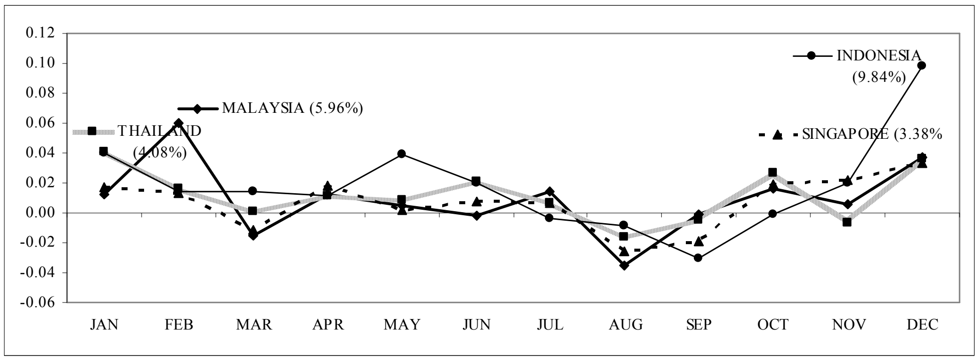
RESULTS AND DISCUSSION

This study begin by identifying the *s* month that will be analyzed as the month with potential seasonality effect in each equity market based on the highest average monthly returns of the n-indexes for the full 18-year study period. The trend of the average monthly returns for each country and the respective statistics are displayed in Panel A and Panel B of Figure 1, respectively. The trend in Panel A shows that for Malaysia, the *s* month should be more appropriately attributed to February which reports the highest average monthly returns of 5.96 percent. For Thailand, the highest average monthly return (4.08%) is in January whereas for both Indonesia and Singapore the highest average monthly returns are in December (9.84% and 3.38%, respectively). The slight difference in terms of month with highest returns (or month s) in these countries is rather normal. For instances, seasonality in Kuwait stock market takes the form of July effect (Al-Saad and Moosa, 2005) whereas they are December/January and July/August in Australian stock market (Silvapulle, 2004). When it comes to month with the lowest average monthly returns, the four countries are however very similar. As reported at the bottom of Figure 1, all except Indonesia consistently report August as the month with the lowest average monthly returns. Even then, Indonesia reports the second lowest return in August. Abd-Karim (2002) posits that the "quiet month" of August is also common in the US, the UK, Japan, and Singapore (Abd-Karim, 2002). The return pattern in Panel A of Figure 1 indicates that August and September both are the quite months in these four countries. Another similarity involves the returns pattern in five other months (January, February, April, May, and December) when all of these countries report positive returns. With respect to Malaysia, the results that this study gather so far differ from those in Yong (1991) where the average monthly returns of January (March) stands highest (lowest) but are similar with those in Abd-Karim (2002), Pandey (2002), and Abd-Rahim (2003, 2005).

Over the 18-year study period, each of the emerging stock markets reports positive average monthly returns. As reported in Panel B of Figure 1, Indonesia offers the highest average monthly returns (1.78% per month or 21.36% per year) followed by Thailand (1.16% per month or 13.93% per year). These returns are not only significant from investment but also from statistical perspectives. The average monthly returns in the other two countries (Malaysia: 0.92% per month or 11.04% per year; Singapore: 0.69% per month or 8.28% per year) are rather adequate from investment but not from statistical perspectives. More surprisingly however is the fact that all except Malaysia adheres well to the risk-return tradeoff theory. Specifically, with the exception of Malaysia, these equity markets report standard deviations that are consistent with the levels of returns that they generate. Finally, this study estimate the correlations among the average returns to determine the co-movement of these markets. In general, all of these markets move in the same direction, particularly in the case of Malaysia and Singapore (0.673), Malaysia and Thailand (0.547), and Thailand and Singapore (0.603). Indonesia appears to be the least dependent on the movement of the other equity markets (correlations range from 0.337 to 0.351).

Figure 1: Average Monthly Returns for Each of the Emerging Market; January 1988 to December 2005

Panel A. Trend of Average Monthly Returns



Panel B. Descriptive Statistics and Correlations

Statistics	Min	Mon	Max	Mon	Mean	StDev	Total	MAS	THAI	INDO	SNG
Malaysia	-0.0349	Aug	0.0596	Feb	0.0092	0.0238	0.1099	1.00			
Thailand	-0.0166	Aug	0.0408	Jan	0.0116*	0.0175	0.1393	0.547*	1.00		
Indonesia	-0.0303	Sept	0.0984	Dec	0.0178*	0.0321	0.2139	0.337*	0.351*	1.00	
Singapore	-0.0257	Aug	0.0338	Dec	0.0069	0.0176	0.0833	0.673*	0.603*	0.351*	1.00

Note: *indicates significance at 5% level. Abbreviations Min = minimum, max = maximum, Mon = month, StDev = Standard Deviation, MAS = Malaysia, THAI = Thailand, INDO = Indonesia, and SNG = Singapore.

This study next proceed with the results of the Mann-Whitney U tests. The result of the tests is presented in Table 3. For Malaysia, results for the full period indicate that the February returns are significantly higher in 19 (24.67%) of 77 pairwise month-comparisons, most of which are in March, August, and September. This result is lower compared to that (33.77%) found from the same sample indexes for the period of 1988 – 2002 (Abd-Rahim, 2003). Other than that, the remaining results pretty much remain as in the previous study. Most of the significant differences take place in August and September, naturally because the comparison involves months with highest and lowest monthly returns. Similarly, with respect to sample index, MFIN remains the one that provides the most significant differences (30% of 20 significant cases). In the meantime, results from the other equity markets show similar evidence of seasonal month effect except for Thailand which reports significant difference in only 3.25 percent of the 154 pairwise month-comparisons. Singapore and Indonesia report significant December effect in 22.73 percent and 27.27 percent cases, respectively. Similar to the case in Malaysia, the December effect is always significant in August and September in Singapore and Indonesia. The fact that this study fail to trace similar pattern in Thailand even though we are most rigorous (biggest sample i.e. 14 indexes) in testing the seasonality effect in that market suggest that our results are quite robust.

Table 3: Summary of Results of the Mann-Whitney U Tests for the Full Period and Active-and Thin-Trading Sub-Periods; January 1988 to December 2005

Period	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	ΣSig	%Sig
Panel A. Malaysia														
Full	0	−	5	1	1	2	0	6	3	0	1	0	19	24.67
Active	4	−	6	1	5	7	3	1	4	6	6	3	46	59.74
Thin	0	−	0	0	0	0	0	2	0	0	0	0	2	5.19
Panel B. Indonesia														
Full	0	0	0	0	0	0	1	1	1	0	0	−	3	27.27
Active	0	0	0	0	0	0	1	1	0	0	0	−	2	18.18
Thin	0	0	0	0	0	0	0	0	1	0	0	−	1	9.09
Panel C. Thailand														
Full	−	0	2	0	0	0	1	0	0	0	1	1	5	3.25
Active	−	0	0	0	0	0	0	0	0	0	0	1	1	0.65
Thin	−	0	2	1	0	0	1	1	0	0	0	0	5	3.25
Panel D. Singapore														
Full	0	0	2	0	0	0	0	2	1	0	0	−	5	22.73
Active	0	0	0	0	0	0	0	0	0	0	0	−	0	0.00
Thin	0	0	0	0	0	0	0	2	0	0	0	−	2	9.09

Notes: The figures in each cell represent the number of pair-wise comparisons that are different at least at the 5 percent significant level. Sub-A refers to the active-trading whereas sub-T refers to the thin-trading sub-periods. Symbol − refers the benchmark month which in the case of Malaysia = February, Indonesia and Singapore = December, and Thailand = January. The percentage of significant differently comparisons are computed by dividing the SUM by the total number of pair-wise comparisons involved i.e. Malaysia = 77, Indonesia = 11, Thailand = 154, and Singapore = 22.

This study next re-examine Abd-Rahim (2003) and Abd-Rahim et al.'s (2005) claim that trading activity could stand as a potential explanation for seasonality effect by repeating the same Mann-Whitney U-tests on the indexes that have been segregated into two sub-periods: active- and thin-trading. The results in Panel A of Table 3 indicate a drastic change in the number of significant differences in active-trading *vs.* thin-trading sub-periods. The number of significant differences increase more than twice of that for the full period to 59.74 percent in the active-trading sub-period whereas it almost vanishes (5.19%) in the thin-trading sub-period. However, unlike the full period, the active-trading sub-period reports most of the significant differences in the months of March, May, June, October, and November and mostly are contributed by the MPROP Index. In short, the results that this study find so far support earlier argument (Abd-Rahim 2003, Abd-Rahim et al. 2005) that the February effect, if ever to be considered relevant in investment decision, should be confined to active-trading periods. Such argument however is only valid to explain the Malaysia equity market because obviously this phenomenon is unique to the Malaysian case. As shown in Panels B to D of Table 3, none of the other three emerging markets exhibit similar patterns. In Indonesia and Singapore, the slight evidence of seasonality effect in the full period becomes less observable in the sub-periods, whereas in Thailand, the results for sub-periods do not seem to show noticeable different.

Before this study proceed with the time-series regression, it is worth noting that even though Mann-Whitney U tests are based on medians, the results are consistent with the patterns of the mean monthly returns in Figure 1. More importantly, the results are also consistent with those obtained from the equivalent parametric t-tests, which basically detect the seasonality effect based on the mean difference. The results of the t-tests (details are not reported in this manuscript) show that for the full period, the number of significant cases according to markets is as follows: (i) Malaysia increases to 20 (25.97%) cases, (ii) Thailand increases to 9 cases (5.84%), (iii) Singapore increases to 6 (27.27%) cases, and (iv) Indonesia reduces to only 1 (9.09%) case. For the active-trading period: (i) Malaysia reduces to 37 (48.05%) cases, (ii) Indonesia increases to 3 (27.27%), whereas (iii) both Singapore and Thailand report no case of significant differences. For the thin-trading sub-period; (i) Malaysia reduces to only 1 (1.30%) case, (ii) Thailand again increases to 7 (4.55%) cases, (iii) Singapore increases to 3 (13.64%) cases, and (iv) Indonesia reports zero case. Despite the slight difference, the results of the t-tests in general support our conclusion based on the Mann-Whitney U-tests. That is, while active trading activity strengthens the evidence of seasonality effect in Malaysia, it does not seem to do much different in the other equity markets.

Next this study run the time series regressions on the index returns to investigate further the results that have been found so far from the Mann-Whitney U as well as T-tests. The results from using Equation (11), as presented in Table 4, seem to suggest that time-series regressions manage to pick up some evidence that is not detected in Mann-Whitney U tests. But first, in the case of Malaysia, the evidence on February effect remains as strong as in earlier tests. Even though the February dummy ($D_{S=FEB}$) is only significant in 4 indexes at the 5 percent significant level, at conventional significant level ($\alpha \leq 0.1$) all are significant. Consistent with the results from the Mann-Whitney U-tests, the February effect seems to be most prevalent in two indexes; MFIN and MPROP. In the meantime, the trading activity dummy (D_{TA}) is consistently not significant in all of the indexes. This finding suggests that while trading activity does not have separate effect on stock returns, the negative coefficient of the D_{TA} indicates that lower monthly returns can be commonly associated with periods of active trading. In the case of Malaysia, the negative insignificant coefficient of D_{TA} explains why the Mann-Whitney U tests detect more significant differences in the active-trading sub-period. That is, it is because more non-seasonal-months produce lower or negative returns during the active-trading period compared to the other period.

The results in Table 4 also help clarify the position of December effect. Particularly for Indonesia, the coefficient of the December dummy variable ($D_{S=DEC}$) is significant at 1 percent level. For Singapore, December effect is also detected but only significant at conventional level ($\alpha \leq 0.10$). Regarding the trading activity dummy (D_{TA}), similar to the case in Malaysia, this variable does not seem to play any role in both markets. The story is a little bit more encouraging in the case of Thailand as some additional evidence to support January effect is detected in that market. As reported in Panel C of Table 4, the coefficient of the January dummy ($D_{S=JAN}$) is reported significant ($\alpha \leq 0.05$) in 2 (14.3%) of the 14 indexes (TFINSEC and SET) and marginally significant ($\alpha \leq 0.1$) in two other indexes (TBANK and TCONS). Furthermore, unlike in other markets, the coefficient of trading activity dummy variable (D_{TA}) is also significant in two indexes (TPSERV and TTOUR) in Thailand. This finding and the fact that the coefficient of the D_{TA} is almost always negative suggest that in Thailand there is a greater tendency that monthly returns are lower in active-trading than in other periods.

Table 4: Results of the Time Series Regressions (Equation 11) for Each of the Emerging Equity Markets; 216 months, January 1988 to December 2005

$$R^M_{t,I} = \alpha^M_I + \beta^M_{I,S}(D^M_{t,I,S}) + \beta^M_{I,TA}(D^M_{t,I,TA}) + \varepsilon^M_{I,t}$$

Market/Index	α	D_S	D_{TA}	t(α)	t(D_S)	t(D_{TA})	Adj-R^2	F-Stats	D-W
Panel A. Malaysia									
KLCI	0.012	0.034	-0.014	1.644	1.731	-1.278	0.012	2.316	1.843
EMAS	0.010	0.047	-0.014	1.299	2.294*	-1.200	0.021	3.351	1.893
MFIN	0.013	0.072	-0.013	1.293	2.692**	-0.902	0.027	4.031	1.904
MIND	0.011	0.034	-0.011	1.667	1.955	-1.141	0.014	2.562	1.927
MPLANT	0.005	0.036	0.003	0.556	1.668	0.246	0.004	1.421	2.122
MPROP	0.006	0.090	-0.020	0.570	3.470**	-1.412	0.053	7.017	1.862
MTNMIN	0.010	0.074	-0.009	0.809	2.191*	-0.496	0.014	2.523	1.955
Panel B. Indonesia									
JKCOMP	0.009	0.088	0.003	0.917	3.202**	0.225	0.037	5.151	1.769
Panel C. Thailand									
TAUTO	0.011	0.002	-0.005	1.196	0.096	-0.397	-0.009	0.083	1.425
TBANK	-0.003	0.060	0.018	-0.238	1.843	0.978	0.011	2.177	1.746
TCOMM	0.010	0.028	-0.011	1.211	1.329	-0.934	0.003	1.319	1.730
TCONS	0.021	0.050	-0.021	1.808	1.679	-1.287	0.011	2.237	1.646
TELCMP	0.009	0.030	-0.013	0.926	1.121	-0.913	0.000	1.045	1.825
TENUTIL	0.031	0.024	-0.003	2.531*	0.737	-0.166	-0.007	0.285	1.605
TFINSEC	0.006	0.099	0.008	0.333	2.113*	0.301	0.012	2.277	1.874
TFDBEV.	0.013	0.008	-0.004	1.843	0.407	-0.383	-0.008	0.156	1.454
TINS	0.015	-0.018	-0.008	2.076*	-0.941	-0.764	-0.002	0.734	1.391
TMIN	0.019	0.044	-0.033	1.415	1.225	-1.653	0.010	2.115	2.214
TPTCHM	0.019	0.059	-0.027	1.319	1.574	-1.298	0.010	2.082	1.842
TPSERV	0.024	0.016	-0.034	2.355*	0.614	-2.331*	0.017	2.905	1.361
TTOUR	0.018	-0.003	-0.029	2.230*	-0.155	-2.382*	0.017	2.849	1.659
SET	0.007	0.049	-0.004	0.747	2.015*	-0.313	0.010	2.079	1.867
Panel D. Singapore									
SGST	0.005	0.033	0.000	0.838	1.955	0.046	0.008	1.911	1.910
SGALL	0.004	0.026	-0.001	0.731	1.719	-0.075	0.004	1.481	1.868

Note: *, and ** represent significance at 5%, and 1% levels, respectively. In each regression, D_S and D_{TA} are the seasonal month dummy and trading-activity dummy for the respective markets. Regressing the monthly returns on the D_S alone provide almost exactly the same coefficients.

Table 5: Results of the Time Series Regressions (Equation 12) for Each of the Emerging Equity Markets; 216 months, January 1988 to December 2005

$$R_{t,I}^{M} = \alpha_{I}^{M} + \beta_{I,sxTA}^{M}(D_{t,I,sxTA}^{M}) + \varepsilon_{t,I}^{M}$$

Market/Indexes	α	D_{SxTA}	t(α)	T(D_{SxTA})	Adj-R^2	F-Stats	D-W
Panel A. Malaysia							
KLCI	0.008	0.036	1.360	1.250	0.003	1.561	1.823
EMAS	0.006	0.058	0.999	1.942	0.013	3.770	1.868
MFIN	0.011	0.057	1.452	1.441	0.005	2.077	1.901
MIND	0.007	0.050	1.450	1.943	0.013	3.775	1.898
MPLANT	0.006	0.077	0.999	2.466*	0.023	6.079	2.102
MPROP	-0.001	0.126	-0.084	3.315*	0.044	10.991	1.812
MTNMIN	0.009	0.093	0.940	1.890	0.012	3.573	1.932
Panel B. Indonesia							
JKCOMP	0.016	0.055	2.045*	1.260	0.003	1.587	1.742
Panel C. Thailand							
TAUTO	0.009	-0.015	1.383	-0.443	-0.004	0.196	1.416
TBANK	0.008	0.039	0.917	0.820	-0.002	0.672	1.742
TCOMM	0.008	-0.011	1.270	-0.349	-0.004	0.122	1.713
TCONS	0.015	0.000	1.791	0.002	-0.005	0.000	1.623
TELCMP	0.006	-0.011	0.831	-0.274	-0.004	0.075	1.798
TENUTIL	0.031	0.028	3.379**	0.598	-0.003	0.357	1.606
TFINSEC	0.015	0.066	1.147	0.950	0.000	0.902	1.883
TFDBEV.	0.012	-0.004	2.302*	-0.142	-0.005	0.020	1.437
TINS	0.010	-0.003	1.874	-0.122	-0.005	0.015	1.415
TMIN	0.010	-0.042	0.972	-0.805	-0.002	0.648	2.190
TPTCHM	0.012	-0.019	1.164	-0.344	-0.004	0.119	1.814
TPSERV	0.011	-0.039	1.494	-0.999	0.000	0.998	1.321
TTOUR	0.006	-0.023	1.001	-0.705	-0.002	1.611	0.497
SET	0.008	0.018	1.224	0.504	-0.003	0.254	1.852
Panel D. Singapore							
SGST	0.007	0.025	1.522	0.939	-0.001	0.882	1.887
SGALL	0.005	0.024	1.210	1.013	0.000	1.025	1.841

Note: *and ** represent significance at 5%, and 1%, respectively. In each regression, D_S and D_{TA} are the seasonal month dummy and trading-activity dummy for the respective markets. The results of regressing monthly returns on the D_S alone provide exactly the same coefficients.

Finally this study run another time-series regression model (represented in Equation 12) and the results are reported in Table 5. As displayed in Panel A, the coefficients of the dummy variable (D_{SxTA}) are significant at 5 percent level in only two indexes (MPLANT and MPROP) but at the conventional level, all are significant except for two indexes (KLCI and MFIN). These results confirm our earlier predisposition that in the case of Malaysia trading-activity does have influence on the seasonality effect. Meanwhile, Panels B to D show that none of coefficients on the dummy variable (D_{SxTA}) are significant in any of the indexes for the other equity markets. Consequently, this finding confirms the conclusion this study made based on the Mann-Whitney U-tests that the influence of trading activity on seasonality effect is limited to the case of Malaysia.

CONCLUSION AND IMPLICATIONS

This study examines the seasonality effect in the Malaysian stock market as well as three other neighboring emerging equity markets, i.e., Singapore, Thailand, and Indonesia. A common characteristic of these markets is the tax exemption on capital gain, which by itself is significant in the literature on seasonality in stock market because tax-loss selling hypothesis has been a widely-accepted explanation of seasonality effect. The inclusion of these other markets is important because it helps to verify whether the argument that trading activity influences seasonality effect (Abd-Rahim, 2003; Abd-Rahim et al. 2005) can be generalized to these markets.

The preliminary results suggest that seasonality effect (if any) varies from one market to another. In Malaysia, seasonality effect is more appropriately associated with February effect because this month reports an exceptionally high average monthly return. By the same virtue, seasonality effect is more appropriately associated with January effect in Thailand and December effect in both Singapore and Indonesia. The results of the Mann-Whitney U tests for the full period and particularly for the active trading sub-period provide some indication of February effect in Malaysia whereas, the totally contradicting results in thin-trading period suggest the influence of trading-activity on seasonality effect in this market is rather a phenomenon of active trading period. While Singapore and Indonesia also indicate some evidence on seasonality effect, Thailand seems to suggest the opposite. In the meantime, unlike in Malaysia, trading activity appears to have no particular influence on seasonality effect in these markets. The results from both regression analyses are also consistent with the finding from Mann-Whitney U tests.

Overall, the results from the Mann-Whitney U tests and regression analyses lead us to the following conclusions. February effect is a unique phenomenon to the Malaysian stock market (1991). Similarly is the influence of trading activity on seasonality effect given that the evidence obviously is confined to the Malaysian equity market. Consistent with Pandey (2002), the results for Malaysia equity market suggest that the market is not informationally efficient. This conclusion implies that the abnormal returns in February may be exploitable but such trading rule only applies to periods of active trading. In the meantime, even though December effect seems to be supported both in Singapore and more so in Indonesia, future study that is more rigorous in terms of sample and/or tests is necessary to draw a firm conclusion. Thailand, on the other hand, indicates the slightest evidence of seasonality effect. Given that the results are obtained from a market which provides the most comprehensive sample and from a market that exempts tax on capital gain, they are valid evidence to suggest that Thailand equity market is efficient (in the weak form) and to some extent they are also consistent with the tax-loss selling hypothesis.

Regarding trading activity, its role which appears to be limited to Malaysia renders a re-examination in future study. This is important to confirm that inappropriate choice of trading activity measure for the other three markets is not the reason it fails to be detected in the other markets. Similarly, since evidence on seasonality effect is most pronounce in the form of February effects, if this phenomenon is to be attributed to Chinese-dominated equity market, then future studies should re-examine February effect in other Chinese-dominated equity markets such as China, Taiwan, and Hong Kong.

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