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TESTING FOR THE QUARTER-OF-THE-YEAR EFFECT IN TEN ASIAN STOCK INDICES

Catherine Kalayaan S. Almonte
De La Salle University, Manila, Philippines

E-mail: catherine.almonte@dlsu.edu.ph

ABSTRACT:

Fama's (1970) efficient market hypothesis (EMH) states that asset returns should be unpredictable (Almonte, 2004; 2012a; 2012b). Conversely, the existence of calendar anomalies casts doubts on Fama's (1970) theory (Almonte, 2004; 2012a; 2012b). The relevance of finding a pattern in stock returns can be profitable because one will have a notion as to when to time an investment (Almonte, 2004; 2012a; 2012b).

The quarter-of-the-year effect (Davidsson, 2006; Almonte, 2012a), a calendar anomaly, was tested by using returns of ten Asian stock market indices from 2001 until 2011. The following indices were studied: the Hang Seng Index (HSI), the Jakarta Composite Index (JCI), the Kuala Lumpur Composite Index (KLSE), the Seoul Composite Index (KOSPI), the Nikkei Stock Average (NIKKEI), the Philippine Composite Index or Philippine Stock Index (PSEi), the Bangkok SET Index (SET), the Shanghai Composite Index (SSE), the Singapore Straits Times Index (STI), and the Taipei Weighted Price Index (TWSE). Based on the statistical tests, the quarter-of-the-year effect was non-existent in all indices. However, the runs test showed that the returns exhibited a pattern while tests for the month-of-the-year effect, another calendar anomaly, revealed that the particular anomaly was non-existent. Therefore, even though the research hypothesis was not supported, one cannot state, for certain, that Fama's (1970) efficient market hypothesis holds.

Keywords: quarter-of-the-year effect, month-of-the-year effect, runs test, market efficiency, stock market indices

1. INTRODUCTION

1.1. Framework and Hypothesis

Fama's (1970) efficient market hypothesis (EMH) says that asset returns should have no pattern (Almonte, 2004; 2012a; 2012b). However, the occurrence of calendar anomalies questions Fama's (1970) theory (Almonte, 2004; 2012a; 2012b). The importance of discovering a pattern in stock returns (even returns of stock indices) can be advantageous since one will have an idea as to when to enter and when to exit an investment (Almonte, 2004; 2012a; 2012b).

Based on observation, the day-of-the-week and month-of-the-year effects are calendar anomalies that have been studied by a number of researchers (Almonte, 2004; 2012a; 2012b). The quarter-of-the-year effect is another calendar anomaly (Davidsson, 2006; Almonte, 2012a). However, unlike the day-of-the-week and month-of-the-year effects, this phenomenon has been studied much less (Almonte, 2012a).

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The following definition of the quarter-of-the-year effect was applied in this research: "The quarter-of-the-year effect is the occurrence where securities prices for at least one quarter are statistically significantly different from at least one other quarter (Davidsson, 2006)" (Almonte, 2012a, p. 65).

Davidsson (2006, p. 17) assessed the presence of the quarter-of-the-year effect in the U.S. stock market (using the S&P 500 index) via an ". . . econometric model . . . ". On the other hand, Almonte (2012a) investigated said anomaly in the Philippine equities market (using the PSEi) by using a non-parametric test.

For this research, the existence of the quarter-of-the-year effect was tested by using the following Asian stock market indices: (1) Hang Seng Index (HSI) in Hong Kong, (2) Jakarta Composite Index (JCI) in Indonesia, (3) Kuala Lumpur Composite Index (KLSE) in Malaysia, (4) Seoul Composite Index (KOSPI) in Korea, (5) Nikkei Stock Average (NIKKEI) in Japan, (6) Philippine Composite Index or Philippine Stock Index (PSEi) in the Philippines, (7) Bangkok SET Index (SET) in Thailand, (8) Shanghai Composite Index (SSE) in China, (9) Singapore Straits Times Index (STI) in Singapore, and the (10) Taipei Weighted Price Index (TWSE) in Taiwan. The data ran from 2001 until 2011. As such, the research hypothesis, inspired by Almonte (2012a), is stated as follows: *There is a quarter-of-the-year effect in the ten Asian stock indices.*

1.2. Literature

Almonte (2012a, p. 66) mentioned that ". . . very few empirical studies have been found with regards to the quarter-of-the-year effect". As cited by Almonte (2012a), Davidsson (2006) and the CXO Advisory Group, LLC (http://www.cxoadvisory.com/4080/calendar-effects/end-of-quarter-effect/, June 14, 2012) analyzed the S&P 500 index (Davidsson's (2006) research covered 35 years while the CXO Advisory Group's (http://www.cxoadvisory.com/4080/calendar-effects/end-of-quarter-effect/, June 14, 2012) study covered more than 60 years): Davidsson (2006) concluded that the last quarter generated the highest returns while the CXO Advisory Group, LCC (http://www.cxoadvisory.com/4080/calendar-effects/end-of-quarter-effect/, June 14, 2012), said that ". . . evidence suggests some systematic strength the first days after ends of quarters bracketed by weakness or doldrums, with effects small compared to daily return variability. The fourth quarter pattern is the strongest and most distinctive". In contrast, Almonte (2012a), using stock market data for ten years (i.e. from 2001 until 2010), found that the PSEi generally did not exhibit said pattern.

The unpredictable results (previously cited above; which may be due to the sample used, length of period covered by the study, etc.) and limited research paves the way for this particular calendar anomaly to be further studied (Almonte, 2012a).

2. METHODOLOGY

Following Almonte (2012a; 2012b), the daily closing values of the aforementioned indices were gathered from *Technistock* and the returns (for 2001 to 2011) were calculated. Any gaps in the trading days were assumed to be holidays and/or non-trading days. As was done by Almonte (2004; 2012a; 2012b), symbols were used to identify which point in time the data belonged to. Again following Almonte (2012a; 2012b), a software, *XLSTAT*, was utilized for all statistical measures.

This paper was modelled after Almonte (2004; 2012a; 2012b).

Table 1 shows that all indices exhibited non-normal returns. Thus, the Kruskal-Wallis Test was employed to check for the quarter-of-

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the-year effect (as was used by Almonte (2004; 2012a; 2012b)).

Table 1
TESTING THE DATA FOR NORMALITY
Jarque-Bera Test at α = 0.05

Stock Index	JB (Observed Value)	JB (Critical Value)	*df*	*p*-value (two-tailed)
HSI	8,291.220	5.991	2	< 0.0001
JCI	3,556.986	5.991	2	< 0.0001
KLSE	10,610.671	5.991	2	< 0.0001
KOSPI	2,472.789	5.991	2	< 0.0001
NIKKEI	5,009.003	5.991	2	< 0.0001
PSEi	23,302.981	5.991	2	< 0.0001
SET	8,341.360	5.991	2	< 0.0001
SSE	6,426.762	5.991	2	< 0.0001
STI	2440.181	5.991	2	< 0.0001
TWSE	454.345	5.991	2	< 0.0001

3. RESULTS AND ANALYSIS

Based on the standard deviation of returns, as presented in Table 2, the KOSPI is the riskiest (with the highest standard deviation at 0.017) while the KLSE is the least risky (with the lowest standard deviation at 0.009). However, based on the range of returns, the PSEi is the riskiest (with a range of 0.299) while the TWSE is the least risky (with a range of 0.134).

Table 2
SUMMARY STATISTICS OF THE VARIABLE "RETURN"

Stock Index	Min.	Max.	Mean	Standard Deviation
HSI	-0.127	0.143	0.000	0.016
JCI	-0.104	0.079	0.001	0.015
KLSE	-0.095	0.046	0.000	0.009
KOSPI	-0.120	0.119	0.001	0.017
NIKKEI	-0.114	0.142	0.000	0.016
PSEi	-0.123	0.176	0.000	0.014
SET	-0.148	0.112	0.001	0.015
SSE	-0.088	0.180	0.000	0.017
STI	-0.083	0.078	0.000	0.013
TWSE	-0.067	0.067	0.000	0.015

According to the information offered in Table 3, there is no quarter-of-the-year effect given that the *p*-values were more than the 5% significance level. Thus, it does not matter which quarter investors buy and/or sell securities. The results validates Almonte's (2012a) study but goes against that of Davidsson's (2006).

For the PSEi, the result being the same with that of Almonte (2012a) was expected given that only one year was added as the time period for this research (Almonte's (2012a) paper covered the years 2001 until 2010 while this paper used data from 2001 to 2011). Furthermore, it is remarkable is that all stock indices, even those generally considered to be part of more developed markets (such as the NIKKEI and STI), did not exhibit the quarter-of-the-year effect.

It is possible that window dressing (The Kuala Lumpur Post, October 1, 2012; Dumlao, September 29, 2012; Knight, September 27, 2012; Linn, September 27, 2012; Reuters, September 27, 2012; March 30, 2011; Heffernan, September 25, 2012; Cayabyab, July 31, 2012; Bangkok Post, February 10, 2012; Krismantari, December 1, 2009; and Lakonishok, J., Shleifer, A., Thaler, R., & Vishny, R., 1991) occurs every quarter such that no quarter is unlike another.

Table 3
TESTING FOR THE QUARTER-OF-THE-YEAR

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EFFECT Kruskal-Wallis Test at α = 0.05				
Stock Index	K (Observed Value)	K (Critical Value)	*df*	Asymptotic *p*-value (two-tailed)
HSI	4.859	7.815	3	0.182
JCI	1.929	7.815	3	0.587
KLSE	2.215	7.815	3	0.529
KOSPI	0.938	7.815	3	0.816
NIKKEI	2.842	7.815	3	0.417
PSEi	0.292	7.815	3	0.961
SET	2.405	7.815	3	0.493
SSE	3.311	7.815	3	0.346
STI	2.898	7.815	3	0.408
TWSE	4.980	7.815	3	0.173

For further analyses, a one-sample runs test (Table 4) and a test for the month-of-the-year effect (Table 5) were conducted. In testing for the month-of-the-year effect, the procedure of Almonte (2012a) was applied. The results of the runs test showed that the returns of the indices were not randomly distributed while the tests for the month-of-the-year effect showed that such an effect did not exist in the selected indices. The results presented in Table 4 may seem to be in conflict with the results presented in Table 3 – it just means that returns follow a certain pattern (however, the pattern it follows is neither that of the quarter-of-the-year effect nor that of a month-of-the-year effect).

Table 4 TESTING FOR RANDOMNESS One-Sample Runs Test at α = 0.05			
Stock Index	R	r (Expected Value)	Asymptotic *p*-value (two-tailed)
HSI	1,374.000	1,357.675	< 0.0001
JCI	1,234.000	1,318.273	< 0.0001
KLSE	1,248.000	1,347.038	< 0.0001
KOSPI	1,356.000	1,357.397	< 0.0001
NIKKEI	1,406.000	1,346.672	< 0.0001
PSEi	1,222.000	1,353.092	< 0.0001
SET	1,281.000	1,326.997	< 0.0001
SSE	1,315.000	1,325.968	< 0.0001
STI	1,413.000	1,376.346	< 0.0001
TWSE	1,324.000	1,358.787	< 0.0001

Table 5 TESTING FOR THE MONTH-OF-THE-YEAR EFFECT Kruskal-Wallis Test at α = 0.05				
Stock Index	K (Observed Value)	K (Critical Value)	*df*	Asymptotic *p*-value (two-tailed)
HSI	11.635	19.675	11	0.392
JCI	14.187	19.675	11	0.223
KLSE	17.100	19.675	11	0.105
KOSPI	5.389	19.675	11	0.911
NIKKEI	6.901	19.675	11	0.807
PSEi	8.054	19.675	11	0.708
SET	10.466	19.675	11	0.489
SSE	9.605	19.675	11	0.566
STI	13.457	19.675	11	0.264
TWSE	9.133	19.675	11	0.610

4. CONCLUSION AND RECOMMENDATIONS

The research hypothesis was not supported by the statistical tests (refer to Table 3). On the other hand, one cannot say, in absolute terms, that Fama's (1970) efficient market hypothesis holds since returns did not follow a random distribution (Tables 3 and 4 gave mixed results).

Further research, as pointed out by Almonte (2004), could include more indices (in different parts of the world), or using specific securities instead of indices, and using different time periods. Finally, future papers on the quarter-of-the-year effect could also test for the day-of-the-week effect (in addition to testing for the month-of-the-year effect and conducting a runs test) as part of the analyses.

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