

The Euphoria Effect of UEFA Champion League Final on Asian Stock Market

Rayenda Khresna Brahmana (Corresponding author)

School of Management, University of Science Malaysia

11800, Pulau Penang, Malaysia

Tel: 60-19-529-5848 E-mail: raye_brahm@yahoo.com

Abstract

Football is the most popular sport in the world. It can make personal attachment to the supporters. One of the most wanted football events is UEFA Champion League Final. It can create euphoria in the supporters. The euphoria will affect the stock market behaviour. This research examines whether investor's performance affected by the football euphoria. This research is important in term of market efficiency, behavioural finance, and portfolio strategy.

This paper examines the UEFA Champion League Final affects on the World index, EAFE index, Pacific index, and 14 Asian stock markets. This paper wants to figure the seasonality of the euphoria during the UEFA Champion League Final.

This study conducts non parametric test such as: Holt Winters, Kruskal-Wallis, and Wilcoxon Signed test. The period of this study is from 1999 up to 2008. The results showed that there are euphoria effects of UEFA Champion League Final on the stock markets. Further, the results also showed that there is seasonality in stock markets caused by the euphoria of UEFA Champion League Final. Future research can employ the same issue in other regions. Another research should be conducted by finding the effect in shorter period or longer period.

Keywords: Investor Irrationality, Football Euphoria, Asian Stock Market Behavior, Behavioral Finance

1. Introduction

Generally, 1+1 does not always equal to 2 in the psychology perspectives. The cognitive in human logic thinking might be affected by human psychology. Finance theory assumes this behaviourism to be rational (Thaler, 1980). It can be seen on the foundation of expected utility theorem. This major stream proposes human will behave logical, rational, and probability calculation in their decision process (Tufan, 2004). However, as there are anomalies in market, finance scholars argue and reject this rational behaviour assumption. Kahneman and Tversky (1979) propose the role cognitive in economic decisions. The cognitive or intuition could replace the rational behaviour or logical way in place of calculating probability (Yazici, 2003). Further, Kahneman (2002) also address that intuitive judgement may be corresponding the perception operation and deliberate the reasoning operation. It means that mood, confidence, mental, emotion, temper can have significant influences on economic decision making.

Stock market anomalies are based on the investor psychology along with other factors (Turfan, 2003). Weather, Moon, Lunch Breaks, and human neuron are the affecting factor of human psychology. For instance, Saunders (1993) finds the relationship between the cloud cover level in New York and the equity returns in New York. In Saunders paper, it surmised when the level of cloud cover was 100%, the stock returns were significantly dispersed negative from the average, and when the clouds cover level was 0-20%, the stock returns were significantly dispersed positive from the average. Gao (2009) investigates the lunar phase effect on two major Chinese stock market return. Gao showed the returns are relatively lower and higher in new moon and full moon, respectively. Azarmi (2002) has investigated if the lunch break on Chinese stock market affects the market returns. Azarmi favour the lunch break has effects on market volatility. Meanwhile, this study wants to investigate the role of football euphoria in stock market of the world.

Football is one big industry in the world nowadays. It is also the most populist sport in all around the world (Note 1). Deloitte Football Money League in 2007 surmised that European Football industry has generated about 3.35 billion Euros revenues annually. Large number of Institution and retail investors are mainly supporters in certain European clubs (Benkraiem, Louhichi, and Marques, 2009) such as AC Milan, Manchester United, Barcelona, Real Madrid, Chelsea, Arsenal, and others club. This emotional attachment may bring those investors to out of their bounded rationality.

The emotion attachment can be seen in many ways in term of financial perspective. Recently, Manchester United, the biggest football club in world, has financial distress problem. The Manchester United Supporter Association, called Red Knight, did fund rising to tackle this problem (Note 2) Before, Newcastle United, Aston Villa, and Liverpool supports also planned to do the same thing.

The emotion attachment also can be seen in the IPO process. Tottenham Hotspur, the first football team went IPO, raised £3.3 million or equivalent to £100million today because the involvement of football supporters (Gannon, Evans, and Goddard, 2006). It also happened to Millwall in 1989 and Manchester United 1991. Another emotion attachment can be seen in emotion sentiment in Listed Football Club price volatility. Brooks et al (2009) conducted research to examine the influence of match result on clubs stock prices. By panel regression of 19 clubs, Brooks et al

found there is significant influence between match result and club stock prices. The sentiment of supporters can also be seen in the noise trading behaviour of betting market (Avery and Chevalier, 1999).

The emotional attachment in decision making can be explained by abnormal psychology. Kreb and Blackman (1990) states that where people tend to have full of energy but easily to distract by talking incessantly, loudly, rapidly and changing from topic to topic in midstream. This is what they called as Mood Mania. Further, Kreb and Blackman state that Mood mania can drive individual to be overconfident.

Mood mania also can motivate individual to act moodily. Early study of this is Showers and Cantor (1985) paper. They address that mood is the determinant of motivation. Positive mood has increased motivation, vice versa. Other study is Raglin et al (1990) paper. It assessed 84 female rowers to examine the relationship between mood and self motivation. They conclude that mood state has significant influence on self motivation in a seasoned competition. Moreover, Bless (2001) states that the mood also affect the motivation process. Mood will decrease individual processing motivation as individual has negative state of mood.

Based on the literature of abnormal psychology, this study also proposes that the euphoria in Final of UEFA champion league can trigger the mood mania. Then, the mood mania will disorder the irrationality in decision making and creating seasonality in the market.

The purpose of this research is to investigate the UEFA champion league final euphoria on 16 Asian stock markets. It is important to examine this phenomenon in regard to portfolio and investing strategy. Further, this research also wants to examine the role of emotion on stock market behaviour. This research is different from other research in 4 ways. First, this research investigated the effect of UEFA Champion League final in 11 years. Previous study by Turfan (2003) only investigated the effect of one World Cup Final. Secondly, this research did conduct more robust analysis by not only using Mann U Whitney as previous research did but also Holt Winters and Wilcoxon Signed Test. Further, we did not employ plain Mann U Whitney, but generalized Mann U Whitney called by Kruskal Wallis. Thirdly, this research examined the effect of three periods, which are 7 days effect, 15 Days effect, and 20 days effect. Lastly, this research did not only examine in one market but 14 stock markets all around the Asia plus 3 world benchmarks which are: MSCI Pacific Index, Europe Australasia and Far East Index, and MSCI World Index. This research contributes to theoretical perspective in term of portfolio strategy, investing strategy, and behavioural finance. It enriches those fields by adding emotion sentiment and euphoria of football match.

This research is important in 3 ways. In term of market efficiency theory, if there is seasonality found during the UEFA Champion league final, this study can propose the new market anomaly. Secondly, in term of behavioural finance, If there is euphoria effect, this study can propose the football euphoria as the new variable that can affect the investor performance. Lastly, in term of portfolio strategy, if there is seasonality, an active trading strategy can be based on this anomaly and can be beaten market.

This study is organized as follows: section 1 will introduce briefly the stock returns, psychology, and football effects. Literature review is also including in this section. Section 2 will address the data and methodology. This is followed by section 3 and 4 which will present empirical results and conclusion respectively.

2. Data and Methodology

2.1 Sample

This research will take the entire Asian stock markets. The samples are: 5 East Asia (China, Hong Kong, Japan, Taiwan, and South Korean), 4 South Asia (Bangladesh, India, Pakistan, and Sri Lanka), 5 South East Asia (Indonesia, Malaysia, Philippines, and Thailand), and 1 Oceania (Australia). To make a robust comparison, this study added MSCI Pacific Index, Europe Australasia, and Far East Index, and also MSCI World Index. The time period is start from 1999 up to 2009. The UEFA Champion League finals are distributed into 10 finals. All of the finals are held on the month of May each year.

2.2 Research Design

This research conducted 5 tests to examine the effect of UEFA Champion League Final euphoria on world stock market. The tests are probability distribution, correlation, Holt Winters, Kruskal-Wallis, and Wilcoxon W. There are also 3 types of lags that will be included in the model, which are 7 days lag, 15 days lag, and 20 days lag. This lag is conducted to reveal the length of the effect of the euphoria on the world market stock markets. This study chooses the 20 days effect as the edge because UEFA Champion league final usually holds 21 days after the last semifinal.

The data of market returns is retrieved from Thomson Datastream and recalculate by using straight forward return calculation by lognormal approach as $r_t = \log \left[\frac{P_t}{P_{t-1}} \right]$ where P_t and P_{t-1} are the closing prices of market on day t and $t-1$, respectively.

3. Results

3.1 Descriptive Result

Panel 1, 2, and 3 depict the probability distribution of the markets. Panel 1 addresses the descriptive result of Asian stock market behaviour 7 days before-and-after UEFA Champion League final. Meanwhile, Panel 2 and Panel 3 address the Asian stock market behaviour 15 days before-and-after the final and 20 days before-and-after the final,

respectively.

According to Panel 1, 2, and 3, the daily mean returns of the entire Asian stock market have inclining and declining trends. For instance, Australian stock market has -0.009% daily mean returns in 20 days before Final. Then, in the panel data of 15 days before the final, the daily mean returns were inclining to -0.08% . It was inclining again to -0.05% daily mean returns in 7 days before the final panel data. These inclining and declining trends of daily mean returns are also found in other stock markets as shown by Panel 1, 2, and 3.

Therefore, we can surmise that there is a declining or inclining trends of the Asian stock markets returns from D-7 to D-15 to D-15. This declining and inclining indicates that there is an effect of football euphoria in the stock markets. Based on this table, we can hypothesize that there is a positive influence between the euphoria of UEFA Champion League Final and the behaviour of the entire Asian Stock Markets. This means that there is still room to investigate further the relationship between euphoria of football and stock market.

3.2 Correlation Results

Correlation indicates the same sharing information among the variables. If the correlation is above 0.7, it means the variables are sharing the similar contained information (Liu, 2000, Brahmana and Hooy, 2009). As addressed by table 2, the correlation between one market to another market is very low. None among of Asian stock market has correlation that higher than .70. It indicates one market is not correlated to other market in term of the information. This result addresses that each market has follow the result of UEFA Champion League Final by their own rationality. The result also addresses that there is a seasonality probability as the markets do not share similar information each other. It is the evidence of irrationality behaviour of the market.

3.3 Holt Winters Result

The Holt-Winters method is a robust, easy-to-use projection procedure which has been around for over 20 years and generally works quite well in practice (Chatfield and Yar, 1988). It can capture the predicted variation of time series seasonal.

The Holt Winters in this study is predicted value to estimate the seasonal in market during 7 days before and after UEFA Champion League Final. As depicted in table 1, this study addresses three important measurements which are the alpha coefficient, beta coefficient, and the Root Mean Square Error (RMSE). The alpha coefficients address that the seasonal can be estimated if it is lower than 0.3. Based on table 1, the entire market alpha coefficient is lower than 0.3 except for EAFE. It means there is a probability of the seasonal existence in the entire market except EAFE. It also indicates the seasonal is fixed during the period of 7 days before and after the UEFA Champion League Final.

In term of beta coefficient, if the beta coefficient is smaller than 0.3, the trend and seasonal component are fixed and not changing. According to table 1 results, the entire market has beta value smaller than 0.3. It means all the market has seasonality during the period of 7 days before and after the UEFA Champion League Final. It indicates there is a euphoria effect of 7 days before and after UEFA Champion league Final in Asian Stock Market.

Lastly, table 1 depicts the RMSE of the entire markets. RMSE Holt Winters is the measurement to show the predicted value has good measure of precision on the cyclic variation such as seasonality. Based on table 1, all of the RMSE Holt Winter of the markets is very close to zero. It means the seasonality is predicted and exits.

As a conclusion, the Holt-Winters no-seasonal results indicate 3 important findings. First, alpha coefficient indicates there is a probability of the seasonal existence in the entire market except EAFE. Secondly, the beta coefficient is smaller than 0.3, meaning the averaging of seasonality in the 7 days before and after UEFA Champion League Final is exits. Lastly, based on the RMSE, it depicts the precision of the seasonality is very close to zero. It means that there is a variability trend and seasonality in 7 days before the UEFA Champion league final. The UEFA Champion League Final euphoria is the driver of this seasonality, meaning there is an effect of UEFA Champion League euphoria in the Asian stock markets.

The Euphoria of UEFA Champion Final is occurred as there is emotional attachment between the investor to the delight and sorrow to their supporting team. The feel of happiness and sorrow brings an irrational behaviour to investor in investing decision. This is in line with the abnormal psychology science. It states the mood disorder can be occurred as the human being has euphoria (Krebs and Blackman, 1990). This mood disorder euphoria brings to the irrational decision making (Isen et al, 1968; Tvede, 2000).

3.4 Kruskal-Wallis (Generalized Mann Whitney)

This research is based on non-parametric test as the sample cannot employ in panel regression and consider small sample. One of the non-parametric tests that conducted in this research is Kruskal-Wallis or the generalized Mann Whitney. This method is robust as it ranks the series from smallest value to largest in generalization series.

Table 3 addresses the result of Kruskal-Wallis. The null hypothesis is there is the difference between 7 days before the Final of UEFA Champion League and 7 days after the Final of UEFA Champion League. The difference between 7 days before and 7 days after is important to reveal the seasonality in the population. If there is difference between the pint-point periods, the Euphoria of UEFA champion league is real exists, vice versa. Hypothetically, the Euphoria should only occur before the event.

Based on the result in Table 3, MSCI world, MSCI EAFE, MSCI Pacific, and most Asian stock market cannot reject the hypothesis in 10% significance level. It means there is significant difference between 7days before and 7days after the Final of UEFA Champion League. It means there is difference between 7 days before and 7 days after UEFA Champion League Final. Therefore, the euphoria of UEFA Champion League Final has significant effect on market behaviour.

It also indicates there is seasonality in the 7days before and 7 days after UEFA Champion League Final. The seasonality affects the investor decision making by its euphoria of Football. The euphoria of football drives the mood mania of investor; and this mood mania affect the investor behaviour in investing decision. This is how the Euphoria of football affects the market behaviour.

3.5 Wilcoxon Signed Test

Another robust non-parametric that employed in this research is Wilcoxon Signed test. Table 4 depicts the result of wilcoxon signed test of this study. The results of wilcoxon signed test are similar to the results of Kruskal-Wallis. The table addresses there is difference before the Final of UEFA champion league and after the Final of UEFA Champion League. This study surmised it as the entire market cannot reject the hypothesis in 10% significance level. It indicates the differences.

These depicted results indicate the seasonality in the market during the UEFA Champion League Final. It indicates also the euphoria effect on the market behaviour. In the end, we can conclude that there is a euphoria effect of UEFA Champion League Final on the World, EAFE, Pacific, and Asian markets. Indeed, this result strengthens the previous result of the Kruskal-Wallis.

4. Conclusion

Football is recognized as the most popular sport in the world. One of the most wanted football event is UEFA Champion League Final. The euphoria of football can affect the behaviour of investor which depicted in market returns behaviour.

After conducting the descriptive statistics, this study found a declining or inclining trends of the Asian stock markets returns from D-7 to D-15 to D-15. This declining and inclining indicates that there is an effect of football euphoria in the stock markets.

Correlation indicates the same sharing information among the variables. None among of Asian stock market has correlation that higher than .70. It indicates that there is a seasonality probability as the markets do not share similar information each other. It means each market has followed the result of UEFA Champion League Final by their rationality.

In term of Holt Winter, the results indicate The UEFA Champion League Final euphoria is the driver of this seasonality, meaning there is an effect of UEFA Champion League euphoria in the Asian stock markets.

The Kruskal-Wallis test also show MSCI world, MSCI EAFE, MSCI Pacific, and most Asian stock market cannot reject the hypothesis in 10% significance level. It means there is significant difference between 7days before and 7days after the Final of UEFA Champion League.

Lastly, this research employed Wilcoxon signed test. The Wilcoxon test also indicates the seasonality in the market during the UEFA Champion League Final. It indicates also the euphoria effect on the market behaviour.

This study surmises that there is a relationship between 7 days before and after euphoria in UEFA Champion league on market behaviour. This result can be explained by the mood mania of abnormal psychology. Krebs and Blackman (1999) define mood mania as a state where people tend to have full of energy but easily to distract. This mood mania is believed as the trigger for overconfident situation in the market (Huberman, 2000). Euphoria is also another form of mood mania. The happiness or sadness in facing UEFA Champion League final can affect investor behaviour. The irrationality of investor behaviour will drive the market to seasonality. This research result shows that there is seasonality 7 days before and after the UEFA Champion League Final. It means the Euphoria in football can affect the market behaviour.

This finding indicates that this study can propose the new anomaly. The new anomaly is the Football anomaly. Investor can rely on this anomaly as active strategy to beat the markets.

Future research can employ the same issue in other markets such as North America region, South America Region, Africa, and Europe. Another research should be conducted by finding the effect in shorter period or longer period. As the robustness check, the winsorized data can be used to avoid the effect of outliers.

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Notes

Note 1.
http://www.sportingo.com/football/a9387_why-football-beautiful-game-most-popular-sport-world,
http://www.fifa.com/mm/document/fifafacts/ffprojects/ip-401_06e_tv_2658.pdf

Note 2.
<http://www.dailymail.co.uk/sport/football/article-1218910/Former-Manchester-United-chairman-Martin-Edwards-reveals-debt-fear-club.html>

Panel 1 Descriptive 7 days before and after the final

		Australia	Bangladesh	China	HongKong	India	Indonesia	Japan	Malaysia
D-7 Days periods	Mean	-9.33E-05	0.001278	0.000806	-0.00011	0.000307	0.000404	-0.0008	-3.73E-05
	Median	-0.00034	0	0.000188	-0.00028	0.001403	0.000209	-0.00111	0.000191
	Max	0.009396	0.012716	0.019858	0.0153	0.034125	0.01925	0.010831	0.013135
	Min	-0.00944	-0.006917	-0.01994	-0.01506	-0.05184	-0.03388	-0.01402	-0.01519
	Stdev	0.003538	0.003643	0.007719	0.005742	0.009058	0.007949	0.005664	0.004218
	Skew.	-0.06017	0.678349	0.056469	-0.09116	-2.01733	-1.41239	0.075251	-0.12444
	Kurtosis	2.970659	4.257727	3.975342	3.152948	17.99438	8.283561	2.489683	5.245109
D+7 Days periods	Mean	0.00025	0.000373	-0.000409	0.000384	0.000221	-0.00097	0.00087	-0.00016
	Median	0.000583	0	0.000213	0.000122	0.001417	-6.80E-05	0.001047	-0.00048
	Max	0.009396	0.009737	0.016131	0.021881	0.067273	0.019413	0.012952	0.010995
	Min	-0.00825	-0.011112	-0.029095	-0.01374	-0.03105	-0.02699	-0.01074	-0.00878
	Stdev	0.003415	0.002584	0.006998	0.005716	0.011781	0.007708	0.005152	0.003736
	Skew.	0.019086	-0.322113	-0.797801	0.470854	2.104767	-0.33087	-0.17855	0.454082
	Kurtosis	2.928443	8.648333	5.619117	4.771092	15.37285	4.669422	2.673845	3.524339

		Pakistan	Philippines	Korea	SriLanka	Taiwan	Thailand	WORLD	EAFE	Pacific
D-7 Days periods	Mean	-0.00084	-0.00079	0.000138	0.000148	0.000236	6.94E-06	-0.00011	-5.85E-05	-0.00022
	Median	-0.00019	-0.00017	0.000224	0	7.00E-05	1.30E-05	5.40E-05	5.10E-05	-0.00012
	Max	0.032552	0.020421	0.020554	0.013306	0.023047	0.023565	0.01392	0.011428	0.015918
	Min	-0.03172	-0.02001	-0.02387	-0.01285	-0.02271	-0.0205	-0.00912	-0.009777	-0.01325
	Stdev	0.009139	0.005711	0.008408	0.004574	0.007498	0.006944	0.00451	0.004027	0.005292
	Skew.	0.165925	-0.33322	-0.32771	0.028643	-0.00066	-0.00786	-0.03982	-0.108824	0.137051
	Kurtosis	6.473286	5.952095	3.502463	4.208419	4.830646	4.587673	3.320883	3.655897	3.827902
D+7 Days periods	Mean	-0.00192	0.000931	0.001122	0.000899	0.000113	0.000771	0.001079	0.000853	0.000572
	Median	8.10E-05	0.000361	0.001203	0	0.000652	0.00055	0.000832	0.000753	0.001003
	Max	0.036946	0.016603	0.024798	0.027185	0.012871	0.021295	0.01392	0.013679	0.011225
	Min	-0.03362	-0.0176	-0.02747	-0.00967	-0.01644	-0.01725	-0.00906	-0.007937	-0.00973
	Stdev	0.012334	0.006061	0.008578	0.005139	0.005664	0.006853	0.004419	0.003804	0.00453
	Skew.	-0.00921	0.168493	-0.22056	2.603531	-0.49641	0.031987	0.209007	0.50985	-0.24241
	Kurtosis	4.416424	4.176257	4.315857	13.78404	3.49984	3.663581	3.640387	3.901654	2.892185

Panel 2. Descriptive of 15 days before and after the Final

		Australia	Bangladesh	China	HongKong	India	Indonesia	Japan	Malaysia	
D-15 Days periods	Mean	-8.91E-05	0.001089	0.000478	-0.0003	0.000704	0.000458	-0.00068	0.000186	
	Median	-2.90E-05	0	0	0	0.001124	0.000108	-0.00027	0.000191	
	Max	0.009396	0.016984	0.019858	0.018164	0.067273	0.019413	0.019318	0.019276	
	Min	-0.01521	-0.013224	-0.01994	-0.01873	-0.05184	-0.03388	-0.02157	-0.02178	
	Stdev	0.00371	0.003704	0.006581	0.005859	0.010191	0.007137	0.005902	0.004641	
	Skew.	-0.33756	0.614853	-0.08742	-0.13351	0.715359	-1.037	-0.13884	-0.47401	
	Kurtosis	4.068522	6.860291	4.500091	3.8646	17.83634	7.577631	4.585849	8.20523	
D+15 Days periods	Mean	-1.78E-05	0.000389	-6.20E-05	0.000213	-0.00052	0.000136	0.000426	6.17E-05	
	Median	0.000352	0	0.000189	7.60E-05	0.00081	0.000177	0.000543	6.40E-05	
	Max	0.009767	0.015981	0.034315	0.021881	0.019975	0.046502	0.012952	0.014075	
	Min	-0.01218	-0.012639	-0.03744	-0.01867	-0.03105	-0.02699	-0.01288	-0.01037	
	Stdev	0.003589	0.00348	0.008523	0.005694	0.007823	0.007551	0.005073	0.003983	
	Skew.	-0.48063	0.060539	-0.67017	0.320665	-0.46369	1.069036	-0.16507	0.25768	
	Kurtosis	4.007026	7.209934	7.940908	5.050708	3.939477	11.61818	2.924951	3.851162	
		Pakistan	Philippines	Korea	Sri Lanka	Taiwan	Thailand	WORLD	EAFE	Pacific
D-15 Days periods	Mean	-0.00015	-3.99E-05	-0.00069	0.000509	-7.61E-0	5	-0.00025	-5.89E-05	-0.00018
	Median	-1.00E-06	0	0	0	0.000277	0	0.00016	0.000171	-0.0002
	Max	0.032552	0.020421	0.021624	0.031695	0.023047	0.023565	0.01392	0.011428	0.017654
	Min	-0.02194	-0.02001	-0.02563	-0.01833	-0.02409	-0.0218	-0.01298	-0.01697	-0.02506
	Stdev	0.007202	0.005597	0.007772	0.005825	0.006947	0.006809	0.00468	0.004037	0.005613
	Skew.	0.424257	-0.03522	-0.4436	1.475687	-0.32368	-0.53501	-0.21315	-0.54594	-0.3225
	Kurtosis	6.236771	4.87223	4.254179	11.21639	4.841711	4.921332	3.476519	4.48866	5.589742
D+15 Days periods	Mean	-0.00076	0.000514	0.000707	0.000526	-0.00029	0.000856	-1.83E-05	-7.66E-05	0.000114
	Median	0.000658	4.50E-05	0.000701	0	0.000147	0.000521	0.000153	-7.30E-05	0.000593
	Max	0.036946	0.020744	0.02754	0.010891	0.015714	0.021295	0.015248	0.013679	0.015317
	Min	-0.03362	-0.0176	-0.02747	-0.00967	-0.01644	-0.01725	-0.01523	-0.01288	-0.0142
	Stdev	0.010199	0.006325	0.008727	0.003686	0.005899	0.006473	0.004528	0.003971	0.004956
	Skew.	-0.1756	-0.02829	-0.01035	0.397177	-0.36601	0.211646	-0.04936	0.057011	-0.20025
	Kurtosis	4.968435	3.930102	4.311819	3.752931	3.437985	3.41013	4.169805	4.060995	3.28977

Panel 3. Descriptive of 20 days before and after the Final

		Aus	Bang	Chn	HK	Ind	Ina	Jpn	Mal
D-20 Days periods	Mean	-4.02E-05	0.000557	0.000829	0.000294	0.000694	0.001046	-0.00023	0.000465
	Median	-7.75E-05	0	0	0	0.00104	0.000493	0	0.000264
	Max	0.012872	0.025668	0.038603	0.023422	0.067273	0.023999	0.019318	0.019555
	Min	-0.01521	-0.04324	-0.01994	-0.01873	-0.05184	-0.03388	-0.02157	-0.02178
	Stdev	0.003589	0.005094	0.006785	0.005914	0.009897	0.007218	0.005778	0.004599
	Skew.	-0.00597	-2.36018	0.781434	0.200304	0.517021	-0.55307	0.002903	-0.03068
	Kurtosis	4.684689	30.21335	7.938413	4.539987	15.98328	6.871835	4.782546	8.301878
D+20 Days periods	Mean	-0.00027	0.000569	-0.00014	-0.00026	-6.46E-05	0.000215	-0.00037	-0.00054
	Median	0.000565	0	-5.70E-05	-0.0002	0.000252	0.000292	0.000471	-0.00034
	Max	0.006653	0.015371	0.022177	0.018576	0.024658	0.01806	0.011672	0.011898
	Min	-0.01366	-0.01264	-0.02934	-0.01272	-0.02328	-1.62E-02	-0.01837	-0.01326
	Stdev	0.003884	0.003759	0.008516	0.005791	0.008133	0.006475	0.00593	0.003918
	Skew.	-1.34776	0.380765	-0.21336	0.306884	-0.31207	-0.053	-0.57311	-0.43239
	Kurtosis	5.089481	7.094496	4.869913	3.430968	3.781123	3.673647	3.315159	4.898425

		Pak	Phi	Kor	SLK	TAI	THAI	WORLD	EAFE	Pacific
D-20 Days periods	Mean	-0.00029	1.99E-05	-0.00039	0.000377	-2.06E-05	0.000247	0.000142	0.000139	9.85E-05
	Median	0	0	0	0	0	0	0.000176	0.000335	1.05E-05
	Max	0.032552	0.020421	0.021624	0.031695	0.028336	0.041792	0.01392	0.011428	0.017654
	Min	-0.02194	-0.02001	-0.02563	-0.01833	-0.02409	-0.0218	-0.01298	-0.016974	-0.02506
	Stdev	0.006784	0.005553	0.007687	0.005292	0.007268	0.007116	0.004639	0.003979	0.005386
	Skew.	0.288101	0.040903	-0.33638	1.499991	0.050176	0.690755	-0.08134	-0.399465	-0.2009
	Kurtosis	6.391644	4.692716	4.314048	12.59443	5.345814	9.495951	3.590944	4.385499	5.734775
D+20 Days periods	Mean	-0.00065	-0.00054	-0.00026	0.001833	-6.75E-05	-0.00015	-0.00059	-0.000794	0.000572
	Median	3.70E-05	-7.50E-05	0.00052	0.00017	-0.00033	-0.00046	5.80E-05	0.000374	0.001003
	Max	0.025052	0.020744	0.016881	0.022663	0.013297	0.016064	0.010103	0.008144	0.011225
	Min	-2.63E-02	-0.01672	-0.0264	-0.00806	-0.01885	-0.01564	-0.01434	-0.016062	-0.00973
	Stdev	0.008506	0.006339	0.007721	0.005232	0.006273	0.006672	0.004428	0.004373	0.00453
	Skew.	-0.35236	0.127308	-0.62508	1.602254	-0.22606	0.193351	-0.77211	-0.942185	-0.24241
	Kurtosis	4.070174	4.069138	4.229771	6.358516	3.279968	2.74431	4.055432	4.610878	2.892185

Panel 4. Correlation Among Indices

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
WORLD (1)	1																
EAFE (2)	0.81	1															
PACIFIC (3)	0.13	0.56	1														
AUSTRALIA (4)	0.16	0.13	-0.05	1													
CHINA (5)	0.04	0.07	0.2	-0.04	1												
HONGKONG (6)	0.02	0.03	-0.01	0.56	-0.01	1											
JAPAN (7)	0.03	0.03	0.07	0.68	-0.03	0.61	1										
KOREA (8)	0.2	0.39	0.53	-0.04	0.14	-0.04	0.02	1									
TAIWAN (9)	-0.01	0.02	0.07	0.39	0.06	0.48	0.53	0.09	1								
BANGLADESH (10)	0.24	0.14	-0.23	-0.04	-0.03	-0.04	-0.12	-0.2	0	1							
INDIA (11)	0.14	0.17	0.17	0.33	-0.02	0.47	0.47	0.07	0.44	0.15	1						
PAKISTAN (12)	-0.05	0.03	0.12	-0.06	0.19	0.09	0.03	-0.01	0.19	0.08	0.07	1					
SRILANKA (13)	0.02	0.09	-0.01	0.16	-0.07	0.16	0.19	0.05	0.22	0.08	0.06	0.12	1				
INDONESIA (14)	-0.1	0.04	0.12	0.24	0.03	0.38	0.36	-0.01	0.46	0.05	0.62	0.45	0.14	1			
MALAYSIA (15)	0.04	-0.07	-0.12	0.19	-0.06	0.33	0.26	0.03	0.39	0.06	0.28	-0.06	0.03	0.12	1		
PHILIPPINE (16)	0.19	0.25	0.11	0.42	-0.21	0.35	0.35	0.02	0.36	0	0.28	0.16	0.04	0.32	0.05	1	
THAILAND (17)	0.05	0.01	-0.08	0.4	0.05	0.51	0.49	0.06	0.63	0.12	0.43	-0.1	0.2	0.34	0.41	0.29	1

Table 2. Holt Winter result

Date: 03/10/10 Time: 15:49

Sample: 1999 2009

Included observations: 154 (each market)

Method: Holt-Winters (No Seasonal)

	Parameter		Sum of Squared Residual	Root Mean Square Error	End period levels	
	Alpha	Beta			Mean	Trends
World	0	0	0.001347	0.004182	-0.00074	-4.58E-05
EAFF	0.52	0.26	5.34E-37	5.69E-20	-0.00477	-4.58E-05
Pacific	0.04	0.1	0.001677	0.004666	-0.00083	-7.22E-05
Australia	0.2	0.01	0.0025	0.003893	0.001388	5.13E-05
China	0.02	0.06	0.008632	0.007233	-0.00204	-4.02E-05
Hongkong	0.12	0	0.006798	0.006419	0.003896	0.000106
Japan	0.14	0.02	0.005166	0.005595	0.001559	2.15E-05
South Korea	0.09	0	0.006162	0.008946	-0.00154	-0.00011
Taiwan	0.02	0.03	0.007243	0.006626	0.000496	2.56E-05
Bangladesh	0.05	0	0.002066	0.003539	0.001665	1.94E-05
India	0.08	0	0.017981	0.010439	0.008372	0.000117
Pakistan	0.02	0.08	0.019201	0.010787	0.001386	0.000143
Sri Lanka	0.03	0.02	0.004111	0.004992	0.001409	2.10E-05
Indonesia	0.01	0.03	0.010312	0.007905	3.29E-05	1.22E-05
Malaysia	0.03	0.01	0.002703	0.004047	0.000308	7.82E-06
Philippine	0.1	0.01	0.006298	0.006178	0.003258	6.50E-05
Thailand	0.12	0.01	0.00825	0.007071	0.003134	1.52E-05

Table 3. Kruskal - Wallis Results in Asian Stock Market

	Kruskal-Wallis	
	Value	Probability
World	1.895475	0.0686
EAFF	1.312159	0.052
Pacific	1.567742	0.0105
Australia	0.366351	0.0545
China	0.364167	0.0546
Hongkong	0.202398	0.0528
Japan	3.857156	0.0495
South Korea		
Korea	0.423071	0.0515
Taiwan	0.031995	0.0580
Bangladesh	1.880579	0.0703
India	0.21227	0.0450
Pakistan	0.016456	0.0979
Sri Lanka	0.236218	0.0627
Indonesia	2.977247	0.0844
Malaysia	0.299705	0.0584
Philippine	1.567742	0.0105
Thailand	0.556812	0.0455

Table 4. Wilcoxon Signed Result

	Wilcoxon Signed	
	Value	Probability
World	1.374956	0.0691
EAFE	1.143689	0.0528
Pacific	1.250288	0.0112
Australia	0.603463	0.0462
China	0.601656	0.0474
Hongkong	0.44808	0.0541
Japan	1.962158	0.0497
South Korea	0.648632	0.0516
Taiwan	0.177064	0.0595
Bangladesh	1.369535	0.0708
India	0.458921	0.0463
Pakistan	0.126474	0.0994
Sri Lanka	0.484216	0.0282
Indonesia	1.723663	0.0848
Malaysia	0.545646	0.0853
Philippine	1.250288	0.0112
Thailand	0.744391	0.0566