



Contents lists available at ScienceDirect

The Quarterly Review of Economics and Finance

journal homepage: www.elsevier.com/locate/qref



Chinese Lunar New Year effect in Asian stock markets, 1999–2012

Tian Yuan*, Rakesh Gupta

Department of Accounting, Finance and Economics, Griffith University, Australia

ARTICLE INFO

Article history:

Received 15 May 2013
Received in revised form 2 May 2014
Accepted 4 June 2014
Available online xxx

JEL classification:

G14
G15

Keywords:

Asian stock markets
Holiday effect
ARMA(1,1)-GARCH (1,1)
Efficiency market hypothesis (EMH)

ABSTRACT

This study investigates the Chinese Lunar New Year (CLNY) holiday effect in major Asian stock markets. These are China, Hong Kong, Japan, Malaysia, South Korea and Taiwan. For robustness test, India is also examined in this paper. Daily stock index returns for each market are analysed for the period of 01/09/1999 to 28/03/2012. Using an ARMA(1,1)-GARCH (1,1) model, we find that there is a significantly positive pre-CLNY holiday effect for all cases. The findings are robust for most cases with the exception of China. It is found that high pre-CLNY returns for China are rewards for high risk, whereas for the other markets, high returns are caused by unknown factors, other than the conditional risk.

© 2014 The Board of Trustees of the University of Illinois. Published by Elsevier B.V. All rights reserved.

1. Introduction

The holiday effect is a well-documented calendar effect in stock markets. It refers to the empirical finding that stock returns on the days preceding holidays tend to be abnormally higher than those for other trading days. The existence of a holiday effect has important theoretical implications. According to the weak-form efficient market hypothesis (EMH), changes in stock prices ought to be unpredictable based on their past values (Fama, 1970). As such, the seasonal pattern of higher returns on trading days prior to holidays seems to challenge the weak-form EMH. Meanwhile, it is also important for investors to understand the stock return behaviour around holiday periods. If the holiday effect exists, it suggests that investors may be able to capture superior returns by taking active trading strategies based on this effect. Compared with other seasonal effects in stock markets, such as the January effect and the day-of-the-week effect, the holiday effect is the least explored seasonal effect (Mitchell & Ong, 2006). Given the theoretical and practical significance of the holiday effect, this paper aims to resolve this issue.

The presence of abnormally high returns on pre-holiday has attracted the attention of academia. Numerous empirical studies

have been conducted, seeking to understand stock returns around holidays. The early literature has extensively examined the pre-holiday effect in the U.S. stock market. For instance, using daily stock returns on the Dow Jones Industrial Average (DJIA) over a 90-year period of 1897–1965, Lakonishok and Smidt (1988) find that the average returns on pre-holidays are about 23 times higher than those for other trading days and they account for 52% of the DJIA annual returns. Similarly, Pettengill (1989) documents that stock returns earned on pre-holidays are unusually high regardless of the weekday, year or holiday closing. He interprets the finding as evidence against market efficiency. Ariel (1990) confirms that the average pre-holiday returns are nine to fourteen times the mean returns for other trading days and account for over one third of the total market returns. His findings support the presence of a pre-holiday effect in the U.S. stock market.

The empirical evidence in recent years seems to suggest that this effect has diminished over time. For example, Vergin and McGinnis (1999) re-examine the pre-holiday effect over a ten-year period from 1987 to 1996. They find that excess pre-holiday returns have disappeared for large companies and have substantially diminished for small firms. Keef and Roush (2005) investigate the pre-holiday effect over a 70-year period from 1930 to 1999. They report that the pre-holiday effect was strong up to the 1987 period, but greatly diminished after 1987. Despite that there is a diminishing trend in this effect in the US market, subsequent studies have documented the holiday effect in other international markets, such as Australia, Hong Kong, Japan, Italy and the UK, etc. (see Barone (1990), Cadsby

* Corresponding author. Tel.: +61 737 354 365.
E-mail addresses: t.yuan@griffith.edu.au (T. Yuan),
r.gupta@griffith.edu.au (R. Gupta).

and Ratner (1992), Kim and Park (1994), Agrawal and Tandon (1994), Meneu and Pardo (2004), Chong, Hudson, Keasey, and Little (2005), and Marrett and Worthington (2009)). The overall evidence suggests that the pre-holiday effect is a well-documented anomaly in global markets.

Unlike prior literature, this paper focuses on the holiday effect in Asian stock markets. Asian countries have enjoyed tremendous economic growth during the last three decades. According to the Asian Development Bank (ADB)'s 2010 report, 'Economic Growth in Asia: Determinants and Prospects', developing Asia's real GDP in purchasing power parity (PPP) terms has increased from \$3.3 trillion in 1980 to \$24.5 trillion in 2009.¹ It is the first region to emerge from the global economic crisis of 2008/2009 (ibid). IMF's 'Regional Economic Outlook 2012' suggests that for Asia as a whole, real GDP growth averaged 5.5% in the first half of 2012, which is well above the global average. Given the significant economic performance of Asia, an increasing number of global investors seeking higher returns and international exposure have taken an interest in investing in Asian equity markets. This study will therefore be of great interest to these investors by providing a better understanding of stock return patterns in these markets.

Specifically, this paper will seek to identify whether there is a Chinese Lunar New Year (hereafter, CLNY) holiday effect in seven major Asian markets, including China, Hong Kong, Japan, Malaysia, Singapore, South Korea and Taiwan.² These nations are either historically influenced by Chinese culture or have a relatively large proportion of Chinese population.³ Lunar New Year is the most important traditional festival in China. It is different from the common concept of the turn-of-the-year (around December to January) in that CLNY falls on different dates each year.⁴ It also has a great cultural influence on most countries in Eastern Asia. Significant impacts of such a cultural-based holiday on stock markets may imply that cultural factor does matter for stock pricing. This is not only important for investors seeking excess returns and risk exposure in these emerging stock markets in Asian region, but also for academic researchers in terms of the weak-form EMH. For robustness, this study will also examine this effect for Indian stock market.⁵ Since the overall population of India is dominated by Hindu religion, which may not be affected by Chinese culture, one would expect that the magnitude of the CLNY effect is relatively small.

Research into the CLNY holiday effect in Asian stock markets is relatively scarce. There are only a handful of studies that look at the impact of the CLNY holiday on stock returns. Wong et al.

(1990) perhaps is the earliest research on the CLNY holiday effect in stock returns. The study test the relevance in four Asian stock markets, including Malaysia, Singapore, Hong Kong, the UK and US stock markets from 1970 to 1985. Using the OLS method, they find that Malaysia, Singapore and Hong Kong exhibit a significant CLNY holiday effect, whereas no effect is found in the UK and US markets. They suggest that the effect may be peculiar to markets with a large population of Chinese. Similar findings are further documented by Yen and Shyy (1993), Chan, Khanthavit, and Thomas (1996), Ahmad and Hussain (2001), McGuinness (2005), and Cao, Harris, and Wang (2007).

More specifically, six markets are examined by Yen and Shyy (1993), including Hong Kong, Japan, Malaysia, Singapore, South Korea, and Taiwan. They document that there are excess returns prior to the Chinese Lunar New Year for all cases. Chan et al. (1996) examine seasonalities in four Asian markets, namely India, Malaysia, Singapore, and Thailand over a general sample period of 1969–1992. Their findings are consistent with those of Wong et al. (1990) that there is a significant CLNY holiday effect in Malaysia and Singapore. A more recent study of Ahmad and Hussain (2001) analyse KLSE stock returns during 1986–96 for evidence of long run market overreaction. The authors provide evidence of an apparent Chinese New Year effect in the profiles of stock returns and overreaction. Using daily stock return on the Hang Seng Index over, first, the period 1 March 1995 to 28 February 2005 and then over an extended 1975–2005 time-frame, McGuinness (2005) find a persistent and robust pre-CLNY effect in Hong Kong. Using the OLS regression method, Cao et al. (2007) tested four holidays separately, including the Chinese Lunar New Year, Labour Day, National Day, and New Year's Day in Chinese stock markets over the period of 1994–2006. Their results show a statistically and economically significant Chinese Lunar New Year effect, whereas returns around the other three holidays show minimal seasonal behaviour.

For instance, Wong et al. (1990) test the CLNY holiday effect in Malaysia, Singapore, Hong Kong, the UK and US stock markets from 1970 to 1985. Using the OLS method, they find that Malaysia, Singapore and Hong Kong exhibit a significant CLNY holiday effect, whereas no effect is found in the UK and US markets. They suggest that the effect may be peculiar to markets with a large population of Chinese. Yen and Shyy (1993) test the CLNY holiday effect across more markets, including Hong Kong, Japan, Malaysia, Singapore, South Korea, and Taiwan. They document that there are excess returns prior to the Chinese Lunar New Year for all cases. Chan et al. (1996) examine seasonalities in four Asian markets, namely India, Malaysia, Singapore, and Thailand over a general sample period of 1969–1992. Similar to Wong et al. (1990), they also find evidence that there is a significant CLNY holiday effect in Malaysia and Singapore. A more recent study by Cao, Harris, and Wang (2007) tested four holidays separately, including the Chinese Lunar New Year, Labour Day, National Day, and New Year's Day in Chinese stock markets over the period of 1994–2006. Their results from the OLS regression show a statistically and economically significant Chinese Lunar New Year effect, whereas returns around the other three holidays show minimal seasonal behaviour.

As discussed above, previous literature generally uses the OLS method. This paper distinguishes itself by using an ARMA(1,1)-GARCH (1,1) model, with a more recent sample from 01/09/1999 to 28/03/2012. The ARMA-GARCH type model appears to be better than the OLS regression for testing seasonalities. The OLS method does require strict assumptions of data properties. Specifically, it requires that the error terms of the stock returns are normally distributed, serially uncorrelated, and homoskedastic. These properties may not hold in reality. As such, the use of the OLS regression may lead to unreliable findings. ARMA-GARCH is capable of dealing with autocorrelation and time-varying variance in the data.

¹ According to Asian Development Bank (ADB), developing Asia includes 12 economies. These are China, Hong Kong, India, Indonesia, South Korea, Malaysia, Pakistan, the Philippines, Singapore, Taiwan, Thailand and Vietnam.

² The Chinese comprise significant ethnic minority group in most Southeast Asian countries. For instance, Chinese people account for 76.8% of the population in Singapore, 23.7% in Malaysia, 14% in Thailand, 11.2% in Brunei, 3.0% in Burma and Indonesia, 2.8% in Laos, 1.4% in Vietnam, 1.3% in the Philippines, and 1.0% in Cambodia. The two exceptions are Japan and South Korea, which perhaps are the most ethnically homogeneous nations. (Statistics sources: *The CIA World Factbook; World Population Review, 2013*). Yet, these two nations have long been influenced by Chinese culture.

³ Other Asian countries are excluded because of small market size and cultural differences, such as Vietnam and Pakistan.

⁴ The turn-of-the-year effect or January effect is another well-documented seasonal effect in stock markets (see Keim, 1983; Roll, 1983; Ritter, 1988; Lakonishok, Shleifer, Thaler, & Vishny 1991). It refers to the tendency for the size premium to be significantly larger in January than in other months. It will be interesting to be able to model the link of January effect and CLNY effect and see what proportion of the CLNY excess returns are because of spill over effect of the January effect. However, data period and number of observations pose a significant modelling issue to be able to carry out such analysis.

⁵ We thank anonymous reviewer for the suggestion to include India.

For these reasons, our study uses the ARMA-GARCH model. Furthermore, we seek to provide a better understanding of the CLNY holiday effect by adopting an ARMA-GARCH-M type model. We test whether high returns are associated with the conditional risk. In this paper, three days prior to and after the Chinese Lunar New Year are used to capture the CLNY holiday effect.⁶

This study contributes to the existing literature by not only identifying the existence of the holiday effect but also seeking to explain the anomaly in the stock markets. The findings have significant implications for the weak-form efficient market hypothesis. Meanwhile, they are of strong interest to international investors as well. More specifically, our findings suggest that there is a significant pre-CLNY holiday effect for all cases. Of the seven stock markets, South Korea has the most significant effect. In addition to the pre-CLNY holiday effect, Malaysia also shows a significant post-CLNY holiday effect in stock returns, which is more profound than its pre-CLNY holiday effect. Results from the ARMA-GARCH-M model suggest that the pre-CLNY holiday effect in stock returns remains significant for all cases except that of China. In the case of China, high stock returns are rewards for high risk, whereas high stock returns for the other six markets, in particular, Hong Kong and Singapore, are abnormal returns which are caused purely by the CLNY dummy. Both Japan and South Korea show a significantly negative pre-CLNY holiday effect in the conditional risk. However, stock return changes for these two markets do not reflect changes in the risk premium, but in the Chinese Lunar New Year holiday dummy. Finally, in the case of Taiwan, high stock returns are positively related to the pre-CLNY dummy and are negatively related to the conditional risk. The robustness test suggests that Indian stock market does not have CLNY effect. This may be because India is neither historically affected by Chinese culture nor has a large proportion of Chinese in the total population.

The rest of this study is structured as follows. Section 2 presents data while Section 3 introduces the econometric model used in this study. Results are discussed in Section 4. Finally, Section 5 concludes.

2. Data

In an effort to study the stock return behaviour around the time of the Chinese Lunar New Year, the daily closing prices for seven Asian stock market indexes were obtained from *Datastream*. These indexes are China Shanghai Composite Index (China), Hang Seng Index (Hong Kong), NIKKEI 225 (Japan), Straits Times Index (Singapore), KOSPI Composite Index (South Korea), FTSE Bursa Malaysia KLCI (Malaysia), and TSEC Weighted Index (Taiwan). For robustness purpose, the market index of CNX Nifty is obtained for India. The stock market returns are calculated as the natural logarithm of the closing price relative to consecutive closing price.⁷ For consistency, the data series used in this study were collected for the period from 01/09/1999 to 28/03/2012. During this period, market condition for these markets is expected to significantly improve after the 1997 Asian crisis.

To ensure that the selected data are usable, we first performed two forms of the Augmented Dickey–Fuller (ADF) test (Dickey & Fuller, 1979) for the seven return series, namely the test with intercept and no trend and the test with intercept and trend. The results were reported in Table 1. The ADF test statistics and the corresponding *p*-values suggest that the null hypothesis of a unit root

⁶ The stock returns for three trading days before and after the Chinese Lunar New Year are compared to other trading day returns (excluding the three-day pre- and post-CLNY holiday periods).

⁷ $R_t = \ln(P_t/P_{t-1}) * 100$.

Table 1
Unit root test.

Series	ADF T-stat (with intercept)	ADF T-stat (with intercept and trend)
China	−54.695*** (0.000)***	−54.686*** (0.000)***
Hong Kong	−56.369*** (0.000)***	−56.361*** (0.000)***
India	−14.837*** (0.000)***	−14.835*** (0.000)***
Japan	−44.519*** (0.000)***	−44.530*** (0.000)***
Malaysia	−48.155*** (0.000)***	−48.161*** (0.000)***
Singapore	−54.361*** (0.000)***	−54.233*** (0.000)***
South Korea	−53.4182*** (0.000)***	−53.368*** (0.000)***
Taiwan	−52.915*** (0.000)***	−52.920*** (0.000)***

This table provides the results of two forms of ADF tests for seven stock indices used in this study. The two forms of ADF test are the test with intercept and no trend and the test with intercept and trend. Both of the ADF test statistics and the corresponding *p*-values are reported for the eight indices. The optimal lag lengths for the ADF test is determined by using the AIC criteria. The critical values for the ADF *t*-statistics are −3.43, −2.86, and −2.56 on models without trend, and −3.96, −3.41 and −3.13 on models with trend for the 1%, 5% and 10% levels of statistical significance, respectively. The null hypothesis of a unit root (non-stationary) can be rejected if the ADF test statistic is less than the critical value at the chosen level of significance. * represents the rejection of the null hypothesis at 10% significance level. ** represents the rejection of the null hypothesis at 5% significance level. *** represents the rejection of the null hypothesis at 1% significance level. Values in parentheses are *p*-values.

can be rejected at the 1% significance level for all cases. Alternatively speaking, all return series used in this paper are stationary. Therefore, the transformation of data is not needed.

Table 2 summarises the descriptive statistics for the daily returns for these Asian stock market indexes. As can be seen in Table 2, with the exception of Japan, all the other markets register positive mean returns during the sample period. Of these markets, the highest mean returns (0.035%) are reported in India, followed by Malaysia (0.030%). Japan has the lowest mean returns (−0.008%) during the sample period. The standard deviation is found to be the highest in South Korea (2.189%), and it is the lowest for Malaysia (1.040%). The skewness of the daily returns for all cases is negative, suggesting that there is a greater probability of decreases in the returns than increases. The kurtosis of the daily returns for the seven markets is greater than three, which indicates a fat-tailed distribution. The Jarque–Bera test is a formal test for normality. Under the null of normal distribution, the Jarque–Bera statistic has an asymptotic chi-square distribution with two degrees of freedom, while the skewness should equal zero and kurtosis should equal 3. It can be seen that the *p*-value for the Jarque–Bera statistic is smaller than the 1% level of statistical significance for all cases. This suggests that the null hypothesis of normality can be rejected for all daily return series used in this paper. Therefore, none of these return series are well approximated by the normal distribution, violating the normality assumption required for the classical linear regression model. Additionally, the presence of autocorrelation is found in China, India Japan, Malaysia, Singapore and Taiwan. This is confirmed by the significant Ljung–Box statistics on the daily return series for the respective market. The discovery of serial correlation in these return series suggests that the current stock return is dependent on its past value. Moreover, the results of the ARCH-LM tests suggest that the assumption of constant variance (homoskedasticity) can be rejected for all cases; heteroskedasticity is present in all of the return series.

Table 2
 Descriptive statistics.

Series	Number of observations	Mean (%)	Std. Dev. (%)	Skewness	Kurtosis	Jarque–Bera	Q(20)	LM test statistics
China	3039	0.020	1.662	−0.058	6.907	1934.385*** (0.000)***	41.020*** (0.004)***	49.889*** (0.000)***
Hong Kong	3125	0.015	1.651	−0.057	10.154	6665.219*** (0.000)***	28.089 (0.107)	392.947*** (0.000)***
India	3281	0.035	1.800	−0.123	10.936	8617.499*** (0.000)***	90.308*** (0.000)***	16.578*** (0.000)***
Japan	3260	−0.008	1.585	−0.228	7.297	2535.897*** (0.000)***	38.193*** (0.008)***	90.049*** (0.000)***
Malaysia	3122	0.030	1.040	−0.626	10.135	6826.309*** (0.000)***	87.567*** (0.000)***	32.929*** (0.000)***
Singapore	3156	0.019	1.428	−0.245	6.976	2110.205*** (0.000)***	40.702*** (0.004)***	118.071*** (0.000)***
South Korea	3182	0.025	2.189	−0.333	13.124	14,032.74*** (0.000)***	18.456 (0.557)	20.271*** (0.000)***
Taiwan	3127	0.003	1.661	−0.170	5.338	727.622*** (0.000)***	49.847*** (0.000)***	30.385*** (0.000)***

This table provides descriptive statistics for daily returns on seven stock indices used in this study. Mean, Standard deviation, Skewness and Kurtosis are reported for each of the return series. Jarque–Bera statistics are used to test the null hypothesis of normal distribution. Q(20) denotes the Ljung–Box statistics for twentieth-order serial correlation of the returns. Under the null hypothesis of serial independence, the Ljung–Box statistic follows the chi-squared distribution with 20 degrees of freedom. Obs*R-squared denotes the ARCH-LM test statistics. Under the null hypothesis of no heteroskedasticity, the ARCH-LM test statistics (Obs.*R-squared) follows the chi-squared distribution up to q-th order, $\chi^2(q)$. * represents the rejection of the null hypothesis at 10% significance level. ** represents the rejection of the null hypothesis at 5% significance level. *** represents the rejection of the null hypothesis at 1% significance level. Values in parentheses are p-values.

3. Methodology

Most previous studies in this field employ the ordinary least squared (OLS) regression to study the daily stock return around holiday periods. The OLS model can be specified as below:

$$R_t = c + \lambda_{holiday} D_{holiday} + \varepsilon_t \tag{1}$$

where R_t are the daily market returns at time t . c is an intercept term and $D_{holiday}$ represents the dummy variable that takes a value of one if returns are on n (i.e., $n = 1, 2, 3, \dots$) days before holidays.⁸ Finally, ε_t is the error term, which is assumed to be a white-noise process. The results from the OLS regression are easy to understand and interpret. If the coefficient for the dummy is found to be significantly positive, it suggests that stock returns before the holiday are significantly higher than those on other trading days. This confirms a pre-holiday effect in the stock market.

However, Chien, Lee, and Wang (2002) argue that the OLS method may not be appropriate for testing the seasonality in stock markets for its empirically invalid assumptions. For example, it requires that the error terms of the data used must be normally distributed, homoskedastic (having constant variance), and serially uncorrelated. As such, the use of the OLS regression in previous work may have led to unreliable findings.

As discussed previously, the daily return data used in this paper do not have the properties required by the OLS approach. It is found that most of these return series have problems of autocorrelation and time-varying variance. Based on these findings, this study does not rely on the OLS regression, yet employs a more sophisticated model without requiring distributional assumptions for residuals.

Specifically, this study uses the ARMA(1,1)-GARCH(1,1) model to examine the presence of the CLNY effect in seven selected Asian stock markets (the equity markets of China, Hong Kong, Japan, Malaysia, Singapore, South Korea and Taiwan). This model appears to be superior to the OLS regression by overcoming the major weaknesses of the OLS regression. Its ARMA portion can deal with the

autocorrelations in the data, while the GARCH component of the model can be used to capture the heteroskedasticity of data.⁹

The standard ARMA(1,1)-GARCH(1,1) model takes the following form:

$$R_t = c + \omega R_{t-1} + \varepsilon_t + \eta \varepsilon_{t-1} \tag{2}$$

where

$$\varepsilon_t^2 | \Omega_{t-1} \sim N(0, \sigma_t^2)$$

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 \tag{3}$$

In the Eq. (2), R_t represents the daily returns at time t , which depend on its past values (R_{t-1}), an error term (ε_t), and past shocks (ε_{t-1}). Ω_{t-1} is the information set variable at time $t-1$. The error term is not a white noise but a GARCH process. The Eq. (3) shows that the conditional variance σ_t^2 is modelled as a linear function of its own lagged one conditional variance (the GARCH term) and the last period's squared errors (the ARCH term); α_0 is the intercept term, while the estimated parameters are represented by α_1 and β_1 which capture the presence of heteroskedasticity in daily index return series.

To examine the Chinese Lunar New Year holiday effect in the stock market, the Eq. (2) can be further modified as follows.

$$R_t = c + \omega R_{t-1} + \varepsilon_t + \eta \varepsilon_{t-1} + \lambda_{pre} D_{pre} + \lambda_{post} D_{post} \tag{4}$$

where D_{pre} is the dummy variable that takes a value of one to represent three trading days before the Chinese Lunar New Year, and zero otherwise, while D_{post} is the dummy assigned a value one to represent three trading days after the Chinese Lunar New Year, and zero otherwise. The significance of the coefficients for the dummy variables suggests the presence of a pre- or/and post-Chinese Lunar New Year holiday effect in stock returns.

The GARCH-in-Mean (GARCH-M) model was proposed by Engle, Lilien, and Robins (1987). It expands the standard GARCH model

⁸ Previous literature generally uses one trading day before a holiday as a 'pre-holiday'.

⁹ The standard GARCH (1,1) model introduced by Bollerslev (1986) specifies the mean and conditional variance equation as follows: Mean equation $R_t = \alpha X + \varepsilon_t$. Variance equation $\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2$.

by including the conditional risk in the mean equation. The GARCH(1,1)-M model takes the following term.

$$R_t = c + \rho\sigma_t + \alpha X_t + \varepsilon_t. \quad (5)$$

where

$$\varepsilon_t^2 \mid \Omega_{t-1} \sim N(0, \sigma_t^2)$$

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 \quad (6)$$

In the mean Eq. (5), R_t represents the daily index returns at time t ; c is a constant term, while X_t is an explanatory variable; σ_t is the standard deviation of the conditional variance which represents market risk. The significance of the estimated coefficient ρ suggests the influence of conditional volatility on stock returns.

Using the adapted ARMA(p,q)-GARCH(1,1)-M model, we explore whether the conditional risk is accountable for the high returns around the time of the Chinese Lunar New Year in these Asian stock markets. Following the previous study by Hsieh (1988), this paper examines the CLNY holiday effect in both the stock returns and volatilities simultaneously by introducing the dummy variable in both the mean and variance equations. The adapted ARMA(1,1)-GARCH(1,1)-M model is specified as follows:

$$R_t = c + \omega R_{t-1} + \gamma D + \rho\sigma_t + \varepsilon_t + \eta\varepsilon_{t-1}. \quad (7)$$

where

$$\varepsilon_t^2 \mid \Omega_{t-1} \sim N(0, \sigma_t^2)$$

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 + \theta D \quad (8)$$

The mean Eq. (7) is similar to the Eq. (3) except the standard deviation σ_t representing the market risk. The coefficient ρ is the price of market risk. D is the dummy variable that takes a value of one to represent three days before the Chinese New Year, and zero otherwise.¹⁰ The significance of the coefficient for the dummy variable suggests the presence of the effect in stock returns; ε_t is an error term.

The Eq. (8) shows that the conditional variance is modelled by a constant term, the ARCH and GARCH terms, and the dummy variable. The estimated coefficient of the dummy variable is represented by θ . Similarly, the significance of the coefficient for the dummy variables suggests that there is a significant pre-(or/and post-) CLNY holiday effect in stock return volatilities.

4. Results and discussion

4.1. The presence of the CLNY holiday effect

This study uses an ARMA(1,1)-GARCH(1,1) model to examine the presence of the CLNY holiday effect in the stock returns for seven Asian markets, including China, Hong Kong, Japan, Singapore, South Korea, Malaysia and Taiwan. As a robustness test, we also investigate this effect in Indian stock market. The results from the estimation of the ARMA(1,1)-GARCH(1,1) model are reported in Table 3. Panel A of Table 3 displays the estimates of the mean equation, which models the daily market returns as a general ARMA process incorporating the pre- and post CLNY dummy variables. Panel B presents the estimates of the conditional variance equation.

¹⁰ Based on our previous findings, all selected markets except Malaysia will be tested for pre-CLNY effects in stock returns and volatilities. Therefore, in Eqs. (7) and (8), only one dummy variable (D_{pre}) will be introduced in the two equations to test for a pre-CLNY effect. Since Malaysia has both pre- and post-CLNY effects, two dummies (D_{pre} and D_{post}) will be incorporated into the equations.

It shows that all estimates in panel B are positive and statistically significant, suggesting that the GARCH portion of the model fits the data well. Low AIC values also support goodness of fit of the models. Estimates in panel A suggest that there is a significant pre-CLNY in stock returns for all cases.

The estimated coefficient of the pre-CLNY dummy variables (λ_{pre}) is positive and statistically significant for all seven market return series.¹¹ In particular, of the seven stock markets, South Korea exhibits the most profound effect. The positive estimated coefficient (λ_{pre}) of 0.0068 suggests that stock returns in South Korea are 0.68% higher on the three days before the Chinese Lunar New Year than returns on other trading days. It is interesting to note that even Japan has a significant CLNY holiday effect in the stock market. Japan has the second highest pre-CLNY incremental returns (0.49%), followed by Hong Kong (0.47%), China (0.42%), Taiwan (0.41%), Singapore (0.32%) and Malaysia (0.23%). The findings are consistent with the expectation that stock returns in Asian markets are affected by this most important traditional Chinese festival.

On the other hand, it is found that for most cases there is no evidence of the post-CLNY holiday effect. The estimated coefficient of the post-CLNY dummy (λ_{post}) is only statistically significant for Malaysia (0.28%) at the 5% level. As compared with the pre-CLNY holiday effect, the post-CLNY holiday effect seems to be more profound in Malaysia in terms of the significance level and the size of the estimated coefficients. To conclude, results suggest the pre-CLNY holiday effect is present in all these seven stock markets and a post-CLNY holiday effect is only found in Malaysia. This suggests that these seven stock markets tend to rise before the Chinese Lunar New Year.

Based on these findings, one may argue that high returns on days prior to the Chinese Lunar New Year may be associated with high risks, which does not necessarily suggest an anomaly in the stock market. To answer this question, this paper further investigates the sources of high pre-CLNY returns by using a GARCH-M based model.

4.2. Sources of the CLNY holiday effect

In Section 4.1, we discussed the findings from the ARMA(1,1)-GARCH(1,1) model. We documented that all the seven markets exhibit a significant pre-CLNY holiday effect in stock returns and among these markets only the Malaysian stock market shows a significant post-CLNY holiday effect. To better understand whether high stock returns on days before (or after) the Chinese Lunar New Year are anomalies or rewards of high volatilities, this study also use a ARMA (p,q)-GARCH(1,1)-in-Mean (where $p=0$ or 1 ; $q=0$ or 1) to re-examine the stock returns around the Chinese Lunar New Year.¹²

¹¹ In markets of Hong Kong, Japan and South Korea, the statistical significance allows to argue the presence of a CLNY effect strongly, whereas in markets of China, Malaysia, Singapore and Taiwan, the existence of this effect does not appear strong based on the statistical significance.

¹² To test the source of high returns around the time of the Chinese Lunar New Year, we modify the ARMA portion of the testing model based on previous findings. For example, in the case of Malaysia, there is no evidence of MA(1) in the data. Therefore, we exclude the MA(1) process in the mean equation, resulting in a ARMA(1,0)-GARCH(1,1)-M model. Finally, the testing models for China, Hong Kong, Japan and Singapore are ARMA(1,1)-GARCH(1,1)-M, the model for Malaysia is ARMA(1,0)-GARCH(1,1)-M, and those for South Korea and Taiwan are ARMA(0,0)-GARCH(1,1)-M (or GARCH(1,1)-M). The modification may help to improve the model performance for different cases. In this model, we also drop the post-CLNY dummy for countries without post-CLNY effect.

Table 3
 The CLNY holiday effect in Asian stock markets.

	China	Hong Kong	Japan	Malaysia	Singapore	South Korea	Taiwan	India
<i>Panel A: Mean equation</i>								
<i>c</i>	0.0003 (0.1355)	0.0005** (0.0126)**	0.0002 (0.3317)	0.0004*** (0.0041)***	0.0007*** (0.0076)***	0.0000 (0.9770)	0.0006** (0.0165)**	0.0011*** (0.0000)***
λ_{pre}	0.0042* (0.0995)*	0.0047*** (0.0102)***	0.0049** (0.0146)**	0.0023* (0.0818)*	0.0032* (0.0929)*	0.0068*** (0.0016)***	0.0041* (0.0661)*	0.0018 (0.5469)
λ_{post}	0.0016 (0.4426)	-0.0020 (0.2669)	0.0023 (0.2703)	0.0028** (0.0323)**	0.0006 (0.7192)	0.0012 (0.5503)	0.0028 (0.1222)	0.0026 (0.3583)
$\omega(AR(1))$	-0.8333*** (0.0000)***	-0.9585*** (0.0000)***	0.3358* (0.0655)*	0.2557* (0.0536)*	0.9737*** (0.0000)***	0.0338 (0.9234)	0.3419 (0.2927)	0.4779*** (0.0031)***
$\eta(MA(1))$	0.8506*** (0.0000)***	0.9641*** (0.0000)***	-0.4131** (0.0185)**	-0.1414 (0.3015)	-0.9693*** (0.0000)***	-0.0341 (0.9228)	-0.2991 (0.3662)	-0.4040** (0.0162)**
<i>Panel B: Variance equation</i>								
<i>c</i>	0.0000*** (0.0000)***	0.0000** (0.0152)**	0.0000*** (0.0001)***	0.0000*** (0.0002)***	0.0000*** (0.0004)***	0.0000*** (0.0066)***	0.0000*** (0.0052)***	0.0000*** (0.0000)***
$\alpha(ARCH)$	0.0774*** (0.0000)***	0.0614** (0.0000)**	0.0858*** (0.0000)***	0.1001*** (0.0000)***	0.0945*** (0.0000)***	0.0832*** (0.0000)***	0.0597*** (0.0000)***	0.1271*** (0.0000)***
$\beta(GARCH)$	0.9084*** (0.0000)***	0.9354*** (0.0000)***	0.8931*** (0.0000)***	0.8902*** (0.0000)***	0.8965*** (0.0000)***	0.9132*** (0.0000)***	0.9334*** (0.0000)***	0.8545*** (0.0000)***
<i>Goodness of fit statistics</i>								
AIC	-5.6192	-5.7471	-5.6649	-6.5887	-5.9322	-4.7942	-5.5835	-5.4663

Notes. This table presents results from the ARMA(1,1)-GARCH(1,1) model. Specifically the model is given as follows.

Mean equation $R_t = c + \omega R_{t-1} + \varepsilon_t + \eta \varepsilon_{t-1} + \lambda_{pre} D_{pre} + \lambda_{post} D_{post}$.

Variance equation $\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2$.

The variables of interest in this study are the two dummy variables in the mean equation, D_{pre} and D_{post} representing three days before and after Chinese Lunar New Year, respectively. The null hypothesis of no CLNY holiday effect in the stock market will be tested against the alternative hypothesis that there is a significant pre/post CLNY holiday effect in the stock market. If it is found that the coefficient for the dummy λ is significantly different from zero, then we will reject the null and conclude that the stock market exhibits a significant pre/post CLNY holiday effect. AIC test reports goodness-of-fit of the model, which favours smaller residual errors in the model. * represents the rejection of the null hypothesis at 10% significance level. ** represents the rejection of the null hypothesis at 5% significance level. *** represents the rejection of the null hypothesis at 1% significance level. Values in parentheses are *p*-values.

Table 4
 Sources of the CLNY holiday effect in Asian stock markets.

	China	Hong Kong	Japan	Malaysia	Singapore	South Korea	Taiwan
<i>Panel A: Mean equation</i>							
<i>c</i>		-0.0001 (0.8720)		0.0002 (0.6962)	0.0010* (0.0991)*		0.0019** (0.0133)**
γ_{pre}	0.0038 (0.1031)	0.0051*** (0.0064)***	0.0052*** (0.0019)***	0.0022* (0.0747)*	0.0033* (0.0597)*	0.0071*** (0.0000)***	0.0041** (0.0133)**
γ_{post}				0.0028** (0.0457)**			
ρ	0.4351*** (0.0047)***	0.0477 (0.3655)	0.0169 (0.2553)	0.0384 (0.4758)	-0.0276 (0.6246)	-2.25E-05 (0.9987)	-0.0954* (0.0899)*
$\omega(AR(1))$	-0.8272*** (0.0000)***	-0.8567*** (0.0000)***	0.3386* (0.0640)*	0.1157*** (0.0000)***	0.6784 (0.1545)		
$\eta(MA(1))$	0.8427*** (0.0000)***	0.8753*** (0.0000)***	-0.4156** (0.0181)**		-0.6662 (0.1689)		
<i>Panel B: Variance equation</i>							
<i>c</i>	0.0000*** (0.0006)***	0.0000*** (0.0002)***	0.0000*** (0.0000)***	0.0000*** (0.0002)***	0.0000*** (0.0003)***	0.0000*** (0.0002)***	0.0000*** (0.0095)***
$\alpha(ARCH)$	0.0785*** (0.0000)***	0.0678*** (0.0000)***	0.0859*** (0.0000)***	0.1004*** (0.0000)***	0.0945*** (0.0000)***	0.0799*** (0.0000)***	0.0589*** (0.0000)***
$\beta(GARCH)$	0.9104*** (0.0000)***	0.09278*** (0.0000)***	0.8914*** (0.0000)***	0.8896*** (0.0000)***	0.8967*** (0.0000)***	0.9151*** (0.0000)***	0.9344*** (0.0000)***
θ_{pre}	-2.07E-07 (0.9881)	-3.62E-06 (0.5289)	-1.59E-05* (0.0686)*	-2.36E-06 (0.7312)	-6.67E-06 (0.3421)	-5.93E-05*** (0.0000)***	
θ_{post}				4.96E-06 (0.5205)			
<i>Goodness of fit statistics</i>							
AIC	-5.6316	-5.7380	-5.6652	-6.5876	-5.9491	-5.2155	-5.5825

Notes. This table presents the estimated results from the ARMA(*p,q*)-GARCH(1,1)-M model (where *p* = 0 or 1; *q* = 0 or 1). Specifically, the ARMA(1,1)-GARCH(1,1)-M model is specified as follows.

Mean equation $R_t = c + \omega R_{t-1} + \gamma D + \rho \sigma_t + \varepsilon_t + \eta \varepsilon_{t-1}$.

Variance equation $\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 + \theta D$.

The coefficients for the dummy variables in both the mean and variance equations will be tested under the null hypothesis of no CLNY holiday effect. If it is found that the coefficient for the dummy in the mean equation is significantly different from zero even after controlling for market risk, then we will reject the null and conclude that high returns are due to the occurrence of the Chinese Lunar New Year. AIC test reports goodness-of-fit of the model, which favours smaller residual errors in the model. * represents the rejection of the null hypothesis at 10% significance level. ** represents the rejection of the null hypothesis at 5% significance level. *** represents the rejection of the null hypothesis at 1% significance level. Values in parentheses are *p*-values.

Results from the estimation of the modified ARMA(p,q)-GARCH(1,1)-M model are reported in Table 4.¹³ Panel A of the table displays the estimates of the mean equation, while panel B provides the estimates of the conditional variance equation. Our findings from the seven markets are mixed. The results for China suggest that after controlling for the conditional risk, the pre-CLNY holiday effect in stock returns became insignificant; there is no pre- or post-CLNY holiday effects in stock return volatilities. Specifically, the estimates in panel A show that the sign of the coefficient for the pre-CLNY dummy variable (λ_{pre}) is positive for China, suggesting that the average stock returns in China are higher on three days prior to the Chinese Lunar New Year. However, the estimated coefficients (λ_{pre}) is statistically insignificant. Additionally, the conditional risk coefficient (ρ) for China is significantly positive at 1% level in the case of China. This indicates that high stock returns before the Chinese Lunar New Year are associated with the high conditional risks in the Chinese stock market. Results in panel B shows that the coefficient for the pre-CLNY dummy variable is statistically insignificant, indicating that market risk in China is not affected by this traditional holiday.

For the other six stock markets, we found that the pre-CLNY holiday effect in stock returns remain statistically significant; South Korea exhibited the highest pre-CLNY returns during the sample period, which is in line with our prior findings. Only Malaysian stocks have a significant post-CLNY holiday effect in returns, which is more profound than its pre-CLNY holiday effect. These findings are consistent with the estimated results from the ARMA(1,1)-GARCH(1,1) models. It is worth noting that the conditional risk in the mean equation is statistically insignificant for Hong Kong, Japan, Malaysia, Singapore and South Korea, indicating that stock returns in these markets do not change via the risk premium but are purely explained by the Chinese Lunar New Year dummy. Yet for Taiwan, we found a significantly negative conditional risk in the mean equation, which suggests that high stock returns are associated with a decrease in risk premium. On the other hand, it is found that South Korea shows a significantly negative pre-CLNY dummy variable in the conditional variance equation. Although the size of the coefficient is minimal ($-5.93E-05$), the estimated coefficient for the dummy (θ_{pre}) is statistically significant at the 1% level. This suggests that the conditional risk in these two markets tend to be lower on days before the Chinese Lunar New Year.

The results show that the Chinese stock market does not have abnormal returns around the time of the Chinese Lunar New Year; high pre-CLNY returns in China can be attributed to an increase in the risk premium. Whereas for Hong Kong, Japan, Malaysia, Singapore and South Korea, high stock returns in these five markets cannot be explained by the conditional risk, but by the occurrence of the Chinese Lunar New Year. Specifically, Hong Kong and Singapore exhibit similar findings that there is a significant pre-CLNY holiday effect in stock returns, which cannot be explained by changes in the risk premium. For Japan and South Korea, not only are stock returns affected by the Chinese Lunar New Year, but also the conditional risks for these two markets are negatively related with the pre-CLNY dummy. However, this impact on the

conditional risk is not reflected in the changes in their stock returns; high pre-CLNY returns are caused purely by the pre-CLNY dummy in the mean equation. In the case of Malaysia, stock prices significantly increase around three days before and after the Chinese Lunar New Year; and there are more price rises after the festival. Finally the results for Taiwan suggest that there is a significant pre-CLNY holiday effect in stock returns; high stock returns can be attributed to both (negative) changes in risk premium and the pre-CLNY dummy.

To conclude, this section presented major findings of this paper. The objective of this study is to examine the impact of the Chinese Lunar New Year on stock returns in seven Asian stock markets. Daily data are collected from China, Hong Kong, Japan, Malaysia, Singapore, South Korea, and Taiwan over the period from 01/09/1999 to 28/03/2012. Using ARMA(1,1)-GARCH(1,1), we found that stocks returns before the Chinese Lunar New Year are significantly higher than those on other trading days for all cases. This suggests that there is a significant pre-CLNY holiday effect in these stock markets. The estimated results from the ARMA(p,q)-GARCH(1,1)-M model (where $p=0$ or 1 ; $q=0$ or 1) confirm the effect in most cases, with the exception of China. In the case of C China, it is found that the high pre-CLNY returns are not anomalies but rewards of the conditional risk. The observed pre-CLNY effect may sometimes be confused with the turn-of-the-month effect.¹⁴ However, the CLNY begins at different dates every year, which generally fall in a period from last week of January to first week of February. As such, a pre-CLNY effect is not consistent with turn-of-the-month effect, though we do recognise that some elements of the turn-of-the-month effect may influence the pre-CLNY effect. Nevertheless, distinguishing a holiday effect from the turn-of-the-month effect is out of the scope of this research.

To quantify the economic gains from timing the CLNY effect, this study selects three markets, including China, Hong Kong and Japan. The trading strategy is based on the CLNY holiday. Specifically, an initial wealth of USD \$100 is invested over an investment period of 1999–2012. We sell the stock market index one trading day before CLNY holiday and buy it back ten trading days after the CLNY holiday for each window period. The accumulated wealth in 2012 is compared to the end wealth of a 'buy-and-hold' strategy over the same investment period. A transaction cost of 1.5% is used on the basis of prior research to see if there still are benefits after considering transaction costs. The findings are consistent with the previous results from GARCH-type models. We found that compared with a 'buy-and-hold' strategy, timing the CLNY does provide incremental benefits in markets of Hong Kong (USD \$20) and Japan (USD \$1), but not China.

5. Conclusions

Seasonal patterns in stock markets have been well documented in the literature. A great deal of evidence shows that the stock returns can be predicted in terms of certain days, months or holidays of the year, which are termed as 'calendar effects'. The empirical findings of seasonalities in stock returns seems to challenge the classic financial theory of efficient market hypothesis (EMH) that stock price changes ought to be random. If any of these calendar effects exist in the market, investors may be able to obtain excess returns by adopting trading strategies based on these

¹³ The models used for testing the sources of high stock returns are modified according to our previous findings. Specifically, the testing models for China, Hong Kong, Japan and Singapore are ARMA(1,1)-GARCH(1,1)-M, the model for Malaysia is ARMA(1,0)-GARCH(1,1) and for South Korea and Taiwan the models are ARMA(0,0)-GARCH(1,1)-M (or GARCH(1,1)-M). Based on findings reported in Table 3, we test the pre-CLNY in the conditional risk for China, Hong Kong, Japan, Singapore, South Korea, and Taiwan. For Malaysia, since we found both pre-and post-CLNY effect in stock returns, we hence examined the pre-and post-CLNY effect in the variance equation for Malaysia. We found that for all models, the value of AIC is low, indicating that these models fit the data well.

¹⁴ Turn-of-the-month effect is another well-documented seasonal anomaly in the financial literature. Ariei (1990) has documented that positive returns occur only during the first half of calendar months, while the returns for the second half of the month are negative.

patterns. As such, studying the seasonal pattern of stock return behaviour is important to both theory and practice.

Compared with other seasonalities, such as the day-of-the-week and turn-of-the-year effects, the holiday effect has received limited attention. This paper extends the existing literature by focusing on the holiday effect in stock markets. Specifically, we analyse the impact of the most important Chinese traditional festival, that is, the Chinese Lunar New Year, on seven Asian stock markets. These are China, Hong Kong, Japan, Malaysia, Singapore, South Korea and Taiwan. Daily data are collected from these markets over the period of 01/09/1999 to 28/03/2012. In the context of remarkable economic development, Asian stock markets have attracted increasing attention. Our study is therefore important to international investors seeking exposure in these Asian markets.

Much prior research in this area has tested the holiday effect on stock returns using the OLS method. Yet, this approach requires that stock returns are normally distributed, which may be too strict to hold in reality. Unlike previous studies, this paper employs a ARMA(1,1)–GARCH(1,1) model to investigate the stock returns before and after the Chinese Lunar New Year. This model appears to be more appropriate than the OLS regression because of its capability to deal with the problems of autocorrelation and heteroskedasticity in real data. Furthermore, this study seeks to explain the high stock returns around the time of the Chinese Lunar New Year by using variations of ARMA(p,q)–GARCH(1,1)–M model. This helps to better understand the sources of abnormally high returns occurring around the time of the Chinese Lunar New Year.

Our major findings are summarised as follows. Firstly, for these seven Asian markets, there is a significant pre-CLNY holiday effect with regard to stock returns. This effect is significant. This is consistent with the previous evidence. Particularly, Malaysia has both pre- and post-CLNY holiday effects; of these seven markets, South Korea registered the most profound pre-CLNY holiday effect. However, it is worth noting that the evidence of the (pre-or/and post-) Chinese Lunar New Year effect in these seven Asian stock markets may not necessarily imply market inefficiency. It may also imply a positive relationship between risk and returns. In the second part of our study, we further explore the source of high stock returns using the ARMA–GARCH–M type model. Our results suggest that high stock returns in the case of China are associated with increases in risk premium, whereas for the other six markets, high returns cannot be fully explained by the conditional risk; Japan and South Korea, among others, have a pre-CLNY holiday effect in the conditional risk.

The reason why China's CLNY effect is different to the other markets tested may lay in the behavioural finance. Chinese stock market is dominated by retail investors those who are generally irrational traders. As Zhang, Sun, and Wang (2008) suggest, these investors are more concerned with short-term gains and tend to ignore long-term investment objectives. It should be noted that there is a relatively long public holiday for CLNY in mainland China, compared with surrounding markets. Typically, the overall duration for a CLNY public holiday could be nine calendar days. Given such a long impending trading break, retail traders in China are likely to trade heavily ahead of CLNY holiday. This noise trading behaviour has its roots in the anticipation of regulatory change. Zhang et al. (2008) argue that the period prior to the CLNY is a 'political high season', suggesting investors are particularly sensitive to potential political or regulatory disclosures ahead of the CLNY. This may create additional noise risk into stock market. Moreover, since many Chinese companies confront restructuring during that period, one would expect increasing uncertainties in the real economy.

One may argue that the CLNY excess returns are an outcome of the turn-of-the-Western-New-Year effect and is not a stand-alone

effect. That is the excess returns around CLNY is a continuing effect of the turn-of-the-year from Western New year and/or the CLNY effect is enhanced by the turn-of-the-year. To address this, we also conduct a graphical analysis to investigate whether the CLNY returns are more pronounced when the overall market is buoyant during the weeks before the CLNY. If there is a consistency between the high returns before the CLNY and those during the turn-of-the-Western-New-Year; CLNY effect may be a manifestation of January effect. The findings suggest that the superior high returns on pre-CLNY holiday are not compounded by buoyant performance of the overall market during January.¹⁵

This study is important to both theory and practice. As discussed previously, our results shed light on the weak-form efficiency in all these markets. From the perspective of investors, an inference may be drawn from our findings. Investors may be able to obtain excess returns by taking active trading investment strategies based on the Chinese Lunar New Year. This study documents that timing the CLNY effect in markets of Hong Kong and Japan does provide incremental wealth for investors, even after considering transaction costs. However, one needs to be cautious since high returns may be rewards for risks, such as in the case of China. Future research is necessary to further identify the factors that have contributed to the high returns on pre-CLNY days in Asian stock markets. In addition, future studies can look at the trend of the pre-CLNY to see if the effect has diminished over time.¹⁶ This may be assessed by conducting sub-period tests within a relatively long period.¹⁷ As discussed previously, the US evidence suggests that the pronounced pre-holiday effect tends to decrease after the late 1980s. It is therefore interesting to investigate the issue in relation to the pre-CLNY effect in Asian markets.

References

- Ahmad, Z., & Hussain, S. (2001). KLSE long run overreaction and the Chinese New Year effect. *Journal of Business Finance & Accounting*, 1(28), 63–108.
- Agrawal, A., & Tandon, K. (1994). Anomalies or illusions? Evidence from stock markets in eighteen Countries. *Journal of International Money and Finance*, 13, 83–106.
- Ariel, R. (1990). High stock returns before holidays: Existence and evidence on possible causes. *Journal of Finance*, 7, 1611–1626.
- Barone, E. (1990). The Italian stock market: Efficiency and calendar anomalies. *Journal of Banking and Finance*, 14, 483–510.
- Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of Econometrics*, 31, 307–327.
- Cadaby, C., & Ratner, M. (1992). Turn-of-the-month and pre-holiday effects on stock returns. *Journal of Banking and Finance*, 16, 497–509.
- Cao, Z., Harris, R., & Wang, A. (2007). Seasonality in the returns, volatility and turnover of the Chinese stock markets. *Finance Letters*, 5, 1–11.
- Chan, M. W. L., Khanthavit, A., & Thomas, H. (1996). Seasonality and cultural influences on four Asian stock markets. *Asia Pacific Journal of Management*, 13, 1–24.
- Chien, C., Lee, C., & Wang, A. (2002). A note on stock market seasonality: The impact of stock price volatility on the application of dummy variable regression model. *Quarterly Review of Economics and Finance*, 42, 155–162.
- Chong, R., Hudson, R., Keasey, K., & Little, K. (2005). Pre-holiday effects: International evidence on the decline and reversal of a stock market anomaly. *Journal of International Money and Finance*, 24, 1226–1236.
- Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, 74, 427–431.
- Engle, R., Lilien, D., & Robins, R. (1987). Estimating time varying risk premia in the term structure: The ARCH Model. *Econometrica*, 55, 391–408.

¹⁵ We thank the anonymous reviewer for his/her suggestion. In the interest of brevity, we do not report the graphs in the manuscript. However, the graphs are available upon request.

¹⁶ We thank the anonymous reviewer for his/her suggestion.

¹⁷ This study has a similar limitation to most research on emerging markets, namely the relatively short time period of the sample. The total sample period used in this study only has 13 years. Though a sub period analysis will be of interest in the context, we would not get enough observation points which is based on one event per year for a sub period test. GARCH model requires a larger number of observations and will not be workable in that case. A similar concern will go with the use of the dummy variable method.

- Fama, E. (1970). Efficient capital markets: A review of theory and empirical work. *Journal of Finance*, 25, 383–417.
- International Monetary Fund. (2012). *Asia and Pacific regional economic outlook – October 2012 update*. Washington, D.C.: IMF.
- Hsieh, D. A. (1988). The statistical properties of daily foreign exchange rates: 1974–1983. *Journal of International Economics*, 24, 129–145.
- Keef, P., & Roush, L. (2005). Day-of-the-week effects in the pre-holiday returns of the standard & poor's 500 stock index. *Applied Financial Economics*, 15, 107–119.
- Keim, D. (1983). Size related anomalies and stock return seasonality: Empirical evidence. *Journal of Financial Economics*, 14, 13–32.
- Kim, C., & Park, J. (1994). Holiday effects and stock returns: Further evidence. *Journal of Financial and Quantitative Analysis*, 29, 145–157.
- Lakonishok, J., & Smidt, S. (1988). Are seasonal anomalies real? A ninety year perspective. *Review of Financial Studies*, 1, 403–425.
- Lakonishok, J., Shleifer, A., Thaler, R., & Vishny, R. (1991). Window dressing by pension fund managers. *American Economic Review*, 1991, 227–231.
- Lee, J. W., & Hong, K. (2010). *Economic growth in Asia: Determinants and prospects (ADB economic working paper series no.220)*. Mandaluyong City: Asian Development Bank.
- Marrett, G., & Worthington, A. (2009). An empirical note on the holiday effect in the Australian stock market, 1996–2006. *Applied Economics Letters*, 16, 1769–1772.
- McGuinness, B. P. (2005). A re-examination of the holiday effect in stock returns: The case of Hong Kong. *Applied Financial Economics*, 15(16), 1107–1123.
- Meneu, V., & Pardo, A. (2004). Pre-holiday effect, large trades and small investor behavior. *Journal of Empirical Finance*, 11, 231–246.
- Mitchell, J., & Ong, L. (2006). *Seasonalities in China's stock markets: Cultural or structural? International monetary fund working paper*.
- Pettengill, G. (1989). Holiday closings and security returns. *Journal of Financial Research*, 12, 57–67.
- Roll, R. (1983). Was ist das? The turn-of-the-year effect and the return premia of small firms. *Journal of Portfolio Management*, 9, 18–28.
- Ritter, J. (1988). The buying and selling behavior of individual investors at the turn of the year. *Journal of Finance*, 43, 701–719.
- Vergin, R. C., & McGinnis, J. (1999). Revisiting the holiday effect: Is it on holiday? *Applied Financial Economics*, 9, 477–482.
- Wong, P. L., Neoh, S. K., Lee, K. H., & Thong, T. S. (1990). Seasonality in the Malaysian stock market. *Asia-Pacific Journal of Management*, 7, 43–62.
- Yen, H., & Shyy, A. L. (1993). Chinese Lunar New Year effect in Asian stock market. *Taiwan National University Management Journal*, 4, 417–436.
- Zhang, Z., Sun, W., & Wang, H. (2008). A new perspective on financial anomalies in emerging markets: The case of China. *Applied Financial Economics*, 18, 1681–1695.