# The School's Out Effect in East-Asian Stock Markets

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## Abstract

We investigate the seasonality in trading activity, stock volatility and returns associated with school vacations employing weekly data for 10 East Asian economies. We find evidence of a new seasonal anomaly, the school's out (SO) effect. Our results show that this causes share turnover to plummet by an average of 13% and stock volatility and returns to fall by 3% and 0.4%, respectively. The SO effect prevails across different size-based portfolios and information flows in contrast to the scant Asian evidence for the Gone Fishin' effect. Finally, a post-SO effect implies that stock return, return volatility and share turnover rise during the first week back at school.

Key Words: Seasonality, anomaly, Gone Fishin', holiday effect, share turnover.

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## 1. Introduction

Numerous studies have tested capital market efficiency and empirically documented large numbers of anomalies in stock prices which run contrary to the Efficient Market Hypothesis (EMH). They include the January effect, turn-of-the-month effect, weekend effect and holiday effect. For the holiday effect, studies have reported abnormally high stock returns on the days prior to short-term holidays. Recently, the study of the holiday effect has been extended to the effects associated with extended holiday periods. These include the festivity effect proposed by Abadir and Spierdijk (2005) and the Hong and Yu (2006) Gone Fishin' effect.

Hong and Yu (2006) introduce the 'Gone Fishin'' effect by examining 51 stock markets and demonstrate that, during the summer months, the average rates of stock turnover, volatility and returns are the lowest of the four seasons of the year. However, they find only a relatively small impact for the 'Gone Fishin'' effect in Asian countries and for in tropical countries more generally. Instead, the effect is far more pronounced for those countries with higher latitude. We test the Gone Fishin' effect for our sample of East Asian countries by employing large data sets. The sample sizes of countries considered are around 3 to 17 times larger than those used by Hong and Yu (2006). Nonetheless, our results simply confirm the weak evidence for the Gone Fishin' effect in East Asian countries.

This paper makes two contributions to the seasonal anomaly literature. First, we propose a new anomaly, the school's out (SO) effect, for East Asian markets. Our results show that share turnover in particular and stock return volatility during school vacations are lower than during the rest of the year. This supports the hypothesis of the SO effect that investors are preoccupied by child care and are therefore most likely to take family holidays during the during the SO periods. Under the assumption of risk aversion, investors would tend to reduce their trading activity since their expenditure is higher due to the costs of child care, family holidays and tuition fees of new semester. Our empirical results also provide evidence that stock returns are lower during the SO period. In addition, another pattern is found in the immediate post-SO weeks. On the basis that investors have more time for trading after their children return to school, we would expect that they increase their trading activity after school vacations and especially for SO periods in excess of one month

The SO effect differs from the Gone Fishin' effect. On one hand, the SO period(s) is (are) generally much shorter than the summer period defined by Hong and Yu (2006). One the other, we posit a post-SO effect which is missing in Hong and Yu (2006). Consequently, we argue that the strength of the SO effect we find could provide a plausible explanation for why the Gone Fishin' effect is absent or weak in countries with lower latitude. This is partly because the timing of the SO or school vacation period in tropical Asian countries varies and is not necessarily in the summer. It is also partly because the SO period only coincides with part of the summer months in countries with higher latitude. While the Gone Fishin' effect is still evident in these countries, it may well be driven by the SO effect. The SO effect is further supported by the results that many of the stock turnover, volatility and return series in the weeks after school vacation are significantly higher than that in the rest of the year for China, Japan and Korea. These weeks are included in the summer defined by Hong and Yu (2006).

The second contribution is that our results provide strong evidence in support of the SO effect for all samples with the exception of Indonesia. However, this is likely due to the fact that the maximum school vacation in Indonesia is three weeks only. Our results show that the SO effect is more prominent for the school vacation periods exceeding one month. We also find that the SO effect prevails across size-based portfolios and information flows. Nevertheless, firm size has a distinct impact on the SO effect for different countries. Its influence declines moving from the smallest to the largest size-based portfolios for Malaysia, Philippines and Japan while the results show an inverse pattern for Hong-Kong and China.

Similarly, a post-SO effect is evident for most of the East Asian countries with school vacations exceeding one month but not for Taiwan, Japan and Korea. For Taiwan and Japan, the activities of ex-dividend and ex-rights in the weeks following school vacations could erode the influence of the post-SO effect. Similar to the weekend effect and turn-of-the-year effects, the post-SO effect is much more prominent in the smallest size-based portfolio and its impact declines from the smallest to the largest size-based portfolios although it prevails in all size-based quintiles.

The festivity and Gone Fishin' effects and the SO effect share similarities. They all involve prolonged holiday periods rather than the one-day public holidays when the markets are closed. For these prolonged holiday effects, stock markets are not closed and so are not influenced by the market-closed effect. Moreover they all share the common effect of reduced trading activity. However, the SO effect possesses several properties which are distinct from those of the festivity or Gone Fishin' effects. Firstly, the SO effect is not only caused by investors going on holidays (mainly for Gone Fishin' effect) or expenditure on celebrating festivities (mainly for festivity effect). The primary factor driving the SO effect is expenditure on child care and the tuition fees of public or cram schools and extension classes in family-oriented economies. Thus family vacations are part of the expenditure on child care. Secondly, in addition to SO effect, we also find special patterns following school vacations. By contrast, there is no particular feature before or after summer for the Gone Fishin' effect while the festivity effect is accompanied by other phenomena preceding and succeeding festivities. Finally and most importantly, the SO effect is an international anomaly that manifests itself independently in different countries since the school vacation periods in East Asia vary from country to country. However, for the festivity or Gone Fishin' effect, festivities or summer takes place at the same time for all countries. Thus testing for these is tricky due to cross sectional dependence or comovement between markets.

The remainder of this paper is organized as follows: Section 2 presents an overview of the literature of the regularities related to holidays; Section 3 describes the data and explains the testing methods and procedure; Section 4 discusses the empirical results; Two further tests for examining the robustness of the SO effect and a robust test of Gone Fishin' effect are presented in section5 and finally, a preliminary conclusion is stated in the last section.

## 2. Holiday-related anomalies

The literature relating to the holiday effect can be grouped into two sub-areas, short-term and prolonged holiday effects. The former mainly focuses on the anomaly associated with one-day bank or public holidays while the latter relates to the effect occurring around sustained holiday periods lasting more than two weeks such as the Chinese New Year and Muslim Ramadan festivity or the summer vacation. In addition to the difference in length of the holiday periods, stock markets are closed for the former whereas stock markets are open[1] for the latter. Consequently, the patterns in these two groups of holiday-related anomalies are distinct.

A large number of studies contributed to the development and investigation of the short-term holiday effect. Since the SO effect is a prolonged holiday phenomenon, we focus on that literature in this section.[2]

### *2.1 Prolonged holiday anomalies*

The holiday effect has been extended to include effects with a long time period such as a festivity effect and Gone Fishin' (or vacation) effect. The time horizons of prolonged holiday anomalies vary from two weeks to three months and so stock markets are still open during festivities or vacations. Consequently, the prolonged holiday effect is induced by factors such as trading activity or liquidity rather than the market-closed effect.

Early studies mainly focus on the features around Chinese New Year. On the basis of the Chinese lunar calendar, the rates of stock returns on the Malaysia, Hong Kong and Singapore markets are demonstrated by Wong et al. (1990) to be prominently greater in the month preceding the Chinese New Year festivity than those in the remaining months of a year. Using daily equally- and value-weighted index returns, Tong (1992) shows that the rates of stock returns in Taiwan are abnormally higher on the five days preceding and following the Chinese New Year's festival[3] than those in the remaining of a year, and he

[1] Based on the Chinese lunar calendar, the Chinese New Year festivity is from 1st to the 15th January. For some Asian countries, the stock markets are closed for the first 3 or 5 days of the festivity.

[2] Lucey (2005) provides an overview of the literature of daily holiday effect. We attempt to subsume relevant studies more completely and expand the scope of daily holiday effect by incorporating the post-holiday, festivity and vacation effect.

[3] Tong (1992) defined that the Chinese New Year's festival are only the first five days of Chinese New Year in which the Taiwan stock markets is closed.

further indicates that this Chinese New Year effect is not a pure holiday effect since it is also influenced by investors' liquidity. This is similar to the empirical result of Yen and Shyy (1993) that the average stock return on the days following the Chinese New Year is positive although it is not statistically significant. Furthermore, Tong (1992) further indicates that this Chinese New Year effect could be induced by the investors' liquidity as the payment of bonuses is tied to Chinese lunar calendar year-end rather than the Western calendar year end.

More recently, Abadir and Spierdijk (2005) apply liquidity constraints to explain some calendar anomalies of stock behavior and introduce a new pattern of stock returns — a festivity effect in ten Asian countries. In their paper, the Muslim Ramadan festivity lasting for a month and the Chinese New Year festivity lasting for 15 days are chosen to examine the new effect. In order to implement the test, the weekly index returns and volumes are regressed on their lags and weekly dummies for the weeks before, during and after festivities. Their results indicate low returns on stocks and low trading volumes in the weeks prior to the festivities. However, in the weeks following festivities, the rates of returns show a reversal and trading volumes have an upward trend.

Although the festivity effect also prevails internationally as the pre-holiday effect, those two festivities take place at the same time in different countries. Consequently, it is awkward to investigate whether the effect occurs independently in different markets. However, it is of interest that for China, Taiwan and Hong-Kong, the stock returns on the weeks during or preceding Chinese New Year festivity are higher than those on the remaining days according to the results of Abadir and Spierdijk (2005). This is different from the pattern of the festivity effect in other countries considered in the paper but consistent with the prior studies relating to Chinese New Year. One plausible explanation for this finding is that annual bonus is paid before the Chinese New Year in these markets, so the liquidity of the investors increases before the festivity. In addition, they further indicate that the festivity effect should be genuine rather than the January effects induced by other factors such as tax-loss motives or window dressing since the time of these two festivities varies every year for the Western calendar.

Hong and Yu (2006) examine the behavior of stock prices and trading activities around the summer vacation period in 51 stock markets including countries in both the Northern and Southern hemisphere and introduce the new regularity – Gone Fishin' effect. They demonstrate that in the summer vacation period, average rates of value- and equally-weighted returns, share turnover[4] and return volatility are the lowest in four seasons. In addition, they also indicate that the number of initial public offerings is the lowest during the summer vacation, implying that Wall Street is also on holiday in the summer. Intriguingly, the hotel occupancy and air travel volume are evident to be higher in the summer, which could provide a plausible explanation for the Gone Fishin' effect.

However, it is worth noting that the drop in monthly stock turnovers in the summer vacation is only 3.4 % in the Asian market, compared with 13.2% of the North American market, 15.6% of European markets, 7.3% of African countries and 6.7% of the Oceanian markets. This indicates that the impact of the Gone Fishin' effect on the Asian countries is weaker than that on the other four regions. Furthermore, their results also show that the evidence of the Gone Fishin' effect is significant for the subtropical but not for tropical countries. In other words, the Gone Fishin' effect does not prevail in the countries with lower latitude. In particular, the sample size employed by Hong and Yu (2006) for Asian

[4] In Hong and Yu (2006), the share turnover is defined as the trading volume divided by the number of shares outstanding.

markets is rather limited, especially for Korea, Taiwan, Philippines, Malaysia and Thailand. Therefore, we also test the Gone Fishin' effect with larger sample size as a robust test, and the introduce of SO effect provide a plausible explanation for weak Gone Fishin' effect in Asia especially in tropical countries.

Our SO effect is a prolonged holiday anomaly since the strongest evidence for it is found for school vacation periods in excess of one month. It is also an international anomaly that prevails independently in different markets as the time of school vacations varies form countries to countries.

## 3. Data and methodology

For tests of the SO effect in East Asian markets, the countries considered in descending order of latitude are Korea, Japan, China, Taiwan, Hong-Kong, the Philippines, Thailand, Singapore, Malaysia and Indonesia. The data on latitude angles for these countries are collected from the CIA Factbook. The relevant financial data for all the countries are extracted from Datastream. The starting dates of the financial data vary for the ten Asian markets as the availability of the observation for these markets in Datastream is different. The longest data span extends back to January 1973 for Singapore, Hong-Kong and Japan and the shortest one to January 1991 for China. This implies that our samples span at least 16 and up to 33 years. The summary statistics of our data sets are given in Table 1.

To investigate the School Out effect, weekly financial data are used since most of the time periods of the school vacations are based on weeks. The exact starting and ending date of the school vacations are modified slightly from year to year[5]. Therefore, the school vacation time periods shown in Table 1 are described schematically[6]. Moreover, all school vacations considered in this present paper involve a four-week period or longer except Indonesia in which the school vacation period lasts around three weeks only. For Singapore and Thailand respectively, there are two school vacations lasting at least one month in a year.

The number of firms shown in Table 1 is the time series average[7] of stocks for each market from the start date up to 30 June 2006. In order to circumvent survival bias, the list of stocks for each market is generated by compiling the stocks in the active and dead file of the Datastream. General speaking, the sample size employed in this paper is about 3 to 17 times larger than that used by Hong and Yu (2006) for Korea, China, Taiwan, Malaysia, Philippines, Thailand and Indonesia. For the remaining countries, Japan, Hong-Kong and Singapore, their sample sizes are still about 1.04 to 1.7 times greater those adopted in Hong and Yu (2006). Accordingly, our bigger sample sizes should provide a more robust test of the Gone Fishin' effect in Hong and Yu (2006) as well as of our novel SO effect.

The SO effect tests are implemented by estimating panel regression models for each country. The models take the following basic form:

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[5] The winter vacation in China and Taiwan last around three to four weeks in January or February, and it mainly depends on the date of Chinese New Year. For Korea, the winter vacation is from the end of December to the end of January. We do not include the winter school vacations in China, Taiwan and Korea as it could exhibit distinct patterns due to the payment of bonus from employers and the fact that the winter vacations cover the lunar New Year festivities (please see Tong(1992) and Abadir and Spierdijk (2005)).

[6] The time periods of school vacation for Singapore, Malaysia, Hong-Kong and Taiwan can be confirmed in the website of Ministry of Education for each country. However, the time periods of school vacation for the remaining countries are confirmed by the department of education in their embassies in London or by their Ministry of education.

[7] In order to compare the number of firms with those used in Hong and Yu (2006), the number is also time series monthly average.

$$\boldsymbol{Dep}_{i,t} = \sum_{j=1}^{h} \beta_j \boldsymbol{SD}_{j,t} + \lambda_i + \theta_t \nu_t + \varepsilon_{i,t} \tag{1}$$

where $\lambda_i$ is the intercept used to capture the fixed-effect for firm $i$; $v_t$ is the annual dummies which are employed to control for particular yearly trends; $SD_{j,t}$ is seasonal dummies; $Dep_{i,t}$ is the dependent variable of the regression model.

In this paper, we generate four dependent variables for the panel regression models to analyze the SO effect. They are the weekly average share turnover, weekly return volatility, variance ratio and weekly stock returns. The daily share turnover is defined as trading shares divided by number of shares in issue. The weekly average share turnover is calculated for a given week to avoid the different number of trading days in a week caused by the public holidays. The closing stock prices on Wednesdays are taken to generate the weekly stock return, and the weekly return volatility is the standard deviation of the daily stock returns in a given week generated by the daily closing stock prices. For the variance ratio, both the daily open and closing stock prices are taken from Datastream to obtain the daily Open-to-Close return ($R_{otc}$) and Close-to-Open return ($R_{cto}$). Consequently, the variance ratio in a given week is generated by dividing the weekly variance of $R_{otc}$ by the weekly variance of $R_{cto}$.

The seasonal dummies, $SD_{j,t}$, can be quarterly, monthly or weekly dummy variables, and the number of $SD_{j,t}$, h, is dependent on which patterns we attempt to test. The details of the seasonal dummies are explained within the empirical results in the following section. In order to have an insight into the post-SO effect, we apply two weekly dummies equal to unity for the first and second week after school vacations. Owing to the fact that all the countries (except Indonesia) considered in this paper are in Northern Hemisphere, the quarterly dummy variables are defined[8] as follows: (1) the spring dummy is equal to one when the time is April, May and June; (2) the summer dummy is equal to one when the time is July, August and September; (3) the fall dummy is equal to one when the time is October, November and December; (4) the winter dummy is equal to one when the time is January, February and March.

## 4. Empirical Results

The basic idea for developing the SO effect is that those investors who are wealthier and can invest extra money in stock markets normally have children who are students in the primary or junior high schools. Therefore, we would assume that the time for them to have their holidays will be highly related to the time of the school vacations. In other words, the time for investors going on holiday for the SO effect is different from that for the Gone Fishin' effect. Furthermore, in addition to go on holidays with children, the investors would need to spend considerably more time on looking after their children during the SO than in the non-SO periods. Consequently, stock holders have less time and energy for trading and so the share turnover and return volatility should be relatively lower in the SO period.

On the basis of the assumption that the majority of investors are risk averse, stock holders would tend to reduce their trading activity when they are looking after their children and when on family holidays. More importantly, this investment behavior is strengthened by liquidity constraints. Due to the cost of family holidays, child care and the tuition fees of

[8] The latitude angle of Indonesia is -5. Especially, the latitude of its capital, Jakarta, is -6. Therefore, the quarterly dummies for Indonesia are defined as follows: (1) the spring dummy is equal to one when the time is October, November and December; (2) the summer dummy is equal to one when the time is January, February and March; (3) the fall dummy is equal to one when the time is April, May and June; (4) the winter dummy is equal to one when the time is July, August and September.

new semesters, expenditure during the school vacation increases and so less if left for trading purposes. Investors may even liquidate parts of their financial assents during the school vacations. For the SO effect, we consequently need to test the hypothesis that the share turnover, return volatility and stock returns are lower during school vacations.

However, investors can increase their trading activity once their children go back to school. This could induce higher volatility and thus higher returns in the early post-SO weeks. In consequence, we could test for a post-SO effect with the hypothesis that the share turnover, return volatility and stock returns are higher in the early post-SO weeks.

For the empirical tests, we establish the school vacation period in each country. We find that, in the countries close to the equator such as Thailand, Malaysia, Singapore, Philippines and Indonesia, the school vacations are very different from those in higher-latitude countries. Then, we employ the basic form of model (1) with weekly dummies and an SO and post-SO dummy variables to test our hypotheses.

### 4.1 Patterns in share turnover

For examining the SO effect with respect to trading activity, the log value of weekly average share turnover is regressed on an SO dummy (SV) for each country to see whether the share turnover is lower during the school vacation than that in the rest of the year. The regression model is as follows:

$$\boldsymbol{log\ st}_{i,t} = \beta * \boldsymbol{SV}_{i,t} + \eta_i + \theta_t \nu_t + \varepsilon_{i,t} \qquad (2)$$

where SV is the school's out dummy variable which is set to be unity for duration of the school vacation for the country and zero otherwise. The results are reported in Table 2.

[Table 2 around here]

Panel A shows the results for the school vacations in excess of 5 weeks, and Panel B are those for the school vacations not exceeding one month. The results indicate that the coefficients on the SO dummy are all significantly negative except Indonesia and Philippines for which the coefficients are significantly positive and insignificant, respectively.

The average SV coefficient fall in share turnover in Panel A is a considerable 13%. This is consistent with what we predict for of SO effect in trading activity since investors go on family holidays and need to look after their children. This average fall in share turnover is over 3.5 times larger than that for the Gone Fishin' effect found in Hong and Yu (2006) for 13 Asian countries; the average SO coefficient is -0.128 while that on the Summer dummy in Hong and Yu (2006) is only -0.034.

To further investigate the SO effect in share turnover, an auxiliary regression model is implemented to see the pattern of share turnover immediately after the school vacation period. This regression model incorporates weekly dummies for the two weeks succeeding the vacation and takes the form:

$$\boldsymbol{\log st_{i,t}} = \beta_1 \boldsymbol{* SV_{i,t}} + \sum_{k=1}^{2} \gamma_k \boldsymbol{*POSVk} + \eta_i + \theta_t \nu_t + \varepsilon_{i,t} \qquad (3)$$

where the dummy variables, POSV1 and POSV2, are equal to one for the first and second week "succeeding" the school vacation respectively and otherwise zero[9]. From Table 3, it is apparent that the coefficient on the SV dummy variable is still significantly negative for all countries except Indonesia and the Philippines. We predict that trading activities may rise after children go back to school.

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[9] It could be appropriate to adopt the weekly dummy variables to conduct the analysis here since the school vacation we considered is at least 3 weeks, and thus the long holiday normally have been scheduled in advance and the relevant patterns consequently exhibit in weekly base.

For instance, the coefficient on POSV1 is significantly positive for Singapore (the second school vacation), Malaysia, Thailand (the first school vacation) and Japan and is insignificant for Hong-Kong and the Philippines. The coefficient is non-decreasing in a similar number of cases for POSV2. This implies the share turnover in these countries increase in the early post-SO weeks.

For Taiwan, we cannot find evidence supporting the post-SO effect which could be due to the fact that the ex-rights and ex-dividend dates in Taiwan are from the middle of June to the end of September for most listed companies and share turnover consequently remains lower after the school vacation. Panel B of Table 3 indicates that we cannot find consistent evidence of the SO or post-SO effects when the school vacations do not exceed one month.

### 4.2 Patterns in return volatility

The results of investigating the pattern of return volatility are presented In Table 2 and 3.

[Table 3 around here]

Two regressions are estimated to obtain the results when the log of the weekly standard deviation of stock returns is used as the dependant variable. These are

$$\boldsymbol{logVol}_{i,t} = \beta * \boldsymbol{SV}_{i,t} + \eta_i + \theta_t \nu_t + \varepsilon_{i,t} \qquad (4)$$

$$\boldsymbol{logVol}_{i,t} = \beta_1 * \boldsymbol{SV}_{i,t} + \sum_{k=1}^{2} \gamma_k * \boldsymbol{POSVk} + \eta_i + \theta_t \nu_t + \varepsilon_{i,t} \qquad (5).$$

The results in Table 2 reveal that the coefficient on the dummy variable SV is significantly negative for all school vacations except for Taiwan and the second school vacation in Thailand. It shows that the volatility of stock returns is lower during the school vacations for East Asian countries by an average 3.4%. It is especially surprising that a significant SO effect for return volatility is also found for Indonesia.

Table 3 specifies the impact on return volatility in the two weeks after the school vacation. In Panel A, the post-SO effect is strongly evident for the second school vacation in Singapore, Malaysia, the first school vacation in Thailand, Taiwan and Hong-Kong as the POSV1 coefficient is significantly positive. For China and the Philippines, the coefficient on POSV1 is insignificant. However, the post-School's-Out effect does not prevail in Japan, which could result from the influence of ex dividend and ex rights in September[10]. Finally there is no post-SO effect in Indonesia and first shorter school vacation in Singapore.

### 4.3 Patterns in Stock Returns

For testing the SO effect in stock returns, weekly excess stock returns of firms are regressed on a dummy variable for the school vacation. A January dummy is also included in the model to control for the impact of the January effect as in the following specification:

$$\boldsymbol{Ret}_{i,t} = \beta_1 * \boldsymbol{SV}_{i,t} + \beta_2 * \boldsymbol{Jan}_{i,t} + \eta_i + \theta_t \nu_t + \varepsilon_{i,t} \tag{6}$$

where SV is unity during the school vacation period and zero otherwise; Jan is one in January and zero otherwise. As expected, the figures in panel A of Table 2 shows that the coefficient on the dummy of SV is significantly negative for all countries. The average economic impact is only 0.4%. This fall is considerably less than in the case of both turnover and volatility. It is of interest that in Panel B, the coefficients on the dummy variables for those three school vacations are significantly positive, implying that the impact of SO effect is much weaker if the duration of the school vacation does not exceed one month. In addition, the coefficient on the January dummy is significantly

[10] Kato and Loewenstein (1995) report that around one third of the ex-devidend days take place in September since some companies pay dividends twice a year.

positive which is consistent with the pattern of the January effect documented in the extant studies.

For post-SO effect on stock returns, we estimate a regression model of the form:

$$\boldsymbol{Ret}_{i,t} = \beta_1 * \boldsymbol{SV}_{i,t} + \sum_{k=1}^{2} \gamma_k * \boldsymbol{POSVk} + \beta_2 * \boldsymbol{Jan} + \eta_i + \theta_t \nu_t + \varepsilon_{i,t} \qquad (7)$$

where the *Jan* dummy is also included in the model to control for the impact of the January effect. Similar to the documented post-holiday effect, Panel A of Table 3 shows that a significantly greater stock return in the first week following school vacation in Malaysia, Hong-Kong, China, Korea and Singapore (the second school vacation). For the Philippines and Thailand (the first school vacation), the coefficient on POSV1 is insignificant, followed by a significantly positive coefficient on POSV2. For Singapore (the second school vacation), Malaysia, Hong-Kong, China and Philippines, the absolute values of the coefficients on POSV1 are about 2.5 to 16 times larger than those on SV. Therefore, the SO and the post-SO effects imply that stock returns are lower during the school vacation but higher immediately afterwards which is consistent with our predictions[11].

In brief, our investigation of the SO effect in terms of share turnover, return volatility and stock returns shows that the effect prevails in all East Asian countries considered with the exception of Indonesia. Similarly, the SO effect is also weak for the first school vacation in Singapore and the second school vacation in Thailand which lasts for a month or less. Thus the SO effect has a clearer impact for school vacations in excess of one month. Furthermore, the post-SO effect also manifests itself in all longer school vacations except Taiwan and Japan due to the impact of ex dividend and ex rights.

[11] Again, for Taiwan and Japan, we can not find the evidence supporting the post-School's-Out effect in return, which could be due to the influence of the ex-right and ex-dividend.

The SO periods in the non-tropical East Asian countries are generally scheduled during part of the summer resulting in the finding that the Gone Fishin' effect prevails in non-tropical countries. In consequence, one may question the statement in Hong and Yu (2006) that the Gone Fishin' effect only exists in the non-tropical markets as the weather in the tropical countries is similar in the four seasons of the year. Thus there is no advantage for the investors in these countries to concentrate their holidays on the summer. This is further supported by the results that some of the coefficients on the dummies for the weeks after the school vacation are significantly positive for China, Japan and Korea, and these weeks are included in the summer definition of Hong and Yu (2006). In particular, we can still find a post-SO effect in China. In addition, the SO and the post-SO effects are supported for all tropical East Asian countries with the school vacations exceeding one month. In other words, Hong and Yu (2006) cannot find a Gone Fishin' effect in tropical countries since the school vacations in tropical countries are not in the summer.

## 5. Robustness tests

While our empirical results in the previous section demonstrate that the SO effect is evident in East Asian countries, two further empirical tests are implemented to explore the robustness of the SO effect. In addition, using data with larger sample size, we also test the Gone Fishin' effect for the ten East Asian countries to confirm whether the Gone Fishin' effect also prevails in the non-tropical East Asian countries given that our SO effect could provide a plausible explanation for the scant evidence of a Gone Fishin' effect in tropical countries.

### 5.1 The relation between the SO and firm size effect

As reported in the extant research relating to the seasonality of stock returns (the turn-of-the-year effect, weekend effect or the one-day holiday effect), firm size can play an important role. Therefore, it is of interest to see whether the SO effect is driven by firm size. In order to investigate the link between the SO effect and the firm size effect, we rank and attribute stocks to size dummies by their market capitalization quintiles as of the last week in December of the previous year in all markets. We estimate regression (6) but replace the SV dummy with the dummies CSVSize*j*, *j*=1, 2,..,5 as follows:

$$\boldsymbol{Retp}_{i,t} = \beta_1 * \boldsymbol{Jan} + \sum_{j=2}^{6} \beta_j * \boldsymbol{CSVSizej} + \eta_i + \nu_t + \varepsilon_{i,t}, \quad \boldsymbol{j} = \mathbf{1,2,..,5.} \qquad \mathbf{(8)}$$ [12]

where CSVSize*j*, *j*=1,…,5 are equal to one for the stocks in quintiles 1 to 5, respectively, during the school vacation. The quintile 1 group includes the firms with the lowest market values while the quintile 5 group consists of the firms with largest market values. The significance of the difference of the coefficients on CSVSize*j*, *j*=1,…,5 is implemented by an equality test to see whether the size effect has a significant impact on the stock returns.

The results are reported in Table 4.

[Table 4 around here]

According to Table 4, the SO effect is found to be robust across different size-based portfolios except in Singapore. However, the SO effect is also driven by firm size for most of the markets except Thailand, Taiwan and Korea. For Thailand and Taiwan, the result of equality of means test shows the difference between the coefficients on the size-based dummies is insignificant. Although the coefficients on the size-based dummies are statistically unequal for Korea, they do not exhibit a pattern from the impact of firm size. However, the other countries can be separated into two groups according to the

[12] In order to hav an insight into the relationship, we use the return percentage as the dependent variable.

relationship between firm size and the SO effect. For Malaysia, Philippines and Japan, the influence of firm size declines moving from the smallest to the largest size-based portfolios. On the contrary, the values of CSVSize*j* coefficients show an inverse pattern for both Hong-Kong and China.

In addition to testing the link between SO effect and firm size effect, we also investigate the impact of firm size on the post-SO effect in returns in the following regression equation:

$$\boldsymbol{Retp_{i,t}} = \beta_1 * \boldsymbol{Jan} + \sum_{j=2}^{6} \beta_j * \boldsymbol{POSVSizej} + \eta_i + \nu_t + \varepsilon_{i,t}, \quad \boldsymbol{j = 1,2,..,5.} \qquad \textbf{(9)}$$

where POSVSize1 to POSVSize5 are set to be unity for the group of size1 to size5 in the week immediately following the school vacation respectively[13]. The estimates of the coefficients on dummies are reported in Table 5.

[Table 5 around here]

It is apparent that the post-School's-Out effect also persists across different size-based quintiles since nearly all the POSVSize*j* coefficients are significantly positive for all quintiles in all markets. Surprisingly, there is a consistent and strong link between the firm size effect and the post-School's-Out effect for all markets – a decrease in the values of the coefficients on the size-based dummies is almost monotonic moving from the smallest to the largest size quintile[14], and the hypothesis of the equality between the coefficients is also statistically rejected. In other words, the post-School's-Out effect has an inverse relation with the firm size for East Asian countries.

[13] For the school vacation in Philippines and the first school vacation in Thailand, the dummies of POVSizej, j=1,…,5 are set to one when the time is in the second week suceeding school vacations for the size-based quintiles since post-School's-Out effect in returns takes place at that time for these two shool vacations.

[14] Although there is an increase in the value of the size-based coefficients is almost monotonic moving from the second smallest to the largest size quintile for Hong-Kong, the coefficient on POSVSize1 is much larger than the others. This indicates that the post-School's-Out effect is more prominent for smallest-size firms in Hong-Kong.

### 5.2 Impact of Information Flows

Although the SO effect is found to prevail in both tropical and subtropical Asian countries, one may question if this effect directly induced by investors going on family holidays. There could be other plausible factors which causing this vacation phenomenon such as trading agents going on holiday or less information being released from firms during the school vacation period. These two factors can be tested by using the mechanism- trading- vs. nontrading-period variance ratio (VR) introduced by Fleming, Kirby and Ostdiek (2005). Fleming et al. report that the trading- vs. nontrading-period variance ratio can properly reflect the impact of information flows on stock and future prices. Following their definition of the trading- vs. nontrading-period variance ratio which is given in the data[15] section, we would expect the variance ratio to be lower during the school vacation if the information flow is smaller or trading agents go on holiday since the generation of the information relating to stocks mainly happen during the day time when the market is open[16].

Therefore, the trading- vs. nontrading-period variance ratio is employed as the dependent variable and regressed on the dummy of SV as follows:

$$\boldsymbol{VR}_{i,t} = \beta * \boldsymbol{SV}_{i,t} + \eta_i + \theta_t v_t + \varepsilon_{i,t} \qquad (10).$$

The coefficient on the SV should be significantly negative if the information flow is

[15] The starting date of variance ratio is later than those of the other variables for most countries except Indonesia, Thailand and China, and thus the time series of variance ratio is shorter than others. However, for stock return, return volatility and share turnover, the empirical results of testing the SO and post-School's-Out effect remain the same patterns when we use the same time period as variance ratio. In other words, the patterns of SO and post-School's-Out effect are consistent in later time period, and the results of testing variance ratio can used to test if the effects are caused by low information flow.

[16] This is because the proportion of the reduction in the information flow should be larger during the day time when the market in open for trading, and consequently the proportion of reduction in the value of $\sigma_{oc}$ is greater than in the value of $\sigma_{oc}$.

lower during the school vacation. The results are reported in Table 6.

[Table 6 around here]

The coefficient on the SO dummy variable is significantly negative for the five countries, Hong-Kong, Taiwan, China, Japan and Korea. However, a significantly positive coefficient is found in three countries, Malaysia, Philippines and Thailand, and the coefficient is insignificant for Singapore. In other words, we cannot find sufficient evidence to support the hypothesis that the SO effect is driven by lower information flows during the SO periods.

### 5.3 Comparison with the Gone Fishin' effect

Based on the fact that the sample sizes employed in this paper is some 3 to17 times larger than that used by Hong and Yu (2006) for Korea, Taiwan, Malaysia, Philippines, Thailand, China and Indonesia, we employ model (1) with quarterly dummies to confirm whether the Gone Fishin' effect is weaker in Asian countries and whether it is evident only in the non-tropical Asian countries. If this is the case, the SO effect provide a plausible alternative explanation and one could claim that investors in East Asian markets go on family holidays during the school vacation but not in the summer.

*Patterns in share turnover*

The basic idea of the Gone Fishin' effect is that investors go on holiday during the summer and consequently the share turnover (i.e. trading activity), stock return and return volatility in the summer are lower than in other seasons. In order to investigate whether the trading activity in the summer is the lowest in the year, the log of the weekly average share turnover is regressed on the quarterly dummy variables and the annual dummies of the form:

$$\boldsymbol{\log ST_{i,t} = \beta * Summer_{i,t} + \eta_i + \theta \nu_t + \varepsilon_{i,t}} \quad \textbf{(11)}$$

$$\boldsymbol{\log st_{i,t} = \beta_1 * Spring_{i,t} + \beta_2 * Fall_{i,t} + \beta_3 * Winter_{i,t} + \eta_i + \theta \nu_t + \varepsilon_{i,t}} \quad \textbf{(12)}$$

where Spring, Summer, Fall and Winter are seasonal dummies. Again, year dummies, $V_t$, are used to capture special features in some years and thus to avoid some noise for the estimation of the coefficients on seasonal dummies. If share turnover in the summer is the lowest, we would expect that the coefficient on *Summer* is significantly negative, but the coefficients on Spring, Fall and Winter are all significantly positive.

The results are reported in Tables 7 and 8.

[Tables 7 and 8 around here]

These reveal that the coefficient on *Summer* is significantly positive at the 1% level for Indonesia, Singapore and Thailand and the coefficient on *Fall* is significantly negative or insignificantly different from zero for Indonesia, Singapore, Malaysia Philippines, Thailand, Hong-Kong and China. These results indicate that the Gone Fishin' effect only impacts in three markets, Taiwan, Japan and Korea. Therefore, our findings support the result in Hong and Yu (2006) that the Gone Fishin' effect is absent or weak in the countries close to the Equator. Moreover, the average value of the *Summer* coefficients for all countries considered is -6.9% which is almost half that of the SO effect of -12.8%.

*Patterns in return volatility*

Under the assumption of lower trading activity in the summer, the stock return volatility should be also lower than those in the other seasons of the year. This is because the investment in the stock market will become less risky if the trading volume is smaller. Therefore, if the 'Gone Fishin'' effect exists, the stock return volatility in the summer should be lower than those in the remaining seasons. To see this, we regress the log of the weekly standard deviation (as the proxy for volatility) of the stock returns on the quarterly dummy variables as the following:

$$\boldsymbol{logVol}_{i,t} = \beta * \boldsymbol{Summer}_{i,t} + \eta_i + \theta \nu_t + \varepsilon_{i,t} \tag{13}$$

$$\boldsymbol{logVol}_{i,t} = \beta_1 * \boldsymbol{Spring}_{i,t} + \beta_2 * \boldsymbol{Fall}_{i,t} + \beta_3 * \boldsymbol{Winter}_{i,t} + \eta_i + \theta \nu_t + \varepsilon_{i,t} \tag{14}$$

The results for the seasonality in return volatility are also shown in the Table 7 and 8. The coefficient on the dummy of *Summer* is negative for all countries except Indonesia and Singapore but significantly negative or insignificant coefficients can be found on the dummies of Spring or Fall for Malaysia, Philippines, Thailand, Hong-Kong, Taiwan and China. These show that the Gone Fishin' effect in turns of return volatility only exists in two non-tropical countries - Japan and Korea. Furthermore, the average value of the coefficients on the dummy variable of Summer is -2.2% which is some 50% smaller in magnitude than the -3.4% fall in volatility induced by the SO effect. We also find that an increase of one degree in latitude will result in a decrease of 0.1% in stock return volatility which is the same as the results in Hong and Yu (2006) if we regress the Summer coefficients in equation (11) on the latitudes of countries.

*Patterns in stock returns*

On the basis of the normal assumption that investors are risk averse, we would expect that stock returns in the summer should be lower than those in the other three seasons. Similarly, this prediction can be tested by the following regression model with weekly stock returns:

$$\boldsymbol{Ret}_{i,t} = \beta_1 * \boldsymbol{Summer}_{i,t} + \beta_2 * \boldsymbol{Jan} + \eta_i + \theta \nu_t + \varepsilon_{i,t} \tag{15}$$

$$\boldsymbol{Ret}_{i,t} = \beta_1 * \boldsymbol{Spring}_{i,t} + \beta_2 * \boldsymbol{Fall}_{i,t} + \beta_3 * \boldsymbol{Winter}_{i,t} + \beta_4 * \boldsymbol{Jan}_{i,t} + \eta_i + \theta \nu_t + \varepsilon_{i,t} \tag{16}$$

where Spring, Summer and Winter are seasonal dummies and the dummy variable, Jan, is included to capture the influence of the January effect. As shown in Table 7 and 8, we find that the Gone Fishin' effect with respect to stock return prevails for half of the countries considered which is slightly stronger for the effect in turns of share turnover and return volatility. The mean value of the *Summer* coefficient is -0.004 which is exactly the same as the impact of the SO effect.

Generally speaking, with larger sample size for the ten East Asian countries, the results demonstrate that the Gone Fishin' effect is more prominent in those countries with higher latitude such as Taiwan, Japan and Korea and the effect is generally less pronounced in the East Asian countries than the SO effect. Therefore, the SO effect provides a plausible explanation for the weak Gone Fishin' effect in the East Asia and especially the countries closer to the equator since the time periods of the school vacation in the Asian countries with lower latitude are not in the summer but those in the countries farther from the equator are in parts of the summer. This is why one could still find strong evidence of Gone Fishin' effect in non-tropical Asian countries.

## 6. Conclusions

This paper introduces a new seasonal anomaly associated with the school vacation for East Asian countries which we call the school's out (SO) effect. The basic hypothesis of is that investors are occupied by family holidays and child care during SO periods and they reduce their trading and positions to finance the high expenditure in these periods. This is supported by our empirical findings that share turnover, return volatility and stock returns are statistically lower during the school vacation than in the remainder of the year. Similar to the one-day holiday effect, we also find a post-SO effect. This exhibits a pattern of relatively higher share turnover, return volatility and stock returns in the early weeks succeeding school vacation since investors increase trading activities and their positions after their children go back to school. Our results show that the SO effect is more pronounced for longer school vacations (in excess of one month). In particular, we cannot find the evidence of the SO effect for Indonesia, which could be due to the fact that the maximum school vacation in Indonesia only lasts three weeks.

Based on the results of robustness tests, the SO effect persists in different size-based portfolios and is not driven by information flows. However, the SO could still have a particular relation with firm size. For Malaysia, Philippines and Japan, the influence of the SO effect declines moving from the smallest to the largest size-based portfolios. By contrast, the results show an inverse pattern for Hong-Kong and China. Intriguingly, we find that the post-SO effect in returns is a small firm effect for East Asian countries although it also impacts on all size-based portfolios.

Finally, using weekly data and much larger samples than Hong and Yu (2006), we test the Gone Fishin' effect hypothesis for East Asian countries. Most of the results are consistent with those found by Hong and Yu (2006) – the Gone Fishin' effect is less pronounced in East Asian countries than the SO effect and evidence of the former effect is scant for non-tropical countries. Therefore, our findings of the SO effect indicate that the reason for the low Gone Fishin' effect in the Asian countries close to the Equator is that investors go on family during the SO periods but not in the summer. However, one still finds evidence of a Gone Fishin' effect in the Asian countries further from the Equator since the school vacations in those countries overlap with parts of the summer.

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**Table 1:** Descriptive Statistics

| Country | Latitude | Starting date | NO. of Firms | School Vacation Time Period | Share turnover | Return | Return volatility | Variance Ratio |
|---|---|---|---|---|---|---|---|---|
| Indonesia | -5 | 1990/04 | 251 | The middle of June ~ the first week of July | 0.018 (0.553) | 0.007 (0.117) | 0.036 (0.051) | — |
| Singapore | 1.22 | 1973/01 | 262 | 1. The last week of May ~the third week of June<br>2.The middle of November ~ the end of December | 0.014 (0.676) | 0.003 (0.075) | 0.025 (0.031) | 2.007 (3.941) |
| Malaysia | 2.3 | 1984/12 | 499 | The middle of November ~ the end of December | 0.010 (0.509) | 0.002 (0.086) | 0.026 (0.028) | 2.409 (2.800) |
| Philippines | 13 | 1984/12 | 174 | The beginning of April ~ the first week of June | 0.047 (0.671) | 0.007 (0.107) | 0.028 (0.043) | 1.572 (2.350) |
| Thailand | 15 | 1987/02 | 538 | 1. The beginning of April ~ the middle of May<br>2. October | 0.022 (0.203) | 0.003 (0.090) | 0.026 (0.033) | 2.405 (4.090) |
| Hong-Kong | 22.15 | 1973/01 | 373 | The middle of July ~ the end of August | 0.004 (0.034) | 0.004 (0.091) | 0.028 (0.032) | 2.046 (1.884) |
| Taiwan | 23.3 | 1987/09 | 609 | July and August | 0.035 (1.000) | 0.001 (0.075) | 0.024 (0.016) | 2.156 (1.741) |
| China | 35 | 1991/01 | 673 | The middle of July ~ the end of August | 0.022 (0.591) | 0.001 (0.063) | 0.023 (0.016) | 4.378 (4.651) |
| Japan | 36 | 1973/01 | 2072 | The last week of July ~ the first week of September | 0.035 (1.236) | 0.003 (0.066) | 0.021 (0.023) | 2.018 (3.409) |
| Korea | 37 | 1980/01 | 815 | The middle of July~ third week of August | 0.041 (0.484) | 0.004 (0.103) | 0.032 (0.026) | 2.017 (3.032) |

Note: The number of firms is the time series average of stocks for each market from the start date up to 30 June 2006. The daily share turnover is defined as trading shares divided by number of shares in issue. The weekly average share turnover is calculated for a given week to avoid the different number of trading days in a week caused by the public holidays. The closing stock prices on Wednesdays are taken to generate the weekly stock return, and the weekly return volatility is the standard deviation of the daily stock returns in a given week generated by the daily closing stock price. For the variance ratio, both the daily open and closing stock prices are taken from Datastream to obtain the daily Open-to-Close return ($R_{otc}$) and Close-to-Open return ($R_{cto}$). Consequently, the variance ratio in a given week is generated by dividing the weekly variance of $R_{otc}$ by the weekly variance of $R_{cto}$. The average of the share turnover, stock return, return volatility and variance ratio in a given week are reported in the table, and their standard deviations are given in the parentheses.

## Table 2. SO Seasonality Effects

***Panel A: Long School vacations***

| Country | Share Turnover $\log st_{i,t} = \beta * SV_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t}$ | Return Valatility $LogVolatilities_{i,t} = \beta * SV_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t}$ | Stock Return $Ret_{i,t} = \beta_1 * SV_{i,t} + \beta_2 * Jan_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t}$ | |
|---|---|---|---|---|
| | **SV** | **SV** | **SV** | **Jan** |
| **Singapore** (2nd School Vacation) **(1.22)** | -0.299** (0.007) | -0.048** (0.004) | -0.001** (0.000) | 0.004** (0.001) |
| **Malaysia (2.3)** | -0.132** (0.006) | -0.009** (0.003) | -0.004** (0.000) | 0.008** (0.000) |
| **Philippines (13)** | -0.007 (0.013) | -0.015** (0.007) | -0.003** (0.001) | 0.008** (0.001) |
| **Thailand** (1st School Vacation) **(15)** | -0.099** (0.008) | -0.106** (0.005) | -0.005** (0.001) | 0.011** (0.001) |
| **Hong-Kong (22.15)** | -0.031** (0.006) | -0.017** (0.003) | -0.004** (0.000) | 0.002** (0.001) |
| **Taiwan (23.3)** | -0.181** (0.004) | 0.019** (0.003) | -0.007** (0.000) | 0.017** (0.000) |
| **China (35)** | -0.113** (0.004) | -0.045** 0.002 | -0.004** (0.000) | 0.001** (0.000) |
| **Japan (36)** | -0.128** (0.002) | -0.028** (0.001) | -0.006** (0.000) | 0.009** (0.000) |
| **Korea (37)** | -0.170** (0.005) | -0.057** (0.002) | -0.006** (0.000) | 0.009** (0.000) |
| **Average** | **-0.128** | **-0.034** | **-0.004** | **0.008** |

***Panel B: Short Shool Vacations***

| Country | Share Turnover $log\ st_{i,t} = \beta * SV_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t}$ | Return Valatility $LogVolatilities_{i,t} = \beta * SV_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t}$ | Stock Return $Re\ t_{i,t} = \beta_1 * SV_{i,t} + \beta_2 * Jan_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t}$ | |
|---|---|---|---|---|
| | **SV** | **SV** | **SV** | **Jan** |
| **Indonesia** **(-5)** | 0.075** (0.018) | -0.036** (0.010) | 0.007** (0.001) | 0.009** (0.001) |
| **Singapore** (1st School Vacation) **(1.22)** | -0.043** (0.008) | -0.038** (0.005) | 0.006** (0.000) | 0.005** (0.001) |
| **Thailand** (2nd School Vacation) **(15)** | -0.115** (0.010) | 0.025** (0.006) | 0.004** (0.001) | 0.012** (0.001) |
| **Average** | **0.006** | **-0.028** | **-0.016** | **0.009** |

Note: The closing stock prices on Wednesdays are taken to generate the weekly stock return, Ret. The daily share turnover is defined as trading shares divided by number of shares in issue. The weekly average share turnover, st, is calculated for a given week to avoid the different number of trading days in a week caused by the public holidays. The weekly return volatility is the standard deviation of the daily stock returns in a given week generated by the daily closing stock price; $\lambda_i$ is the intercept used to capture the fixed-effect for firm $i$; $\nu_t$ is the annual dummies which is employed to control for particular yearly trends; SV is the school vacation dummy variable which is set to be unity when the time is during the school vacation for the country and zero otherwise; Jan is assigned to be one when the time is in January and zero otherwise; standard errors are given in the parentheses. * Indicate significance at 10% levels; ** Indicate significance at 5% levels.

## Table 3. SO Extended Seasonality Effects

### *Panel A: Long School vacations*

| Country | Share Turnover $log\, st_{i,t} = \beta_1 * SV_{i,t} + \sum_{k=1}^{2} \gamma_k * POSVk + \eta_i + \nu_t + \varepsilon_{i,t}$ | | | Return Valatility $LogVol_{i,t} = \beta_1 * SV_{i,t} + \sum_{k=1}^{2} \gamma_k * POSVk + \eta_i + \nu_t + \varepsilon_{i,t}$ | | | Stock Return $Ret_{i,t} = \beta_1 * SV_{i,t} + \sum_{k=1}^{2} \gamma_k * POSVk + \beta_4 * Jan + \eta_i + \nu_t + \varepsilon_{i,t}$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **SV** | **POSV1** | **POSV2** | **SV** | **POSV1** | **POSV2** | **SV** | **POSV1** | **POSV2** | **Jan** |
| **Singapore** (2nd School Vacation) **(1.22)** | -0.290** | 0.202** | 0.246** | -0.041** | 0.125** | 0.161** | -0.001** | 0.016** | 0.006** | -0.000 |
| | (0.007) | (0.017) | (0.016) | (0.004) | (0.010) | (0.010) | (0.000) | (0.001) | (0.001) | (0.001) |
| **Malaysia (2.3)** | -0.124** | 0.114** | 0.257** | -0.004 | 0.082** | 0.132** | -0.004** | 0.011** | 0.019** | 0.000 |
| | (0.006) | (0.014) | (0.014) | (0.003) | (0.008) | (0.008) | (0.000) | (0.001) | (0.001) | (0.001) |
| **Philippines (13)** | -0.005 | -0.040 | 0.100** | -0.018** | -0.086** | -0.022 | -0.003** | -0.002 | 0.009** | 0.008** |
| | (0.013) | (0.036) | (0.035) | (0.007) | (0.021) | (0.020) | (0.001) | (0.003) | (0.003) | (0.001) |
| **Thailand** (1st School Vacation) **(15)** | -0.095** | 0.125** | 0.051** | -0.102** | 0.125** | 0.022* | -0.005** | -0.000 | 0.006** | 0.012** |
| | (0.008) | (0.019) | (0.019) | (0.005) | (0.011) | (0.011) | (0.001) | (0.001) | (0.001) | (0.001) |
| **Hong-Kong (22.15)** | -0.032** | -0.023 | -0.024 | -0.016** | 0.033** | 0.033** | -0.004** | 0.013** | -0.008** | 0.002** |
| | (0.006) | (0.015) | (0.015) | (0.003) | (0.008) | (0.008) | (0.000) | (0.001) | (0.001) | (0.001) |
| **Taiwan (23.3)** | -0.196** | -0.270** | -0.354** | 0.019** | 0.027** | -0.074** | -0.007** | -0.012** | -0.002** | 0.016** |
| | (0.004) | (0.012) | (0.012) | (0.003) | (0.007) | (0.007) | (0.000) | (0.001) | (0.001) | (0.000) |
| **China (35)** | -0.116** | -0.080** | -0.041** | -0.048** | 0.004 | -0.110** | -0.003** | 0.021** | 0.015** | 0.002** |
| | (0.004) | (0.010) | (0.010) | (0.002) | (0.006) | (0.006) | (0.000) | (0.001) | (0.001) | (0.000) |
| **Japan (36)** | -0.126** | 0.038** | 0.039** | -0.032** | -0.060** | -0.128** | -0.006** | -0.004** | -0.004** | 0.008** |
| | (0.002) | (0.005) | (0.005) | (0.001) | (0.003) | (0.003) | (0.000) | (0.000) | (0.000) | (0.000) |
| **Korea (37)** | -0.177** | -0.159** | -0.183** | -0.058** | -0.062** | 0.009* | -0.006** | 0.005** | -0.004** | 0.009** |
| | (0.005) | (0.010) | (0.010) | (0.002) | (0.005) | (0.005) | (0.000) | (0.001) | (0.001) | (0.000) |

### *Panel B: Short Shool Vacations*

| Country | **Share Turnover** $\log st_{i,t} = \beta_1 * SV_{i,t} + \sum_{k=1}^{2} \gamma_k * POSVk + \eta_i + \nu_t + \varepsilon_{i,t}$ | | | **Return Valatility** $LogVol_{i,t} = \beta_1 * SV_{i,t} + \sum_{k=1}^{2} \gamma_k * POSVk + \eta_i + \nu_t + \varepsilon_{i,t}$ | | | **Stock Return** $Ret_{i,t} = \beta_1 * SV_{i,t} + \sum_{k=1}^{2} \gamma_k * POSVk + \beta_4 * Jan + \eta_i + \nu_t + \varepsilon_{i,t}$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **SV** | **POSV1** | **POSV2** | **SV** | **POSV1** | **POSV2** | **SV** | **POSV1** | **POSV2** | **Jan** |
| **Indonesia** | 0.075** | -0.015 | 0.031 | -0.044** | -0.169** | -0.186** | 0.007** | 0.009** | 0.003 | 0.010** |
| **(-5)** | (0.018) | (0.033) | (0.033) | (0.010) | (0.019) | (0.019) | (0.001) | (0.003) | (0.003) | (0.001) |
| **Singapore** (1st School Vacation) | -0.044** | -0.039** | -0.041** | -0.040** | -0.018* | -0.059** | 0.006** | 0.008** | -0.008** | 0.005** |
| **(1.22)** | (0.008) | (0.016) | (0.017) | (0.005) | (0.010) | (0.010) | (0.000) | (0.001) | (0.001) | (0.001) |
| **Thailand** (2nd School Vacation) | -0.118** | -0.015 | -0.105** | 0.026** | 0.046** | -0.012 | 0.004** | 0.019** | 0.001 | 0.013** |
| **(15)** | (0.010) | (0.020) | (0.020) | (0.006) | (0.011) | (0.011) | (0.001) | (0.001) | (0.001) | (0.001) |

Note: The closing stock prices on Wednesdays are taken to generate the weekly stock return, Ret. The daily share turnover is defined as trading shares divided by number of shares in issue. The weekly average share turnover, st, is calculated for a given week to avoid the different number of trading days in a week caused by the public holidays. The weekly return volatility is the standard deviation of the daily stock returns in a given week generated by the daily closing stock price; $\lambda_i$ is the intercept used to capture the fixed-effect for firm *i*; $\nu_t$ is the annual dummies which is employed to control for particular yearly trends; SV is the school vacation dummy variable which is set to be unity when the time is during the school vacation for the country and zero otherwise; Jan is assigned to be one when the time is in January and zero otherwise; The dummy variables, POSV1 and POSV2, are equal to one for the first and second week "succeeding" the school vacation respectively and otherwise zero; standard errors are given in the parentheses. * Indicate significance at 10% levels; ** Indicate significance at 5% levels.

**Table 4. SO Seasonality Effect vs. Firm Size Effect** ( $Retp_{i,t} = \beta_1 * Jan + \sum_{j=2}^{6} \beta_j * CSVSizej + \eta_i + \nu_t + \varepsilon_{i,t}$ )

| Country | January | CSVSize1 | CSVSize2 | CSVSize3 | CSVSize4 | CSVSize5 | Equality test (Size1 ~ Size5) |
|---|---|---|---|---|---|---|---|
| **Singapore** | 0.511** | 0.037 | 0.020 | 0.012 | -0.100 | 0.220** | 1.44 |
| **(1.22)** | (0.055) | (0.124) | (0.108) | (0.103) | (0.100) | (0.100) | (0.218) |
| **Malaysia** | 0.856** | -0.668** | -0.566** | -0.318** | -0.375** | -0.077 | 6.490 |
| **(2.3)** | (0.050) | (0.097) | (0.091) | (0.088) | (0.086) | (0.085) | (0.000) |
| **Philippines** | 0.821** | -1.247** | -0.715** | -0.453** | -0.343* | 0.284 | 6.380 |
| **(13)** | (0.141) | (0.264) | (0.248) | (0.218) | (0.204) | (0.186) | (0.000) |
| **Thailand** | 1.138** | -0.241 | -0.482** | -0.745** | -0.567** | -0.599** | 1.570 |
| **(15)** | (0.066) | (0.159) | (0.144) | (0.136) | (0.136) | (0.131) | (0.180) |
| **Hong-Kong** | 0.198** | 0.265** | -0.373** | -0.539** | -0.554** | -0.564** | 13.21 |
| **(22.15)** | (0.050) | (0.102) | (0.091) | (0.086) | (0.082) | (0.080) | (0.000) |
| **Taiwan** | 1.659** | -0.752** | -0.676** | -0.639** | -0.650** | -0.606** | 0.680 |
| **(23.3)** | (0.043) | (0.067) | (0.064) | (0.063) | (0.064) | (0.065) | (0.607) |
| **China** | 0.131** | -0.135** | -0.324 | -0.384** | -0.510** | -0.633 | 13.310 |
| **(35)** | (0.035) | (0.052) | (0.050) | (0.050) | (0.050) | (0.052) | (0.000) |
| **Japan** | 0.871** | -0.672** | -0.768** | -0.749** | -0.661** | -0.509** | 17.280 |
| **(36)** | (0.016) | (0.029) | (0.026) | (0.025) | (0.024) | (0.024) | (0.000) |
| **Korea** | 0.930** | -0.375** | -0.759** | -0.984** | -0.861** | -0.644** | 7.590 |
| **(37)** | (0.042) | (0.086) | (0.083) | (0.083) | (0.082) | (0.083) | (0.000) |

Note: The closing stock prices on Wednesdays are taken to generate the weekly stock return, Ret. $\lambda_i$ is the intercept used to capture the fixed-effect for firm *i*; $\nu_t$ is the annual dummies which is employed to control for particular yearly trends; Jan is assigned to be one when the time is in January and zero otherwise; CSVSizej, j=1,…,5 are equal to one during the school vacation. For the second school vacation in Singapore, the dummies of CSVSizej, j=1,…5 are set to be unity when the time is in the first week prior to school vacation since the investors start reducing their positions from the week immediately preceding to school vacations and the coefficient on SV is very close to zero; This test does not include the school vacation in Indonesia, the first school vacation in Singapore and the second school vacation in Thailand since there is no strong school vacation effect in these vacations. Standard errors are given in the parentheses. For the equality test, we report the F statistics and P value in the parentheses. * Indicate significance at 10% levels; ** Indicate significance at 5% levels.

**Table 5. SO Extended Seasonality Effect vs. Firm Size Effect** ( $Retp_{i,t} = \beta_1 * Jan + \sum_{j=2}^{6} \beta_j * POSVSizej + \eta_i + \nu_t + \varepsilon_{i,t}$ )

| Country | January | POSVSize1 | POSVSize2 | POSVSize3 | POSVSize4 | POSVSize5 | Equality test (Size1 to Size5) |
|---|---|---|---|---|---|---|---|
| **Singapore (1.22)** | 0.172** (0.055) | 1.762** (0.274) | 1.145** (0.251) | -1.722** (0.244) | 1.250** (0.235) | 0.933** (0.241) | 2.280 (0.058) |
| **Malaysia (2.3)** | 0.802** (0.055) | 1.565** (0.247) | 0.982** (0.239) | 0.309** (0.233) | 0.020** (0.231) | -0.566 (0.225) | 12.970 (0.000) |
| **Philippines (13)** | 0.901** (0.139) | 1.881** (0.838) | 1.709** (0.797) | 1.258* (0.713) | 0.834 (0.663) | -0.837 (0.579) | 2.820 (0.023) |
| **Thailand (15)** | 1.209** (0.065) | 1.403** (0.324) | 1.311** (0.306) | 0.707** (0.291) | 0.826** (0.288) | -0.438** (0.276) | 6.470 (0.000) |
| **Hong-Kong (22.15)** | 0.278** (0.050) | 2.108** (0.269) | 1.047** (0.238) | 1.164** (0.225) | 1.223** (0.214) | 1.322** (0.206) | 2.660 (0.031) |
| **China (35)** | 0.242** (0.035) | 2.886** (0.147) | 2.091** (0.145) | 1.957** (0.144) | 1.795** (0.145) | 1.080** (0.145) | 19.650 (0.000) |
| **Korea (37)** | 1.015** (0.042) | 2.462** (0.184) | 1.589** (0.178) | 0.898** (0.178) | 0.277 (0.177) | 0.332* (0.177) | 06.040 (0.000) |

Note: The closing stock prices on Wednesdays are taken to generate the weekly stock return, Ret. $\lambda_i$ is the intercept used to capture the fixed-effect for firm *i*; $\nu_t$ is the annual dummies which is employed to control for particular yearly trends; Jan is assigned to be one when the time is in January and zero otherwise; POSVSizej, j=1,…,5 are equal to one when time is in the week succeeding the school vacation. For the school vacation in Philippines and the first school vacation in Thailand, the dummies of POVSizej, j=1,…,5 are set to one when the time is in the second week succeeding school vacation for the size-based quintiles since post-School's-Out effect takes place at that time for these two school vacations; This test does not include the school vacation in Indonesia, Taiwan and Japan since there is no strong post-SO effect in these markets. Standard errors are given in the parentheses. For the equality test, we report the F statistics and P value in the parentheses. * Indicate significance at 10% levels; ** Indicate significance at 5% levels.

**Table 6. SO Seasonality Effect vs. Information flows** ($VR_{i,t} = \beta * SV_{i,t} + \eta_i + \theta_t \nu_t + \varepsilon_{i,t}$)

| Country | SV |
|---|---|
| **Singapore (1.22)** | -0.006 (0.026) |
| **Malaysia (2.3)** | 0.067** (0.012) |
| **Philippines (13)** | 0.104** (0.023) |
| **Thailand (15)** | 0.521** (0.030) |
| **Hong-Kong (22.15)** | -0.141** (0.021) |
| **Taiwan (23.3)** | -0.035** (0.006) |
| **China (35)** | -0.414** (0.017) |
| **Japan (36)** | -0.191** (0 .007) |
| **Korea (37)** | -0.128** (0.010) |

Note: Both the daily open and closing stock prices are taken from Datastream to obtain the daily Open-to-Close return ($R_{otc}$) and Close-to-Open return ($R_{cto}$). Consequently, the variance ratio in a given week, VR, is generated by dividing the weekly variance of $R_{otc}$ by the weekly variance of $R_{cto}$; $\lambda_i$ is the intercept used to capture the fixed-effect for firm *i*; $\nu_t$ is the annual dummies which is employed to control for particular yearly trends; SV is the school vacation dummy variable which is set to be unity when the time is during the school vacation for the country and zero otherwise; This test does not include the school vacation in Indonesia, China, the first school vacation in Singapore and the second school vacation in Thailand since there is no strong school vacation effect in these vacations. Standard errors are given in the parentheses. * Indicate significance at 10% levels; ** Indicate significance at 5% levels.

**Table 7. The Gone Fishin' Effect in Stock Returns, Share Turnover and Return Volatility (1)**

| Country | Share Turnover $\log st_{i,t} = \beta * Summer_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t}$ | Return Valatility $LogVolatilities_{i,t} = \beta * Summer_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t}$ | Stock Return $Ret_{i,t} = \beta_1 * Summer_{i,t} + \beta_2 * Jan_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t}$ | |
|---|---|---|---|---|
| | **Summer** | **Summer** | **Summer** | **Jan** |
| **Indonesia (-5)** | 0.103** (0.011) | 0.001 (0.006) | 0.003** (0.001) | 0.006** (0.002) |
| **Singapore (1.22)** | 0.011** (0.005) | 0.003 (0.003) | -0.007** (0.000) | 0.003** (0.001) |
| **Malaysia (2.3)** | -0.049** (0.004) | -0.005* (0.003) | 0.000 (0.000) | 0.009** (0.001) |
| **Philippines (13)** | -0.055** (0.011) | -0.027** (0.007) | -0.007** (0.001) | 0.007** (0.001) |
| **Thailand (15)** | 0.013** (0.006) | -0.013** (0.004) | -0.001 (0.000) | 0.012** (0.001) |
| **Hong-Kong (22.15)** | -0.044** (0.005) | -0.017** (0.003) | -0.003** (0.000) | 0.002** (0.000) |
| **Taiwan (23.3)** | -0.273** (0.004) | -0.010** (0.002) | -0.009** (0.000) | 0.015** (0.000) |
| **China (35)** | -0.146** (0.003) | -0.059** (0.002) | -0.002** (0.000) | 0.001** (0.000) |
| **Japan (36)** | -0.055** (0.002) | -0.041** (0.001) | -0.005** (0.000) | 0.008** (0.000) |
| **Korea (37)** | -0.192** (0.003) | -0.052** (0.002) | -0.005** (0.000) | 0.009** (0.000) |
| **Average** | **-0.069** | **-0.022** | **-0.004** | **0.007** |

The closing stock prices on Wednesdays are taken to generate the weekly stock return, Ret. The daily share turnover is defined as trading shares divided by number of shares in issue. The weekly average share turnover, st, is calculated for a given week to avoid the different number of trading days in a week caused by the public holidays. The weekly return volatility is the standard deviation of the daily stock returns in a given week generated by the daily closing stock price; $\lambda_i$ is the intercept used to capture the fixed-effect for firm $i$; $\nu_t$ is the annual dummies which is employed to control for particular yearly trends; Summer is a seasonal dummy variable which is set to be unity when the time is in the summer and zero otherwise; standard errors are given in the parentheses. * Indicate significance at 10% levels; ** Indicate significance at 5% levels.

**Table 8. The Gone Fishin' Effect in Stock Returns, Share Turnover and Return Volatility (2)**

| Country | Share Turnover $\log st_{i,t} = \beta_1 * Spring_{i,t} + \beta_2 * Fall_{i,t} + \beta_3 * Winter_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t}$ | | | Return Volatility $\log Vol_{i,t} = \beta_1 * Spring_{i,t} + \beta_2 * Fall_{i,t} + \beta_3 * Winter_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t}$ | | | Stock Return $Ret_{i,t} = \beta_1 * Spring_{i,t} + \beta_2 * Fall_{i,t} + \beta_3 * Winter_{i,t} + \beta_4 * Jan_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t}$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Spring** | **Fall** | **Winter** | **Spring** | **Fall** | **Winter** | **Spring** | **Fall** | **Winter** | **January** |
| **Indonesia** | -0.267** | 0.072** | -0.147** | 0.022** | 0.004 | -0.029** | -0.004** | 0.005** | -0.012** | 0.006** |
| **(-5)** | (0.013) | (0.013) | (0.013) | (0.008) | (0.008) | (0.008) | (0.001) | (0.001) | (0.001) | (0.002) |
| **Singapore** | 0.000 | -0.135** | 0.108** | -0.035** | 0.014** | 0.012** | 0.007** | 0.006** | 0.008** | 0.001** |
| **(1.22)** | (0.006) | (0.007) | (0.007) | (0.004) | (0.004) | (0.004) | (0.000) | (0.000) | (0.000) | (0.001) |
| **Malaysia** | 0.038** | -0.085** | 0.207** | -0.020** | -0.004** | 0.042** | -0.003** | -0.000 | 0.004** | 0.005** |
| **(2.3)** | (0.005) | (0.005) | (0.005) | (0.003) | (0.003) | (0.003) | (0.000) | (0.000) | (0.000) | (0.001) |
| **Philippines** | 0.050** | -0.008 | 0.124** | 0.004 | 0.020** | 0.057** | 0.004** | 0.005** | 0.013** | 0.001 |
| **(13)** | (0.014) | (0.014) | (0.014) | (0.008) | (0.008) | (0.008) | (0.001) | (0.001) | (0.001) | (0.002) |
| **Thailand** | -0.008 | -0.143** | 0.119** | -0.014** | -0.000 | 0.053** | 0.001 | 0.001 | 0.000 | 0.012** |
| **(15)** | (0.008) | (0.008) | (0.008) | (0.005) | (0.005) | (0.005) | (0.001) | (0.001) | (0.001) | (0.001) |
| **Hong-Kong** | 0.093** | -0.046** | 0.093** | 0.003 | -0.000 | 0.052** | 0.002** | 0.002** | 0.007** | -0.002** |
| **(22.15)** | (0.006) | (0.006) | (0.006) | (0.003) | (0.003) | (0.003) | (0.000) | (0.000) | (0.000) | (0.001) |
| **Taiwan** | 0.339** | 0.002 | 0.522** | 0.032** | -0.051** | 0.058** | 0.002** | 0.010** | 0.017** | 0.007** |
| **(23.3)** | (0.005) | (0.005) | (0.005) | (0.003) | (0.003) | (0.003) | (0.000) | (0.000) | (0.000) | (0.000) |
| **China** | 0.387** | -0.105** | 0.183** | 0.154** | -0.012** | 0.063** | 0.006** | -0.003** | 0.006** | -0.003** |
| **(35)** | (0.004) | (0.004) | (0.004) | (0.002) | (0.002) | (0.002) | (0.000) | (0.000) | (0.000) | (0.000) |
| **Japan** | 0.083** | 0.006** | 0.078** | 0.030** | 0.037** | 0.056** | 0.007** | -0.000* | 0.008** | 0.005** |
| **(36)** | (0.002) | (0.002) | (0.002) | (0.001) | (0.001) | (0.001) | (0.000) | (0.000) | (0.000) | (0.000) |
| **Korea** | 0.146** | 0.175** | 0.258** | 0.023** | 0.049** | 0.086** | 0.002** | 0.006** | 0.006** | 0.007** |
| **(37)** | (0.004) | (0.004) | (0.004) | (0.002) | (0.002) | (0.002) | (0.000) | (0.000) | (0.000) | (0.000) |

Note: The closing stock prices on Wednesdays are taken to generate the weekly stock return, Ret. The daily share turnover is defined as trading shares divided by number of shares in issue. The weekly average share turnover, st, is calculated for a given week to avoid the different number of trading days in a week caused by the public holidays. The weekly return volatility is the standard deviation of the daily stock returns in a given week generated by the daily closing stock price; $\lambda_i$ is the intercept used to capture the fixed-effect for firm *i*; $v_t$ is the annual dummies which is employed to control for particular yearly trends; Spring, Fall and Winter are seasonal dummy variables which are set to be unity when the time is in the spring, all and winter respectively and zero otherwise; standard errors are given in the parentheses. * Indicate significance at 10% levels; ** Indicate significance at 5% levels.