CALENDAR ANOMALIES IN THE SHANGHAI STOCK EXCHANGES

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Özet

Bu çalışma Haftanın Günleri Etkisi ve Tatil Öncesi Etkisi şeklinde bilinen takvimsel anomalilerin varlığını Şanghay Borsası üzerinde analiz etmektedir. Bu çalışmaının ana amacını, bahsi geçen takvimsel anomalilerin SSE'de ki varlığının 08 Ekim 2001 – 28 Eylül 2012 tarihleri arasında tespit edilmesi ve kullanılan beş alt grup ile süreklilik açısından değerlendirilmesi oluşturmaktadır. Elde edilen bulgulara göre, takvimsel anaomaliler Şanghay Borsası'ında görülmemesine karşın farklı zaman aralıklarında günlük trendler ortaya çıktığı görülmüştür. Ayrıca, SSE'de görülen takvimsel anomalilerin alt grup incelemesi yapıldığında süreklilik göstermediği ortaya çıkmıştır. Bu nedenle, gerçekleştirilen bu çalışma nazarında, Çin Piyasası'nın etkin olmadığı söylenemez. Bir başka ifadeyle, bu piyasada yatırım yapan katılımcılar, tarihsel verileri kullanarak anormal getiri elde edemezler.

Anahtar kelimeler*: Etkin Piyasalar Hipotezi, Takvimsel Anomaliler, Şangay Borsası.*

Abstract

This paper examines the presence of the day of the week and pre-holiday effect as calendar anomalies evidences in the Shanghai Stock Exchange (SSE), and this presents a challenge to the ongoing theory of efficiency, also termed the Efficient Market Hypothesis (EMH). In particular, this paper aims to examine the presence of these calendar anomalies in SSE during the period from 08 October 2001 to 28 September 2012 and five sub-periods that is designed to determine persistency. The findings from the data analyses show that although the calendar anomalies do not exist in the market, it can be observed that the daily patten does appear days. This research investigated calendar anomalies related to SSE and we figured out that in some periods and in some types calendar pattern, although anomalies has been detected, they are not persistent. Hence, it cannot be claimed that Chinese Market is inefficient and one is expected to beat the market consistently.

Key words: Efficient Market Hypothesis, Calendar Anomalies, Shanghai Stock Exchange.

Introduction

There has been a vast amount of empirical literature about seasonalities in order to expose the nature of predictability in financial markets. These seasonalities or regularities may be exploited by investors to gain abnormal profit in the stock exchanges. However, as in the efficient market hypothesis (EMH) discussed by Fama (1970), no one should beat the market as

the market prices are fully adjusted to the available information. Three forms of efficient markets were explained by Fama, namely weak form; current stock prices reflect the past prices, semi-strong form; available public information is taken into account of current prices and strong form; current securities prices are predicted by all information including both public and private information.

The presence of these market anomalies has been documented for several markets throughout the world under the main idea that '-*information is power-'.* Stock market anomalies, specifically, calendar patterns for our case study, are the systematically predictable variations or seasonal phenomena which occur at specific periods of time, such as monthly or daily patterns (Thompson *et al.*, 2003). Some of the most common calendar anomalies are the Holiday effect, the January Effect, the Day-of-the-week effect, the Halloween effect and so on. Theoretically, stock market anomaly research suggest that if market movements indicate that there is some pattern existing over time, this information can be exploitable and can be challenge to the EMH. Moreover, those seasonalities are not only found in developed markets such as Dow Jones (US) (Ariel, 1987) but also in emerging markets such as Istanbul Stock Exchange, Athens Stock Excahnge and so on (Balaban, 1995).

This paper as mentioned tend to provide some evidences of seasonalities in a fast-developing emerging market, Shanghai Stock Exchange, data of stock prices and whether EMH can be found in this particular market by using two anomalies, namely the day of the week and pre-holiday effect. The structure of this paper can be seen as follows. Section 1 will be used as a discussion and implication of efficient market hypothesis. Section 2 explains data and methodology it employs. Section 3 will discuss the findings of the seasonalities as well as literature reviews. Section 4 will include the argument of this study and the paper will conclude with conclusion.

1. Data and Methodology

We examine the Shanghai Stock Exchange (SSE) market which is the world's sixth largest stock market by market capitalization (Business week March 2, 2007). We used the daily stock price index data (uk.finance.yahoo.ac.uk), from 08 October 2001 till 28 September 2012 in order to test the presence of seasonalities in stock index closing prices return.

For two different types of seasonalities we examine, we use the Ordinary Least Square method (OLS), and more specifically the following equation:

$R_t = \alpha_0 + \beta_n D_n + e$

and null hypothesis is $\alpha_0 = \beta_n = 0$, meaning all days or all months, depending to which effect we test, have the same daily return. The variable D_n is the Dummy variable that takes the value of 1

or 0 for days of the week, and we compute Returns using the equation $R = Log[P_t / P_{t-1}]$. We have also divided the total time period into five subgroups from 2 years each, in order to test the persistency of seasonality effects over shorter periods of time, and have clearer statistical results, according to Coutts and Sheikh (2002).

2. Calendar Anomalies in SSE- Results and Analysis

In this part of the research, we investigated the existence of calendar patterns (day of the week effect, january effect, pre-holiday effect and turn of the quarter effect) in Shanghai Stock Excahnge in whole period and sub-periods by employing descriptive statistics and OLS methods as mentioned methodology section.

2.1. The Day of the Week Effect

One of the most prevalent calendar anomalies appears to be the day of the week effect (DOWE) in stock markets. It refers; the average daily return is not the same for all days of the week, as it would be expected on the fundamental of the efficient market theory (Nath and Dalvi, 2004). In this context, this seasonality has been investigated in both developed and emerging markets. For instance, Jaffe and Westfield (1989)'s investigation shows that typically Monday returns have been negative, whereas Friday returns have been positive in the USA, Japanese and British markets. However, in other markets, it has been observed that negative and lowest returns accured on Tuesday such as the Istanbul stock exchange (Aydogan (1994), Balaban (1995), Ozmen (1997)).

Fields (1934) published the earliest work related to DOWE. After that Merrill (1966) investigated the DOWE and the weekend effect in DJIA and he suggested that the higher possibility of stock price increases in weekdays, excluding Monday. However, the first academically documented weekday anomaly in contemporary finance was published by Cross (1973). He analysed the weekend effect by applying S&P 500 data during the period 1953-1970 and produced the statistically significant result that Monday stock returns were lower than those of the immediately-preceding Friday. Several subsequent studies followed his path to investigate weekday patterns. French (1980) extended the previous researches and analysed the S&P 500 index as Cross had done in 1973. He found that Monday returns were significantly negative and lower than those of other days. Additionally, a study carried out on the S&P 500 by Gibbons and Hess (1981) found that Monday returns were persistently negative, while Wednesdays and Fridays showed positive returns. The presence of these anomalies in the S&P 500 was also shown by Keim and Stambaugh (1984) who found significant positive returns on

Fridays. Furthermore, Jaffe and Westerfield (1985) examined the weekend effect on capital markets throughout the world. They found that weekly phenomena exists.

Nageswari, Selvam and Gayathri (2011) figured out the effect of DOWE on S&P CNX Nifty and S&P CNX 500. According to outcomes they obtained, while the highest positive return is observed in Fridays, the lowest return is appeared in Mondays. Moreover, Sattayatham and Premando (2012) found statistically significant coefficient in Friday which can be interpreted that it will have continous impact in long term by employing MRS-GARCH model.

The existence of the day-of-the-week effect is investigated in South American countries such as Brazil, Argentina, Chile and so on from 1993 to 2007 by Rodriguez (2012). He found significant effect of Mondays and Fridays, which is parallel to literature, in almost all focus countiries.

Table 1. *Summary statistics (Mean and Standard derivation) on the day of the week effect in the SSE Composite Index*

	Observations	**Mean**	**S.D**
Whole Period (01-Oct-01: 30-Sep-11)			
MONDAY	480	0.00017861	0.009344485
TUESDAY	486	-2.83341E-05	0.007147227
WEDNESDAY	487	0.00024325	0.007798046
THURSDAY	481	-0.000288033	0.007332817
FRIDAY	482	-6.37606E-06	0.006864387
Subperiod 1 (05-Oct-09: 30-Sep-11)			
MONDAY	97	0.000900698	0.010177255
TUESDAY	100	-0.000661191	0.007865456
WEDNESDAY	99	0.00022564	0.009046224
THURSDAY	95	-0.000152213	0.007334434
FRIDAY	95	0.000112606	0.007174
Subperiod 2 (01-Oct-07: 05-Oct-09)			
MONDAY	95	0.000666993	0.012890939
TUESDAY	97	-0.000421945	0.010234727
WEDNESDAY	98	0.00067878	0.010437419
THURSDAY	98	-0.000260232	0.010830533
FRIDAY	98	-0.000113377	0.009725606
Subperiod 3 (03-Oct-05: 01-Oct-07)			
MONDAY	95	0.000252394	0.00581354
TUESDAY	96	-8.28308E-05	0.005277761
WEDNESDAY	98	0.000519662	0.007058493
THURSDAY	97	-0.000501366	0.005876571
FRIDAY	98	0.000246963	0.005713294
Subperiod 4 (06-Oct-03: 03-Oct-05)			
MONDAY	97	-1.54686E-05	0.006043609
TUESDAY	98	0.000289265	0.005177996
WEDNESDAY	97	5.45263E-05	0.005362444
THURSDAY	96	-0.000283332	0.005878196
FRIDAY	96	-0.000284685	0.00483217
Subperiod 5 (01-Oct-01: 06-Oct-03)			
MONDAY	96	-0.000782294	0.009611725
TUESDAY	95	0.000711597	0.006158209
WEDNESDAY	95	-0.000263546	0.005992642
THURSDAY	95	-0.000252865	0.005467604
FRIDAY	95	-3.26272E-05	0.005871256

Konak and Kendirli (2014), examined the presence of the day of the week effect as calendar anomaly in the BIST 100 index Before and after the Global Financial Crisis by employing GARCH (1,1) model on the main period and three sub-periods which are pre-crisis period, crisis period and post-crisis period. According to the outcomes, even though they figured out different negative and positive results for the main period and sub-periods, only the negative Monday coefficient observed in the main period is statistically significant at 10% level.

At first glance, Table 1 illustrates that Friday returns have been remarkable less than other week days returns during the last ten years whereas, Mondays' and Wednesdays' returns are positive. In terms of volatility, Fridays' standard derivations are less (but not significant) than others, while Mondays' volatility are the highest, it shows that Mondays are unstable and Fridays are much stable than other days. According to the Table 1 we also observed that this situation not same in each subsamples. For instance, in sub period 3, the lowest return on Tuesdays, while the Fridays' returns are positive. However, the DOWE cannot be explained by using this data. Therefore, we test for the DOWE by using the following OLS equation which is stated in the methodology part.

Table 2. *OLS results on the day of the week effect in the SSE Composite Index*

	Coefficient	*t* Statis.	R-sq.	F-statist.	Pr(>|t|)
Whole Period (01-Oct-01: 30-Sep-11)					
MONDAY	7,61E-01	0.964	-2,94E-02	0.9292	0.335
TUESDAY	-0.0004284	-0.488	-0.00032	0.2385	0.625
WEDNESDAY	0.0013402	1.531	0.000556	2.344	0.126
THURSDAY	-0.0019733	-2.245	0.001671	5.039	0.0249 **
FRIDAY	-0.0002088	-0.238	-0.00039	0.05641	0.812
Subperiod 1 (05-Oct-09: 30-Sep-11)					
MONDAY	0.0050767	2.391	0.009655	5.718	0.0172 **
TUESDAY	-0.0045432	-2.171	0.00761	4.712	0.0304**
WEDNESDAY	0.0008644	0.41	-0.00172	0.1677	0.682
THURSDAY	-0.0014758	-0.689	-0.00109	0.4743	0.491
FRIDAY	0.0001882	0.088	-0.00205	0.00771	0.93
Subperiod 2 (01-Oct-07: 05-Oct-09)					
MONDAY	0.0035935	1.27	0.001263	1.612	0.205
TUESDAY	-0.003267	-1.172	0.000773	1.375	0.242
WEDNESDAY	0.003536	1.274	0.001288	1.624	0.203
THURSDAY	-0.0022515	-0.811	-0.00071	0.6571	0.418
FRIDAY	-0.0013463	-0.484	-0.00158	0.2347	0.628
Subperiod 3 (03-Oct-05: 01-Oct-07)					
MONDAY	0.0010001	0.654	-0.00119	0.4282	0.513
TUESDAY	-0.0011	-0.723	-0.00099	0.5225	0.47
WEDNESDAY	2,60E+00	1.724	0.004064	2.971	0.0854*
THURSDAY	-0.003683	-2.442	0.01017	5.965	0.0150**
FRIDAY	0.0011638	0.771	-0.00084	0.5937	0.441
Subperiod 4 (06-Oct-03: 03-Oct-05)					
MONDAY	0.0001962	0.141	-0.00204	0.01999	0.888
TUESDAY	0.0020845	1.5	0.002585	2.249	0.134
WEDNESDAY	0.0006305	0.454	-0.00165	0.2065	0.65
THURSDAY	-1,49E+00	-1.067	0.000287	1.138	0.287
FRIDAY	-1,48E+00	-1.06	0.000255	1.123	0.29

Subperiod 5 (01-Oct-01: 06-Oct-03)

MONDAY	-2,07E+00	1.905	0.005517	3.63	0.0574*
TUESDAY	0.0049232	3.031	0.01698	9.186	0.00257***
WEDNESDAY	-0.0011329	-0.691	-0.0011	0.4777	0.49
THURSDAY	-0.0010666	-0.651	-0.00122	0.4233	0.516
FRIDAY	0.0003012	0.184	-0.00204	0.03373	0.854

Note: * 1% level, ** 5% level, * 10% level.**

According to the Table 2, it can be clearly observed that the P-value of the Thursday returns is statistically significant at 10% level, while Mondays and Fridays showed positive and negative returns (but not significant) respectively in whole period. However, it has not been realized any significance in sub period 2 and 4. Nonetheless, in other sub periods some significant returns has appeared in different days such as Mondays and Tuesdays returns in subsample 1 which are significantly positive and negative respectively. Therefore we can reject the null hypothesis for whole period, sub periods 1, 3 and 5 on the SSE Composite index. Hence, we tentatively conclude that the SSE Index displayed a DOWE in entire period and some sub-samples, although this effect was not persistent so that the Shanghai Index is not inefficient in terms of the day of the week effect in the weak form market efficiency theory.

2.2. Pre-holiday efffect

One of the most famous seasonalities is the pre-holiday effect. It's a kind of effect that the returns of the last trading days before holiday usually get a higher level than that of common days. Barone (1990) claims that returns of the last trading days before holidays were obviously higher than that of common days in Italian stock market. Arsad and Coutts (1997) realized that there was pre-holiday effect in FTSE-30 during the period of 1935-1994.

In recent years, Chong *et al*. (2005) extended the scope of precious research in order to identify whether the holiday effect had declined in the leading international markets such as the UK, Hong Kong and the US. Their findings indicated that the market pattern had been declining in all cases of their study, while only one stock market, which is in the US, had a statistically significant effect. Finally, Marrett and Worthington (2009) examined the Australian markets in the context of small-cap firms during the period 1996-2006. They found that the holiday effect existed overwhelmingly in retail markets and that no statistically significant return was anticipated on post-holidays for all the markets in the country.

Table 3. *Summary statistics (Mean and Standard derivation) on the pre-holiday effect in the SSE Composite Index*

	Observations	Mean	S.D.
Whole Period (01-Oct-01: 30-Sep-11)			
Other day	2367	0.0000392	0.017157
Pre-holiday	48	0.0049284	0.013068
Subperiod 1 (05-Oct-09: 30-Sep-11)			
Other day	467	-0.0004382	0.0143676
Pre-holiday	8	0.0020419	0.0059757
Subperiod 2 (01-Oct-07: 05-Oct-09)			
Other day	476	-0.0002662	0.0122448
Pre-holiday	8	0.0002964	0.0102026
Subperiod 3 (03-Oct-05: 01-Oct-07)			
Other day	476	0.0004144	0.0133841
Pre-holiday	8	0.0037059	0.0111886
Subperiod 4 (06-Oct-03: 03-Oct-05)			
Other day	474	0.0002852	0.0245883
Pre-holiday	11	0.0121830	0.0215058
Subperiod 5 (01-Oct-01: 06-Oct-03)			
Other day	474	0.0001943	0.0190283
Pre-holiday	13	0.0041689	0.0076877

Table 3 above shows that the pre-holiday have a remarkable mean return which is far more than other day's mean return during the last 10 years, even in the each sub period the pre-holidays have also stronger return than the other days'. And meanwhile the St.deviation of the pre-holiday returns is always significantly less than that of other day, it illustrates that the returns before holiday is much stable than other days. However, we cannot judge if the pre-holiday effect exists in the market only depend on this table.

Table 4. *OLS results on the pre-holiday effect in the SSE Composite Index*

	Coefficient	t-statistic	P-value	R^2	F-statistics
Whole Period (01-Oct-01: 30-Sep-11)					
Intercept	3.927e-05	0.111	0.9119		
Pre-holiday	4.889e-03	1.943	0.0521*		
				0.001563	3.776*
Subperiod 1 (05-Oct-09: 30-Sep-11)					
Intercept	-0.0004391	-0.664	0. 507		
Pre-holiday	0.0024810	0.487	0.627		
				0.0005007	0.2369
Subperiod2 (01-Oct-07: 05-Oct-09)					
Intercept	-0.0002662	-0.475	0.635		
Pre-holiday	0.0005626	0.129	0.897		
				3.461e-05	0.01668
Subperiod 3 (03-Oct-05: 01-Oct-07)					
Intercept	0.0004144	0.677	0.499		
Pre-holiday	0.0032915	0.691	0.490		
				0.0009906	0.4779
Subperiod 4 (06-Oct-03: 03-Oct-05)					
Intercept	0.0002852	0.253	0.800		
Pre-holiday	0.0118978	1.590	0.112		
				0.00521	2.529
Subperiod 5 (01-Oct-01: 06-Oct-03)					
Intercept	0.0001947	0.225	0.822		
Pre-holiday	0.0039742	0.750	0.454		
				0.001158	0.5624

Note:***statistically significant at the 1% level, **statistically significant at the 5% level,
*statistically significant at the 10%level

According to the Table 4, it can be clearly observed that the P-value and the F-statistics of the pre-holiday return is significant at 10% level. Although the coefficient of the pre-holiday are always positive and much more than that of intercept in the each subperiod, all the five subperiods on the SSE Composite index have no significant level. Therefore we can only reject the null hypothesis for the whole period and cannot reject the five subperiods on the SSE Composite index. There is a pre-holiday effect during the last 10 years, but there is not any pre-holiday effect that can be found during the each subperiod.

Conclusion

This paper has indicated what the four main seasonalities(the January effect, the pre-holiday effect, the day of the week effect, the turn of the quater effect) are through the way to test the existence of the two seasonalities in the SSE Composite index. The initial conclusion being that the pre-holiday effect and the day of the week effect exist for the whole testing period. Yet, the both don't exist for all of the five 2-year subperiods. Meanwhile, the other three effects cannot be found in the index during the past 10 years. Although the text does not investigate the existence of all the four seasonalities, the process of the text can clearly solve the most impotent question that what these seasonalities are.

This study has also illustrated the market efficiency that the Chinese market is an inefficient market depending on the result we make from the four seasonalities. Although the pre-holiday effect and the DOW effect can be found in the SSE Composite index during the whole period, they cannot beat market consistently because of the subperiods' data.

Taking all into consideration, this research investigated calendar anomalies related to SSE and we figured out that in some periods and in some types calendar pattern, although anomalies has been detected, they are not persistent. Hence, it cannot be claimed that Chinese Market is inefficient and investors connot employ these pattern in order to obtain abnormal profit. In other words one is not expected to beat the market consistently.

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