Market efficiency anomalies
A study of seasonality effect on the Chinese stock exchange
Abstract

The Chinese stock market is a remarkable emerging market, the two stock markets Shanghai and Shenzhen Stock Exchanges were both established in 1990, and since then they have been playing a very important role in Chinese economy. More and more attention is focused on the emerging Chinese market, and investors have been trying to find the opportunity to achieve abnormal returns through the Chinese stock market. We name this phenomenon market efficiency anomaly, one pattern of which is seasonality effect. In our study, we would like to choose the seasonality effect as the approach.

This study focuses on Shanghai Stock Exchange Composite Index, and we settle two research questions:

**Does seasonality effect exist in Chinese Stock exchange?**

**Is the seasonality effect persistent over times?**

We try to test the seasonality in Chinese stock market by **day of the week effect**, **January effect and semi-month effect**. Deductive approach and quantitative research method are used in this thesis. To analyze seasonality effect, the data has been collected from Shanghai Stock Exchange Index and has been tested in four periods: 1992-1996, 1997-2001, 2002-2006 and the whole period 1992-2006. Null hypothesis and T-test with $\alpha=0.05$ is used to test the seasonality effect. The results show that seasonal anomalies like Day of the week effect, positive March effect, and negative July effect exist in the Chinese stock market, while semi-month effect does not occur significantly; but the existing seasonal effect is not persistent over times. The above indicates that the Chinese stock market is not fully efficient yet. Investors may have opportunities to make use of the seasonal anomalies to earn abnormal return. However, the study is based on the historical data, but the future stock price is affected by lots of factors; and like in other invested stock markets, as soon as the seasonal anomalies is certified by the public, the opportunity of making excessive return by profitable trading strategies will disappear at once.

**Key Word:**

Chinese stock market market efficiency anomalies seasonality effect
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Chapter One: Introduction

This chapter gives a general introduction of the research area within this thesis. First we have a description of Chinese stock market current situation, which aims to lead the readers to our research questions and study purpose. Following we present the limits we can not reach by this study, thereafter the important definitions are displayed, finally we illustrate the outlines of our thesis.

1.1 Problem Background

China is a big developing country with huge population and market size. With the reform of Chinese economy, China is realizing the progress from plan economy market to the capital market economy. The facts tell us that China is very successful in the economic development during the last 30 years, while it attracts big attention from all over the world. The world factory, the engine of the world economy, such titles have been given to China. That can only prove one thing, the Chinese economy is soaring. To accelerate the capitalization, the Chinese government started to establish the stock exchange from 1990.

During the development of Chinese stock exchange market, researchers have tried to find whether the Chinese stock market is efficient or not. If the market is not efficient, there will exists some market efficiency anomalies, then the investors can gain some abnormal returns by using well planned strategies within the market. The market efficiency anomalies contradicts efficient market hypothesis (EMH). It believes that there are some abnormal returns can be digged within the stock market. One of the most discussed anomalies phenomenon is seasonality effect. Sometimes we also call it calendar effect, for instance, the day of the week effect, the January effect, semi-month effect. Ritter showed that the ratio of stock purchases to sales of individual investors reaches an annual low at the end of December and an annual high at the beginning of January. The day-of-the-week effect shows that the stocks returns are generally lowest on Mondays and highest on Wednesdays and Fridays. The semi-month effect indicates that the stock return in first half of the month is higher than that in the second half.

According to the above mentioned market efficiency anomalies studies, Is it interesting to have a study about the market efficiency anomalies on Chinese stock market? Before moving on, we would like to have a further look into the Chinese stock market.

China is a remarkable emerging market, while the Chinese stock market is emerging as well. Currently there are 2 stock exchanges in China mainland, Shanghai stock exchange and Shenzhen Stock Exchange; they are all inspected under China Securities Regulatory Commission. Both of the stock exchanges were established in 1990, and have been

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developing a lot in the past decades and they have been playing a very important role in Chinese economy. For instance, when it was founded in 1990, there were only few companies listed in Shanghai stock exchange and the market value was low, but the market value increased to 5335.613 in 1996. So far there have been 857 companies listed, and the total market value is up to 246238 4 billions Chinese Yuan till December 2007. In Shenzhen Stock exchange, the listed companies’ amount is to 644 and the market value is up to 5149.3245 billions Chinese Yuan till October 2007. Since the beginning the Chinese stock exchange has been defined as an instrument of refinancing the state owned enterprises. With the development of capitalization in China, more private investors engage in the stock market and the stock market has been playing a more and more important role in Chinese economy.

The Chinese stock market has got great achievements during the past years. It is already marked as one of the big stocks market in Asia. The tremendous currency not only floats from the domestic investors but also from the international investors, as the existing potential opportunity to dig more profit. Basically, the Chinese stock market can well allocate the capital resource, which is a very solid step to push the Chinese economy into the market economy. The Chinese investors have been injected more ideas about how to bear the risks and how to make investment strategies. The listed companies in the Chinese stock market are the big beneficiary: they can collect the funds from the stock market and their company governance is much closer to the international standard, which is also an important aim of Chinese economic reform. The Chinese stock market has helped the firms construct a better capital structure, especially the state owned enterprises.

In spite of the great development of the Chinese stock market, there are some vital phenomena we can not ignore. Since China just has a short history of market economy after the economic reform from command and control economy and the history of the stock market is also quite short, the emerging market is efficient or not is in doubt. In the market, the information system is not that transparent, the investors are very limited to the information and the information can not be just released to the public smoothly. Under such background, we would like to test whether market efficiency anomalies which contradict the efficient market hypothesis exist in the Chinese stock market. Furthermore, are there any seasonal anomalies opportunities can be digged?

1.2 Research Questions

According to the above mentioned facts and our interest, we decided to confine our problems to the market efficiency anomalies, and the question of our research will be settled as followed:

1 Does seasonality effect exist in Chinese Stock Exchange?
2 Is the seasonality effect persistent over times?

5 http://www.szse.cn/ cited 2007-10-28
1.3 The Purpose of the Study

To investigate the seasonality effect in Chinese stock exchange market, we use the daily closing stock price data from Shanghai Stock Exchange Composite Index to test day of the week effect, January effect and semi-month effect, and we also evaluate whether there is any persistent seasonality existing over the tested periods.

1.4 The Limitation

The test will be limited to Shanghai Stock Exchange Composite Index, whereas the Shanghai Stock Exchange is very representative, but due to the varied operation and situation of the other stock exchange, we have to say that our testing result may not reach the absolute real condition. The seasonality effect will be evaluated by testing day of the week effect, January effect and semi-month effect due to the time limit, while it is always nice to test more variety of seasonality effects to have a fuller picture.

1.5 The Definitions

Efficient Market Hypothesis

The prices of securities fully reflect available information. Investors buying securities in an efficient market should expect to obtain an equilibrium rate of return. Weak-form EMH asserts that stock prices already reflect all information contained in the history of past prices. The semi-strong form hypothesis asserts that stock prices already reflect all publicly available information. The strong-form hypothesis asserts that stock prices reflect all relevant information including insider information.\(^6\)

Market Efficiency Anomalies

Market efficiency anomalies are evidence that seems inconsistent with the efficient market hypothesis, for instance, seasonality effect, and book-to-market ratio, price to earning ratio, post-announcement earning drift and small firm effect.

Seasonality Effect

Seasonality effect, we can also call it calendar effect. Seasonality in stock returns is a subject closely related to week-form-efficiency. When week-form-efficiency is analyzed the relevant information set is restricted to previous prices, seasonality in stock returns as a persistent phenomenon implies that investors have different required rates of returns on

\(^7\) Ibid.,p.359
risky assets depending for instance on which calendar month a monthly investment span\textsuperscript{8}.

**Day-of-the-Week Effect**

Day of the week effect is primarily relating to stock market patterns occurring on Friday and Monday trading days. The tendency for stock prices to rise on Fridays and fall on Mondays. With more evidence appearing, the day of the week effect not only occurs on Mondays and Fridays but also on the other days among the world stock markets\textsuperscript{9}.

**Month of the Year Effect (January effect)**

The month of the year effect is described by the existence of patterns in stock returns during a particular month of the year; the most discussed effect is the January effect. The January effect is associated with the higher average stock returns in January compared with the other months of the years\textsuperscript{10}.

**Semi-Month Effect**

Semi-month effect first studied by Ariel (1987), the stock returns from the first half of the month are significantly higher than the second half of the month\textsuperscript{11}.

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\textsuperscript{8} Berglund, T., Anomalies in Stock Returns on a Thin Security Market, the Swedish School of Economics and Business Administration, Helsinki, 1986, p.95

\textsuperscript{9} Anthony J., Arline A., The January effect and other seasonal anomalies: A common theoretical framework, 2000, JAI PRESS INC., p.267


1.6 Disposition

Chapter Two. Theoretical Framework:
In this chapter we go through the relevant theories of our study. First we introduce the market efficiency and efficient market hypothesis, then the contradicting study market efficiency anomalies are presented. The market efficiency anomalies study focuses on the seasonality effect: Day of the Week Effect, January Effect and Semi-month Effect.

Chapter Three. Methodology:
In this chapter we display the principle of how we guide our study. First the choice of subject, the preconceptions of the authors’ and the perspective of the study are given, followed by research philosophy, then we explain how we approach our study, and after the qualitative and quantitative methods are evaluated, the collection of secondary data is displayed. At last, more is explained about the statistic methods we adopt in this paper.

Chapter Four. The Chinese Stock Market and Data Collection:
In this chapter we talk about the Chinese stock market, the focus is laid on Shanghai stock exchange. Also, we try to explain how we collect the data and how to process the data.

Chapter Five. Empirical Analysis and Results:
In this chapter we lay out the essential part of our study. We explain how we perform our hypothesis test, and the test results are displayed, furthermore we also have a detailed explanation about our empirical results.

Chapter Six. Conclusions and Recommendations:
In this chapter we sum up our study in a general way, and further study suggestion is carried out.

Chapter Seven. Research Evaluation:
In this chapter we evaluate the reliability and validity, and generalizability of our research.
Chapter Two: Theoretical Framework

This chapter starts with an introduction to market efficiency, then we present a framework of efficient market hypothesis, following the three forms of EMH are displayed. Market efficiency anomalies are against the efficient market hypothesis (EMH), one perspective of which is seasonality effect. Here the three patterns of seasonality effect we try to test in Chinese stock market are given: Day of the Week Effect, January Effect and Semi-month Effect. At last, we have a little touch about the other anomaly effect.

2.1 Market Efficiency

2.1.1 A Brief History of Market Efficiency

The first one who mentioned the market efficiency is Bachelier (1900) when he wrote his PHD thesis. When we talk about the market efficiency, the random walk theory is usually mentioned. The first one who found the random walk model is Kendall, when he examined 22 UK stocks and commodity price series; he accidentally got the conclusion that “in series of prices which are observed at fairly close intervals the random changes from one term to the next are so large as to swamp any systematic effect which may be present. The data behave almost like wandering series”, this finding is named random walk theory, which is very famous and is the base of the later market efficiency studies. When the people had a very good understanding of market price information, they started to use the random walk model to test the efficient market hypothesis. Samuelson proved “In competitive markets there is a buyer for every seller. If one could be sure that a price could rise, it would have already risen”, which fully supports that the market price can not be predicted and follows a random fluctuation. Basing on Samuelson’s study Fama (1970) worked out his enormous financial theory efficient market hypothesis, while it is the cornerstone of market efficiency studies.

2.1.2 The Efficient Market Hypothesis

The market efficiency has been a long time debated topic. Actually in 1965 Fama first indicated the efficient market, which is defined where there are large numbers of rational,

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14 Samuelson, Paul (1965), The proof that properly Anticipated Prices Fluctuate Randomly, Industrial Management Review, 6, p.41-49
profit-maximizers actively competing, with each trying to predict future market values of individual securities, and where important current information is almost freely available to all participants. In 1970 Fama established efficient market hypothesis, which has been widely accepted and many researchers has tried to test it by using different empirical examples. Fama Said: “A market in which firms can make production-investment decisions, and investor can choose among the securities that represent ownership of firms’ activities under the assumption that security prices at any time ‘fully reflect’ all available information”. It is more about how to allocate the capital for the company under the precise information. The company will allocate their resources according to the signals within the capital market, and price will be the best indicator.

Fama’s work based not only on the theoretical but also the empirical works. The research reviewed some historical studies and also tested the hypothesis by using some models, such as fair game model, expected return model and random walk model. The hypothesis based on some preconditions:
1. There is no transaction cost in trading securities
2. All available information is costless available to all market participant
3. All agree on the implications of current information for the current price and distributions of future prices of each security. The hypothesis actually based on the perfect situation.

Under the EMH the information is unbiased, indicating we can not use the historical price to predict the future return, and the price should be random. The investors can not speculate by buying the undervalued stocks or selling the inflated stocks. They should trade in the stock market with the fair price. The new information or the signal will appear in the future randomly, which is defined unpredictable, and the investors can not just outperform within the market by using the already released information, unless they have really good luck.

Bodie & Kane defines efficient market hypothesis that the prices of securities fully reflect available information. Investors buying securities in an efficient market should expect to obtain an equilibrium rate of return. Weak-form EMH asserts that stock prices already reflect all information contained in the history of past prices. The semi-strong form hypothesis asserts that stock prices already reflect all publicly available information. The strong-form hypothesis asserts that stock prices reflect all relevant information including insider information.

2.1.3 Weak Form Efficiency

17 Ibid., p.387
The weak-form hypothesis asserts that stock prices already reflect all information that can be derived by examining market trading data such as the history of past prices, trading volume, or short interest\textsuperscript{19}. This version of the hypothesis implies that trend analysis is fruitless. Past stock price data are publicly available and virtually costless to obtain. The weak-form hypothesis holds that if such data ever conveyed reliable signals about future performance, all investors already would have learned to exploit the signals. Ultimately, the signals lose their value as they become widely known because a buy signal, for instance, would result in an immediate price increase\textsuperscript{20}. The weak form hypothesis is the most tested form comparing to the other forms, and many researchers have tried to work on it.

Fama (1991) revised his work about the weak form hypothesis, instead of only testing the past returns, he covered more general areas. The new revised weak form hypothesis is named as “test for return predictability”, which also includes the burgeoning on forecasting returns with variables like dividend yields and interest rates\textsuperscript{21}.

### 2.1.4 Semi-strong Form Efficiency

Fama said “semi-strong form efficiency, in which the concern is whether price efficiency adjust to other information that is obviously publicly available are considered”\textsuperscript{22}. The semi-strong form includes the past price that is considered in the weak form, besides, some other information should also be available, such like fundamental data on the firm’s product line, quality of management, balance sheet composition, patents held, earning forecasts, and accounting practices\textsuperscript{23}. If the semi-strong form holds, the publicly available information will be incorporated with the price, in other words, the price will fully reflected the publicly available information. In 1991 Fama created a very common name for semi-strong form efficiency, event studies\textsuperscript{24}. For the researchers who want to test the semi-strong form efficiency, the sample size is very important, and they have to measure how quickly the stock prices can respond to the information announcement.

### 2.1.5 Strong Form Efficiency

The strong form tests concerned on whether given investors or groups have monopolistic
access to any information relevant for price information is reviewed\textsuperscript{25}. This hypothesis indicated that the stock prices can reflect all the information relevant to the firm, even the information only accessible to the company insiders. We can define the insiders as the financial experts or the managers of the publicly trade firms. If the insiders have monopolistic power to access to some information, they are possible to generate larger return than the average level, and they can also use the information before it reaches to the public to gain some advantages.

Actually the strong form hypothesis is an extreme case, which includes the information from semi-strong form and also the information available only to the corporate insiders. Fama (1991) changed the semi-strong form hypothesis into test for private information, thereafter trying to examine whether the corporate insiders can have the private information. The evidence of the test can prove that the corporate insiders can have the private information to make more profits over the normal investors. At the same time, Fama also tried to examine the mutual fund and pension fund managers’ ability to generate the abnormal profit. The results tell us that the professional investors generally have no ability to make more profit by following the corporate insiders, and the exceptions are so sparse\textsuperscript{26}.


2.2 Market Efficiency Anomalies

With the development of Efficient Market Hypothesis, some contradicting studies-market efficiency anomalies are also going on. Market efficiency anomalies are evidence that seems inconsistent with the efficient market hypothesis. There are some very significant studies we should mention here. Basu (1972) has used the P/E(price earning ratio) to test the market efficiency, he assumed that the low P/E securities can over perform the high P/E ratio securities, and he chose data from April 1957 to March 1971. Finally Basu draw the conclusion that “On average information that was implicit in P/E ratio was not fully reflected in security prices in as rapid a manner as postulated by the efficient markets hypothesis. Rather, it seems that during the period studies, disequilibria persisted in the NYSE, and securities with different P/E’s, on average, were inappropriately priced vis-a-vis one another”\(^{27}\), the solution of Basu in a sense is against Fama’s EMH, as the test is pretty valid. Ball (1978) documented that the post-announcement earnings consist excessive returns. If the information is publicly good, then it is inconsistent with the market efficiency\(^ {28}\). This anomaly is named post-announcement earning drift. Banz (1981) has examined the relationship between the return and total market value of NYSE common stocks, he found the problem that the smaller firms had the higher value than the big firms in risk-adjusted returns on average, and the size effect existed more than 40 years and the CAPM has been mispriced\(^ {29}\). The earning and size anomalies are not the only challenge to the market efficiency hypothesis. We can review more studies from the other famous researchers.

DeBondt and Thaler (1985) mentioned that most of the time the investor will overreact to the dramatic event. They tried to test whether the events will affect the stock price, and the evidence from CRSP monthly return data is consistent with the overreaction hypothesis. Portfolios of prior losers are found to over perform the prior winners, 26 months after the portfolio formation; the losing stocks have earned 25% more than the winners, even though the latter are significantly riskier\(^ {30}\). Ritter (1991) said “using a sample of 1526 IPO’s that went public in the US in the 1975-84 period, I find that in the 3 years after going public these firms underperformed a set of comparable firms matched by size and industry”\(^ {31}\), the initial investment in these shares have underperformed at the first date of trading.

According to the above mentioned studies, market efficiency anomalies can be defined as, a phenomenon, which is persistent, that contradicts the hypothesis of market efficiency\(^ {32}\).

\(^{27}\) Basu, Sanjoy, The information content of price earning ratios, Financial Management(1972), Summer 75, Vol 4, Issue 2, p.53-64
\(^{29}\) Banz Rolf, The relationships between return and market value of common stocks, journal of Financial Economics Vol 9,1981, p.3-18
\(^{32}\) Berglund, T., Anomalies in Stock Returns on a Thin Security Market, the Swedish School of Economics and
Ever since the announcement of Fama’s efficient market hypothesis in 1970, the inconsistent studies has been performing against continually. In the real science, there are much clear evidence that beat the market by using some investment strategies, for instance the famous Warren Buffett has focused on the undervalued stock strategy to generate millions of profits and some funds managers have showed their capability in making better portfolio than the average investors. The above mentioned facts happened indeed in the real life, but if we want to have a thorough understanding of the market efficiency anomalies, we have to look at some theoretical frameworks systematically. Therefore the following we will present some very popular studies done by the former researchers, since we can not present all the studies due to the huge amount of the former people’s works. After the presentation of anomalies theoretical work, the readers can have a good effort to understand our empirical works.

### 2.2.1 Seasonality Effect

Seasonality effect also is called calendar effect. We can simply see from the meaning of words, it is about the time. Actually, the seasonality effect which includes many effects dealing with the time is one of the main patterns of the market efficiency anomalies. The people try to specify a certain period of time or a group of time to test the special phenomenon about the stock returns, then to see if any rules we can follow or any speculation opportunities we can catch. The calendar effect include: January effect, the day of the week effect, the month of the year effect, monthly effect, holiday effect, Monday effect, Weekend effect, turn of the year effect etc. Here we will give some detailed expressions about day of the week effect, January effect and semi-month effect.

### 2.2.2 Day of the Week Effect

The day of the week effect has been a hot topic for decades. The most common case is the Monday effect, meaning that the Monday’s average return is significantly lower than the other days’ average returns. The Fridays normally present the highest return over the most of the stock markets of the world. However, some special case appeared after some empirical studies broadly in different stock markets, for instance in some market the Tuesday effect exists instead of the Monday effect.

During the past decades, many studies about the day of the week effect have been carried out. The most discussed market is US stock market, a study from Gibbons and Hess (1981) reported the US stock market from 1962 to 1978. They found that the Monday returns are much lower than the other days’ returns and the Friday returns are much higher than the other day’s returns. Keim and Stambaugh (1984) used the data from US Business Administration, Helsinki, 1986, p.26

stock market from 1928 to 1982, and they also provided evidence that the Monday negative returns and Friday positive returns on US market\(^{34}\).

In addition to the US evidence, we have also many international stock market illustrations about the day of the week effect. We can see that the result of testing the multiple countries is varied and a broader picture appears to us. Jaffe and Westerfield (1985) found that the weekend effect appeared in Australia, Japan, The United Kingdom and Canada, as Japan shows a very high stock return on the last trading day of the week-Saturday, Japan and Australia both shows very significant lower returns on Tuesday\(^{35}\). A study of Agrawal and Tandon (1994) tested eighteen countries, in which they found large and positive returns on Fridays and Wednesdays over most of the countries, and most of the countries showed lower or negative returns on Mondays and Tuesdays\(^{36}\). Another international study from Balaban, Bayer and Kan (2001) observed 19 countries, they were Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Italy, Japan, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, UK, USA\(^{37}\). This study is very representative, as it almost covers all the major stock exchanges in the world. They found that 14 countries had the negative Monday’s returns, but only Austria, Canada, Japan and New Zealand were significant. Austria, Germany and Netherlands had the negative Tuesday’s effect, only Japan had the positive Tuesday’s effect. There was no significant negative Wednesday’s effect found among countries, only some positive Wednesday’s effect found in Hong Kong, Japan and New Zealand. The Netherlands and New Zealand had the negative Thursday’s effect, the positive Thursday’s effect found in Japan and New Zealand. New Zealand was the only one had the positive Friday’s effect; oppositely Austria and Germany had the negative Friday’s effect\(^{38}\). To have a fuller picture of the day of the week effect, we can also review the study on the Asia pacific market. A study from Ho (1990) tested 10 Asia Pacific countries and also USA and UK, 5 countries were consistent with USA which had the Monday negative returns, but only Malaysia and Philippines were significant. In contrary, New Zealand had a significant positive Monday return. The UK had a significant negative return and USA had an insignificant negative return. Australia, Japan, Malaysia, Thailand, and Philippines had a negative Tuesday effect, New Zealand and Taiwan had a positive Tuesday effect, and UK also had a positive Tuesday effect. Hong Kong, Japan, Korea, Taiwan and Australia had positive Wednesday effect, so the UK and US were same. Australia, Malaysia, New Zealand, Philippines, Singapore and Thailand had significant Thursday effect, but not UK and US. Except Taiwan and US, most of the countries have positive Friday effect, but we have to mention that Japan, Korea and Taiwan had the trading day Saturday\(^{39}\). Although there is different effect during the week days among the countries,


\(^{35}\) Jaffe, J. And R. Westerfield, the week-end effect in common stocks returns: The international Evidence, Journal of Finance, 40(1985a), pp.433-454


\(^{38}\) Ibid.

\(^{39}\) Yan-Ki Ho, Stock return seasonalities in Asia Pacific Markets, Journal of Financial Management&Accounting, Spring90, Vol 2, Issue 1, p.47-77
but we can still see that 6 out of the ten Asian countries have the highest Friday return. From the above mentioned facts we can say that the day of the week effect is a very popular anomalies phenomenon.

In spite of the above mentioned evidence, we have also some contradicting studies against the day of the week effect. Connolly (1989) used some US indices from 1963 to 1983, he concluded that the weekend effect was smaller than previously believed and may have ceased to exist by the mid-1970s, and thereby he supported the efficient market hypothesis. Jaffe, Westerfield and Ma (1989) have studied the indices from US, UK, Japan, Canada and Australia, and they found that abnormally low or negative Monday effect virtually disappeared.

To be clear, why there is the day of the week effect, we provide some recommendations from some professional researchers. One suggested reason is that Monday is the day with lowest trading volume, that the propensity of individuals to transact on Monday is highest relative to other days of the week and that that of institutions is the lowest, and that the propensity of individuals to sell on Monday is higher than their propensity to buy. The other suggested reason is that the settlement cost has been used to explain day of the week variations. There are 5 trading day in a stock market, if the settlement day is the second trading day, the Thursday return will be higher than rest of the week days. If a investor buy on the Wednesday’ close price and sell on the Thursday’s close price, then he will earn the high Thursday return. Another suggested reason is about the individual investors’ behavior, the individual investors want to sell more on Monday due to the reason that the bad news always released the prior week, and the individual investors tend to use Monday as the opportunity to satisfy the liquidity needs. So far, we could not find any explanation about day of the week effect which can be fully satisfied with. It is hard to say that we can generate abnormal return by using the day of week effect anomalies. It is always possible to find abnormal returns for short periods, but it seems a much harder task to generate abnormal returns over a longer period, as anomalies vary over time and tend to disappear or even reverse after they have been discovered.

2.2.3 January Effect

January effect is the most studied pattern of month of the year effect. It is defined that the

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January stock return is higher than the other months of the year, and it is caused normally by a significant low return in December.

Rozeff and Kinney (1976) had a study of New York Stock exchange prices for the period from 1904 to 1974; they found that the average return in January was approximately 3.5%, while the return in January was much higher than average returns in the other months\textsuperscript{46}. The study really attracts a lot of attention, and many researchers try to test this finding. One of the most famous studies performed by Gultekin and Gultekin, they conducted their study by using 17 countries, and they found the evidence that the January return is much higher than the other months’ returns\textsuperscript{47}. This is very strong evidence against market efficiency hypothesis, and this study makes the January effect a international orientation.

After the January effect is proved, there are many studies trying to explain why the January effect exists, and one of the most discussed reasons is tax-loss selling hypothesis. According to this hypothesis, normally the investors will sell the losing stocks until the end of the tax year. They try to increase the capital losses, and then they can reduce the burden of the tax liability. The consequence is that the declining stocks has to face a downward pressure, but at the beginning of the next year the downward pressure will disappear due to the absence of selling pressure, therefore the stock prices can gain their real market value. As we have known that this phenomenon can generate big stock abnormal returns at the turn of each tax year. There are some supportive evidence to the tax-loss selling, such like Reinganum (1983) and Ross (1983). Reinganum’s study is concerning about the US capital market\textsuperscript{48}, and Roll’s study discusses that the small firms will be affected more by the tax-loss selling hypothesis than the big firm\textsuperscript{49}. However, there are still some cases the tax-loss selling hypothesis can not explain. A study from Brown (1983) provided the evidence of stock return monthly effect happened in both January and July, as the beginning of the tax year of Australia is July\textsuperscript{50}. Reinganum and Shapiro used the London Stock Exchange data to test the seasonality; the result was that the tax effect happened both in January and April, because the individual investors choose April as the tax year\textsuperscript{51}. Another test by Ho (1990), he provided the evidence that most of the Asian countries have no January effect, there was no support to the tax effect, although 3 out of 9 countries showed the significant tax effect\textsuperscript{52}. As the tax-loss selling is not the satisfactory explanation to the January effect, we have to view the other explanations.

\textsuperscript{52} Yan-Ki Ho, Stock return seasonalities in Asia Pacific Markets, Journal of Financial Management&Accounting, Spring90, Vol 2, Issue 1, p.47-77
Another explanation of the January effect suggests that abnormal returns in January are due to the new information provided by the firms at the end of the fiscal year\(^{53}\), just like the financial earning announcement is made normally in January; it could be a very powerful influencing factor to push up the stock returns.

One more explanation to the January effect could be the firm size. Rogalski and Tinic (1986) found that the small firms had the significant higher risk in the beginning of the year than the rest of the year\(^{54}\). Hence, according to the capital asset pricing model the investors should have higher return, because they have to get some compensation for the higher risk they take in the beginning of the year.

The last explanation is the structure problem causes the January effect. Keim (1989) found systematic tendencies for closing prices to be recorded at the bid in the last traded in December and at the ask in early January, which caused the return to be very high in the first few days of January, even the bid-ask spread was not changed. The tendency is especially sensitive for the small firm, so we can say the small firm caused bias is a main attribution to the January effect\(^{55}\). We have mentioned several reasons how the January effect happens, but no one can fully explain the January effect, even the most popular tax-loss selling hypothesis still can not explain some extreme cases, therefore the more study are expected to be carried out to have a better explanation to the January effect.

2.2.4 Semi-month Effect

To define the semi-month effect, we can start by looking into the study from Arief (1887), who first provided evidence that the first half of the month had higher return than the rest of the days of the month by using CRSP data from 1963 to 1981, and the difference was almost one percent high\(^{56}\). Lakonishok and Smidt (1988) tried to examine the semi-month effect by using the DJIA data from 1897 to 1986, the result is not that significant like Arief’s study, and the first half month returns is 0.24 percent higher than the rest of the days\(^{57}\). Their findings are the strong evidence that the semi-month effect does exist, which is the base of the studies in the following time.

There are some suggested reasons why the turn of the month effect occurs, and the famous 3 potential explanations is from Arief\(^{58}\): new information concerning corporate cash flow, changes in the risk free rate, changes in the preferences of market participants.

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leading to variations in demand for securities, which can not be offset by adjustment in supply. But the hypothesis is really doubtful, as some evidence has been provided against it.

The above mentioned theoretical work all belongs to calendar effect. As the anomalies study is a system framework, hereinafter we would like to have more interpretation about market efficiency anomalies.

### 2.2.5 The Other Anomalies

**Price to earnings ratios**

The price to earnings ratio is a financial measure; it uses the price which the companies pay for one share divided by the profit the company earns from one share. It is a simple measure, and Basu proved that portfolios of low P/E ratio stocks can over perform the high P/E portfolios\(^{59}\), because the P/E ratio is such a simple measurement, so the low P/E ratio company can generate abnormal returns is still doubted by many researchers. One possible interpretation of these results is that the model of capital market equilibrium is at fault in that the returns are not properly adjusted for risk\(^{60}\). But if we want to use the P/E ratio to measure the anomalies effect the CAPM beta has to be used as the instrument to adjust the risk, thereafter we can associate with the abnormal return by using the CAPM as the benchmark.

**Book to market ratios**

Fama and French show a book to market ratio, which is the ratio of the book value of the firm’s equity to the market value of equity. Fama and French divided the firms into 10 groups according to book to market ratios and try to examine the monthly return of these 10 groups respectively, the result tell us that the group with the highest book to market ratio has the higher average return\(^{61}\). This study concludes that the book to market value is not dependent on the beta. The firms with higher book to market ratio is relatively under priced, and the company can use this ratio to pursue the abnormal stock returns.

**Small firm in January effect**

The small firm effect is defined as the firms with the small size or capitalization can over perform the big firms in the stock returns. It also indicates that the small firms are relatively much riskier, so the investors require more returns due to the more risk they

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bear. The small firm effect can exist also for other reasons, as the companies’ size is small, they can have more chance to growth their business, and instead the big company has less room for growing. Another reason could be that the small firm has a lower stock price comparing to the big firm, and the lower price can make more opportunities to increase.

As above we have mentioned some market efficiency anomalies, we can have some understanding about the anomalies phenomenon. As the market efficiency anomalies is a framework, the above mentioned patterns have to be included in the theoretical part to give the reader a total idea.
Chapter Three: Methodology

This chapter describes scientific methods we have chosen in our thesis. This chapter starts with the discussion of how we choose our topic, and then some preconceptions of authors’ are presented. Furthermore, we discuss our perspective and research philosophy followed by scientific approach. We will also discuss how we decide quantitative and qualitative method, followed by the discussion of the collection process of the secondary data, and in the end, how we design our statistical framework is described in a detailed way.

3.1 Theoretical Methodology

3.1.1 Choice of Subject

As an emerging stock market, the Chinese stock market really attracts our attention due to the recent booming bull market situation, it is an abnormal situation, and many traders have earned the big profit from there. Such an emerging market, such a colorful situation makes us curious to explore some deeper rules behind the surface appearance and to see whether the stock market is efficient or not. We have attended the program in Accounting and Finance in Umea School of Business and Economics from fall 2006, and have finished all the required courses and learned further about the professional financial and investment knowledge. And we would like to use the knowledge we learned from school to study the topic we are especially interested in. Also, as international students from China, we have good advantage to get more valuable information from the China local media and stand on an international perspective to analyze Chinese stock market. So we decide to test whether there are some market anomalies situations within Chinese market, whether there are some opportunities to pursue the excessive stock returns.

3.1.2 Preconceptions

Preconceptions are a complex pattern based on a person’s social background, education, practical experience. The personnel’s preconceptions can have significant impact on the decisions and behaviors of theirs.

Both authors are from China, and they received the bachelor’s degree of economics from China. One graduated in international finance and the other graduated in international trade and economics. So good understanding of the Chinese capital market can be strengthened. When we study in the Master Program of Accounting and Finance in USBE

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62 Johansson Lindfors, M-B., Att utveckla kunskap, 1993, p.25
of Umeå University, the courses we took like corporate finance, investment and multinational finance, enforce our knowledge of theory of investment. We are both very interested in the stock markets and have practical experience in stock dealing as investors. All the theoretical and practical experience can make us conduct this study in a confident way.

3.1.3 Perspective

When one issue is analyzed from different perspectives, the results might be different. Therefore, it is necessary to choose a suitable perspective in conducting research. Hantrais Linda describes perspective as the ideas and conceptions about the most important aspects of the research and the collection of information\(^{63}\).

In our research, we try to test whether there exist market efficiency anomalies in Chinese stock market. If anomalies do exist, investors can have chance to obtain excessive return by trading strategies. So, from the investors’ perspective, the study will be more meaningful and objective.

3.1.4 Research Philosophy

When we are doing the scientific research, there are always different ideas. To develop the knowledge, we need research philosophy to guide our thought. Three views about the research process dominate the literature: positivism, interpretive and realism\(^{64}\).

If you adopt the positivism research philosophy, you manage your work like a natural scientist. You will prefer working with an observable social reality and that the end product of such research can be law-like generalizations similar to those produced by the physical and natural scientists\(^{65}\). The investors have to collect some so-called value-free data, interpreting them by using the statistical tools, and then duplicate the truth and reality. The positivism normally should be objective and emotion avoidance.

However, the social world of business and management is too complicated in comparing with the natural science. Therefore, to define the law by using the same way like natural science seems not that feasible. Rich insight into the complex world are lost if such complexity is reduced entirely to a series of law-like generalizations\(^{66}\), this is the

\(^{63}\) Hantrais Linda, Cross National Research in the social sciences, 1996, p.68

\(^{64}\) Mark Saunders, Philip Lewis, Adrian Thornhill, Research Methods for Business Students, third edition, Prentice Hall, 2003, p.83


\(^{66}\) Mark Saunders, Philip Lewis, Adrian Thornhill, Research Methods for Business Students, third edition, Prentice Hall, 2003, p.84
Realism is based on the belief that a reality exists that is independent of human thoughts and belief\textsuperscript{67}. Realism is a mixture of positivism and interpretive, because it can relate to some objective nature of the society and also recognize that the people can not be studied like the natural science objectively.

Choosing which philosophy is depending on the need of our study, so we choose the Positivism as the research philosophy of ours. Because we think we have to do our analysis and draw our conclusion according to a huge amount of data, the result of the calculation will tells us the solution. We have to use the statistical instrument, and our solution can not depend on the human thought, the only thing we have to deal with is the figures. Therefore, we can see that our research philosophy is positivism.

### 3.1.5 Scientific Approach

As have been known, when we do the research the scientific approach has to be set up. Normally two approaches can be chosen by us: the deductive and inductive approach. If the deductive approach is adopted, the researchers have to use some existing theory, then using the theory to conduct some empirical study. If the inductive approach is chosen, then the researchers need not do the analysis by collecting the data according to the previous models, instead the researcher will use the data to develop a theory after the data analysis. The deductive approach owes more to the positivism and inductive approach to interpretive\textsuperscript{68}.

Clearly for our study, we are not going to make some theories. We will use the deductive approach. Our study will based on some relevant existing theories and some valuable topics that have been done by the formers; thereafter we collect certain amount of data to do some empirical study. After the empirical study we can draw our solutions.

### 3.1.6 Qualitative versus Quantitative Research

There are two methods for research work we can perceive: the qualitative and quantitative methods. Robson\textsuperscript{69} said: qualitative data are associated with such concepts and are characterized by their richness and fullness based on your opportunity to explore a subject in as real as manner as is possible. It indicates that the qualitative data has to be collected in a very good planned process, and the data can not be collected in a standard

\textsuperscript{67} Mark Saunders, Philip Lewis, Adrian Thornhill, Research Methods for Business Students, third edition, Prentice Hall, 2003, p.84.
\textsuperscript{68} ibid, p.85
\textsuperscript{69} Robson, C.(2002), Real world Research, second edition, Oxford, Blackwell
way like the quantitative data method. The qualitative method is the primary method, while it normally collects the data through the human, in stead of the inventories or questionnaires. The qualitative researcher has to get insight of the human’s habit, working experiences, lives etc.

Virtually all research will involve some numerical data or contain data that usefully be quantified to help you answer your research questions and to meet yours objectives. Quantitative data refers to all such data and can be a product of all research strategies. If we use quantitative research method we have already know what to do before we start to collect the data, unlike the qualitative method requesting the precise procedures. We are aiming to clarify the features, and count them, then settle the statistical framework to test our observations. The data normally will be collected by using the questionnaires and some instrument, such as the computers. After the collection of data we can use the statistical tools to test our hypothesis.

Our study purpose is to use some historical prices to test the market efficiency anomalies, and we need huge amount of figures, furthermore we are not going to create any theory. The aim is to test our hypothesis by using the statistical models, so the quantitative research method is suitable for our study.

3.1.7 Collection of Secondary Data

According to our research question and purpose, literatures, scientific articles about market efficiency and market efficiency anomalies become the major source of our basic theory study. The Umeå university library is a very good source; we can access the relevant books via Album database on the library website, by searching keys words, like investment, business statistics and methodology. Lots of relevant scientific articles and journals which have been helpful to construct our theoretical framework can be obtained from the database of the Business Source Premier via Umeå University’s websites. The key words are: Chinese stock market, market efficiency, seasonality, day of the week effect, January effect, semi-month effect etc.

Information about Shanghai Stock Exchange is collected from the official website of Shanghai Stock Exchange (www.sse.com.cn), and the data of closing price of the Shanghai Stock Exchange Composite Index is provided by Sohu Business(http://business.sohu.com), which is the most popular and very professional finance and business website in China.

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3.2 Statistical Method

We will present the statistical methods in this part, based on the knowledge we got from Financial Data Analysis Course. Statistical software of SPSS is used to calculate the statistical measurement of the data and to do the hypothesis test.

3.2.1 Hypothesis test

When performing the empirical study, we use the statistical test. The essential part of the statistical test is to form the hypothesis test. A systematic approach to assessing tentative beliefs about reality is called hypothesis testing. It involves confronting those beliefs with evidence and deciding, in light of this evidence, whether the beliefs can be maintained as reasonable or must be discarded as untenable\footnote{Kohler, H., Statistics for Business and Economics, third edition, Harper Collins College Publishers, 1994, p.368}.

In the normal case, the hypothesis testing involves four steps\footnote{Kohler, H., Statistics for Business and Economics, third edition, Harper Collins College Publishers, 1994, p.368}, they are:

1. Formulating two opposing hypothesis
2. Selecting a test statistic
3. Deriving a decision rule
4. Taking a sample, computing the test statistic, and confronting it with the decision rule

3.2.2 The Four Steps of Hypothesis Test

3.2.2.1 The first step: Formulating Two Opposing Hypothesis

The first step of hypothesis testing always involves constructing two mutually exclusive hypotheses---the null hypothesis $H_0$ and the alternative hypothesis $H_A$. The null hypothesis $H_0$ represents the common belief, and the $H_A$ contradicts $H_0$. If one of the hypotheses is proved truth, then the other one must be false.

To construct the hypothesis, three ways can be chosen\footnote{Ibid., p.369}:

<table>
<thead>
<tr>
<th>Form 1</th>
<th>Form 2</th>
<th>Form 3</th>
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\[\text{Form 1} \quad \text{Form 2} \quad \text{Form 3}\]
\[H_0: \mu \geq \mu_0 \quad H_0: \mu \leq \mu_0 \quad H_0: \mu = \mu_0\]

\[H_A: \mu < \mu_0 \quad H_A: \mu > \mu_0 \quad H_A: \mu \neq \mu_0\]

Where the sample mean is expressed as \(\mu\) and the specified value is expressed as \(\mu_0\).

The form 1 and Form 2 are normally called one-sided hypothesis, the null hypothesis can hold for the deviation only in one direction. In the form 1, if the sample mean \(\mu\) is greater than the specified value, the null hypothesis will be accepted, if the sample means \(\mu\) is smaller than the specified value, and then we have to reject the null hypothesis. The form 2 is exactly opposite of the form 1, but both of them follow the one direction rule. The form 3 is called two-sided hypothesis, it is a exact hypothesis, the null hypothesis can hold for the deviation in two direction. Only when the sample mean \(\mu\) is equal to the specified value \(\mu_0\), the null hypothesis can be accepted; otherwise we have to reject it. This hypothesis requires the \(\mu\) values precisely.

As to our study, for example, in order to test January effect, the mean return of January should be compared with the mean return of all the other months. Therefore, the two-sided hypothesis will be suitable as an instrument for our case, which can be described by the following:

\[H_0: \mu_1 = \mu_2\]
\[H_A: \mu_1 \neq \mu_2\]

Where:
\(H_0\): the null hypothesis
\(H_A\): the alternative hypothesis
\(\mu_1\) = the mean of population 1
\(\mu_2\) = the mean of population 2.

Our test will be performed respectively like the following descriptions:

The day of the week effect
\[H_0: \mu_1 = \mu_2\]
\[H_A: \mu_1 \neq \mu_2\]

\(\mu_1\) = the average daily log return of the investigated day in percentage
\(\mu_2\) = the average daily log return of the other weekdays in percentage

As to the day of the week effect test, as we mentioned in the theoretical part (Chapter two), the returns of Monday or Friday are generally found significantly different from other days. Since we don’t know what kind of day of the week effect there is before we test the Chinese stock market, we would like to test each weekday as the investigated day. The average return of other weekdays means the mean of all the weekdays except the investigated day. For example, if we want to test Monday effect, then the mean return of Monday is compared with the mean return of all the other days. If P-value is significant,
we can reject the null hypothesis, means the return between Monday and the other days is statistically different, then there is a Monday effect.

The January effect

\[ H_0: \mu_1 = \mu_2 \]

\[ H_A: \mu_1 \neq \mu_2 \]

\( \mu_1 \) = the average daily log return of the investigated month in percentage

\( \mu_2 \) = the average daily log return of rest of the months in percentage

To test the January effect in Chinese stock market, we compare the average daily return of January with that of all the other months of the year. Since we don’t know what kind of Month-of-the-Year effect exists in Chinese stock market, every month has been tested whether it is significantly different from all the other months.

The semi-month effect

\[ H_0: \mu_1 = \mu_2 \]

\[ H_A: \mu_1 \neq \mu_2 \]

\( \mu_1 \) = the average daily log return of the first half of the months in percentage

\( \mu_2 \) = the average daily log return of the second half of the months in percentage.

For the semi-month effect test, Here we take 1 to 15 calendar days of current month as the first half month, while the rest of days as the second half month. But the problem is that there are 28 days month, 29 days month, 30 days month and 31 days month, therefore the observed number of sample data of the first half month and second half could be different according the calendar.

### 3.2.2.2 The second step: Selecting a Test Statistic

A test statistic is a statistic computed from a simple random sample to be taken from the population of interest in a hypothesis test and then used for estimating the probable truth or falsity of the null hypothesis\(^{74}\). In another word, statistical testing result can determine whether the null hypothesis is rejected or not.

Here, we use T-test to estimate the null hypothesis. An assumption for the T-test is the two populations should have same standard deviation, in case the two comparative

populations are of same origin. And F-test is used to test the standard deviation is significantly same or not before we employ the T-test to test the significance of the difference between average returns. The formula is:

\[ T = \frac{(X_1 - X_2) - (\mu_1 - \mu_2)}{S_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \]  

(1)

Where \( S_p^2 = \frac{n_1 S_1^2 + n_2 S_2^2}{n_1 + n_2 - 2} \)  

(2)

Here, \( S_p^2 \) is the pooled variance, \( n_1 \) is the number of observations in population 1 and \( n_2 \) is number of observations in population 2, \( (\mu_1 - \mu_2) \) is the difference between the two population means and \( (X_1 - X_2) \) is the difference between sample means.\(^{75}\)

In our case, SPSS is used to obtain the statistical results of T-test with significance level of 0.05 and F-test with the same significance level.

### 3.2.2.3 The third step: Deriving a Decision Rule

A decision rule is a hypothesis-testing rule that specifies in advance, for all possible values of a test statistic that might be computed from a sample, whether the null hypothesis should be accepted or whether it should be rejected in favor of the alternative hypothesis.\(^{76}\) How can we decide the hypothesis to be accepted or rejected all depends on the significance level \( \alpha \).

Alpha working like a benchmark, the decision is made by the test of significant level, so called p-value. If p-value is smaller than \( \alpha \), we can reject the \( H_0 \), if the p-value is larger than \( \alpha \), we can not reject the null hypothesis \( H_0 \). Popular levels of significance are 0.05, 0.1 and 0.01. From the empirical analysis of the results in the later chapter, 0.05 is seen to be the significance level when we test the hypothesis.

### 3.2.2.4 The fourth step: Taking a sample, computing the test statistic, and confronting it with the decision rule

Following all the above steps, the last step is to conduct our testing. We collect the sample data from Shanghai Stock Exchange Composite Index, and use Excel and SPSS as the instrument to process our data. We use the SPSS to convert the daily closing price

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into log returns (the reason will be discussed in the next part), and calculate the mean and standard deviation, furthermore, we also use SPSS to perform the T test with significance level of 0.05, F test and get the P-value. We sort out data by using SPSS, such like grouping all the Mondays or Tuesday etc., grouping January or April etc., grouping the first and second half of the months. The Excel is very useful to draw the tables and graphs.
Chapter Four: The Chinese Stock Market and Data Collection

This chapter describes the Shanghai stock market, so the reader can have a picture of the data we chose. This chapter will start with a general introduction to Shanghai stock exchange, and then focus on the description of The SSE Composite Index, and introduce the requirements to be listed in Shanghai stock exchange. Also, we try to explain how we collect data and how to process the data.

4.1 Introduction to Shanghai Stock Exchange

The Shanghai Stock Exchange (SSE) was founded on Nov. 26th, 1990 and in operation on Dec. 19th the same year. It is a non-profit-making membership institution directly governed by the China Securities Regulatory Commission (CSRC). The SSE bases its development on the principle of "legislation, supervision, self-regulation and standardization" to create a transparent, open, safe and efficient marketplace. The SSE endeavors to realize a variety of functions: providing marketplace and facilities for the securities trading; formulating business rules; accepting and arranging listings; organizing and monitoring securities trading; regulating members and listed companies; managing and disseminating market information.

After several years' operation, the SSE has become the most preeminent stock market in Mainland China in terms of number of listed companies, number of shares listed, total market value, tradable market value, securities turnover in value, stock turnover in value and the T-bond turnover in value. Up to 2007, there are 856 companies listed and total market value reaches 21121.2 billions Chinese Yuan. A large number of companies from key industries, infrastructure and high-tech sectors have not only raised capital, but also improved their operation mechanism through listing on Shanghai stock market.

Nowadays, SSE is faced with great opportunities as well as challenges to further boost the market construction and regulation. SSE is fully committed to the goal of State-owned industrial enterprises reform and developing Shanghai into an international financial center.

4.2 Shanghai Stock Exchange Indices

SSE Indices are compiled and published by Shanghai Stock Exchange, as authoritative statistical indicators widely adopted by domestic and overseas investors in measuring the performance of Chinese security market. SSE Indices are price indices including SSE 180 Index, SSE 50 Index, SSE Dividend Index, SSE New Composite Index, SSE Composite Index, Sector Indices, SSE Fund Index, SSE Government Bond Index, and SSE.

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Corporate Bond Index. Among them, the earliest one compiled was SSE Composite Index.

In order to promote the long-term infrastructure construction and the standardization process of the security market, Shanghai Stock Exchange restructured SSE 30 Index and renamed it SSE Constituent Index (SSE 180 Index) in June 2002. As the core of SSE Indices, SSE 180 has made major improvements in methodology on the basis of SSE 30 Index through taking China's current financial market situation into consideration and integrating international experience. Its objective is to select constituents that best represent Shanghai market through scientific and objective method, to establish a benchmark index that will reflect Shanghai market and serve as a performance benchmark and a basis for financial innovation.

SSE Government Bond Index and Corporate Bond Index were launched in 2003. Thus SSE Indices formed a complete system including equity, fund and bond. In early 2004, Shanghai Stock Exchange launched SSE 50 Index in order to reflect the performance of a number of most influential stocks in Shanghai Market. Thus, SSE Composite Index (a whole market index), SSE 180 Index (a performance benchmark index), SSE 50 Index (an index for good quality, large scale stocks) have formed a 3-level pyramid index structure.

SSE Indices reflect overall price changes of stocks listed at Shanghai Stock Exchange from various perspectives. SSE Indices also reflect the level of prosperity and overall price changes of each industry, thus provide investors with benchmark systems for different investment portfolios. With security market's growing importance in national economy, SSE Indices has gradually become a weatherglass for China's economy.

### 4.3 The SSE Composite Index

The SSE Composite Index covers all the listed stock both A shares and B shares in Shanghai stock exchange, The base day is December 19, 1990, the base period is the total market capitalization of all stocks of that day, the base value is 100, and the index was launched on July 15, 1991.

### 4.4 Listing Requirement

According to the regulations of the “Securities Law of the People’s Republic of China” and “Company Law of the People’s Republic of China”, limited companies applying for the listing of shares must meet the following conditions:

- The shares must have been publicly issued following approval of the State Council Securities Management Department.
- The company’s total share capital must not be less than RMB 50 million.

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The company must have been in business for more than 3 years and have main profits over the last three consecutive years. In the case of former state-owned enterprises re-established according to the law or founded after implementation of the law and if their issuers are large and medium state owned enterprises, it can be calculated consecutively. The number of shareholders with holdings of values reaching in excess of RMB 1,000 must not be less than 1,000 persons. Publicly offered shares must be more than 25% of the company’s total share capital. For company’s whose total share capital exceeds RMB 400 million, the ratio of publicly offered shares must be more than 15%.

- The company must not have been guilty of any major illegal activities or false accounting records in the last three years.

### 4.5 Data Collection

Since SSE Composite Index is the earliest index in Shanghai Stock Exchange, which is a representative index of the Chinese stock market, it has been chosen as a proxy for this research. The data of closing price of SSE Composite Index is collected from the Sohu Business. Then what we need to do is to convert the daily closing price of stock into log returns, because in statistical study, the price of stock is fluctuating all the time, while return has a steady trend, which is more suitable for study and the results of analyzing return is more valuable for the investors.

Thereby, we use the daily closing stock price of Shanghai Composite Index as the source of our statistical testing, and the data investigated is daily log return, calculated by the formula:

\[
R_t = (\ln P_t - \ln P_{t-1}) \times 100
\]

Where:
- \(R_t\) is the return in the period \(t\);
- \(P_t\) is the daily closing share price index at a particular time \(t\);
- \(P_{t-1}\) is the daily closing share price index for the preceding period;
- \(\ln\) is the natural logarithm

In order to test the Chinese stock market for the short term as well as the long term, four study periods is determined: the first period 1992-1996, the second 1997-2001, the third period 2002-2006 and the whole period 1992-2006. The history of other indices is too short to present the long term study, so SSE Composite Index is the best choice for this study.

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Chapter Five: Empirical Analysis and Results

This chapter describes the empirical work and results of our study about the three seasonal anomalies: day of the week effect, January effect and the semi-month effect. Firstly, we analyze the results of the statistical test about the day of the week effect during different periods 1992-1996, 1997-2001, 2002-2006 and the whole period 1992-2006, and then we evaluate the stability of the day of the week effect over times. Secondly, we analyze the hypothesis tests of the January effect for the four periods of study, followed by evaluating the stability of the January effect (month of the year effect). At last we test whether the Semi-month effect exists in Chinese stock market.

5.1 Day of the Week Effect

The day of the week effect primarily relates to stock market patterns occurring on Friday and Monday trading days. The tendency for stock prices to rise on Fridays and fall on Mondays. With more evidence appearing, the day of the week effect not only occurs on Mondays and Fridays but also on the other days among the world stock market\(^{82}\). In the U.S. stock market, the stock return has been well documented to have a “Monday” effect or a “weekend” effect. With regard to the daily seasonality in return volatility, the Monday return variance is found to tend to be higher than for all other days of the week.

Here, we test all weekdays separately to see whether day of the week effect exists in Chinese stock market. In order to study this calendar effect in short and long term, four studied periods will be test: the first period 1992-1996, the second period 1997-2001, the third period 2002-2006 and the whole period 1992-2006.

The hypotheses to investigate in the case of the day-of-the-Week effect are:

\[
\begin{align*}
H_0: & \quad \mu_1 = \mu_2 \\
HA: & \quad \mu_1 \neq \mu_2
\end{align*}
\]

\(\mu_1\) = the average daily log return of the investigated day in percentage

\(\mu_2\) = the average daily log return of the other weekdays in percentage

The result of the study will be reported in tables and figures by using the statistical measurements: mean, standard deviation, F-test, T-test, and P-value (two-tailed). The mean shows the central tendency of the investigated sample and will be presented in percentage. The standard deviation is most commonly used to evaluate the statistical dispersion around the mean as well as functioning as a risk indicator. The F-test is used to test whether the standard deviations of two normally distributed populations are equal.

\(^{82}\) Anthony J., Arline A., The January effect and other seasonal anomalies: A common theoretical framework, 2000, JAI PRESS INC., p.267
and thus that they are of comparable origin. T-test is used to test whether the means of two normally distributed populations are equal. According to the level of P-value, the hypothesis can be rejected or not. Then the study question will be analyzed: Does seasonality effect exist in Chinese Stock Exchange? (Day of the week effect)

We will do a comparison of the empirical results from the study periods at the end of this section. Thereby, we can conclude the stability of the statistical measure between the time periods. Then the study question will be analyzed: Is the seasonality effect persistent over times? (Day of the week effect)

5.1.1 Results of Day of the Week Effect for the Time Period 1992 to 1996

![Average daily percentage return 1992-1996](image)

Figure 1: Average daily percentage return for day of the week 1992-1996

As can be seen in the figure above, Monday has a negative mean return, but not the lowest. Instead of Monday, Tuesday has the lowest negative mean return. Wednesday, Thursday and Friday have positive mean returns. It is also found that the mean of daily return for Friday is significantly highest average return. This might be seen as an indication that a Friday effect exited at Shanghai Stock Exchange during 1992 to 1996.

<table>
<thead>
<tr>
<th>Weekday</th>
<th>n</th>
<th>Mean</th>
<th>Sd</th>
<th>F-test</th>
<th>Sig.</th>
<th>T-test</th>
<th>df</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>249</td>
<td>-0.1952</td>
<td>4.3146</td>
<td>7.965</td>
<td>0.005</td>
<td>S</td>
<td>-1.204</td>
<td>1258</td>
</tr>
<tr>
<td>other days</td>
<td>1011</td>
<td>0.1610</td>
<td>4.1487</td>
<td></td>
<td></td>
<td>D</td>
<td>-1.176</td>
<td>369,107</td>
</tr>
<tr>
<td>Tuesday</td>
<td>252</td>
<td>-0.4415</td>
<td>3.2753</td>
<td>1.266</td>
<td>0.261</td>
<td>S</td>
<td>-2.261</td>
<td>1258</td>
</tr>
<tr>
<td>other days</td>
<td>1008</td>
<td>0.2236</td>
<td>4.3716</td>
<td></td>
<td></td>
<td>D</td>
<td>-2.681</td>
<td>499,647</td>
</tr>
<tr>
<td>Wednesday</td>
<td>252</td>
<td>0.1707</td>
<td>3.7375</td>
<td>0.531</td>
<td>0.466</td>
<td>S</td>
<td>0.34</td>
<td>1258</td>
</tr>
<tr>
<td>other days</td>
<td>1008</td>
<td>0.0706</td>
<td>4.2883</td>
<td></td>
<td></td>
<td>D</td>
<td>0.369</td>
<td>431,744</td>
</tr>
<tr>
<td>Thursday</td>
<td>254</td>
<td>0.3239</td>
<td>5.7776</td>
<td>0.814</td>
<td>0.367</td>
<td>S</td>
<td>0.995</td>
<td>1258</td>
</tr>
<tr>
<td>other days</td>
<td>1006</td>
<td>0.0317</td>
<td>3.6737</td>
<td></td>
<td></td>
<td>D</td>
<td>0.768</td>
<td>306,485</td>
</tr>
<tr>
<td>Friday</td>
<td>253</td>
<td>0.5879</td>
<td>3.2093</td>
<td>2.744</td>
<td>0.098</td>
<td>S</td>
<td>2.118</td>
<td>1258</td>
</tr>
</tbody>
</table>
Table 1: The day of the week effect 1992-1996
Notes of table 1
n: number of observation
Mean: mean of daily return
Sd: standard deviation of daily return
F-test: the hypothesis of F-test is standard deviation of two populations is equal (with significance level of 0.05)
S stands for the sd of two populations are tested to be significant same; D stands for the sd of two populations are tested to be significant different.
T-test: the null hypothesis is the average daily log return of the investigated day in percentage is equal to the average daily log return of the other weekdays in percentage
Df: degree of freedom for T-test
P-value: 2-tailed P-value for T-test
N: the T-test is not significant
Y: the T-test is significant
α=0.05

Table 1 reports the standard deviation in daily returns. Usually, the standard deviation is regarded as a risk indicator. The higher the volatility is, the higher the risk is. By comparing the daily volatility in returns with daily mean returns, we can get insight into whether higher returns on a particular weekday are due to the higher risk on that day. During this period, Tuesday, Wednesday and Thursday are more or less associated with the rule that lower risk, lower return and higher risk, higher return. But, in regard to Monday and Friday, the results are opposite, that for Monday, the return is much lower with a higher volatility, while for Friday, the return is the highest with a lowest volatility.

The table above shows the result of the F-test with the hypothesis that the standard deviations of two normally distributed populations are equal. There is an important hypothesis when using T-test to test the means of two normally distributed populations that the two populations should be of comparable origin. This hypothesis can be tested by F-test, that is why we do the F-test here before we test the mean return equal or not. If the F-test is insignificant, we can’t reject the hypothesis of F-test, then we use the first result from T-test; if the F-test is significant, we can reject the hypothesis of F-test, and then we use the second result from the T-test.

We can see that the results of the T-test with the hypothesis that the average daily log return of the investigated day in percentage are equal to the average daily log return of the other days of the week ($H_0: \mu_1 = \mu_2$). Tuesday shows the lowest mean return at -0.4415 and Friday shows the highest mean return at 0.5879, as we can see obviously that the P-value of both Tuesday (0.024) and Friday (0.034) is less than 0.05, so the null hypothesis can be rejected, which indicates that the mean return of Tuesday and Friday is significantly different from that of the other days respectively. Therefore, for the period 1992 to 1996, there exists a Negative Tuesday effect, which is consistent with findings for Japan and Australian markets (Jaffe and Westerfield (1985)); and a Positive Friday effect, which is usually the case according to the western theoretical framework.

83 The notes for table 1 can be applied for the other tables in this thesis.
5.1.2 Results of Day of the Week Effect for the Time Period 1997 to 2001

![Figure 2: Average daily percentage return for day of the week 1997-2001](image)

From the figure above, we can see that for this period Monday, Wednesday, and Friday have positive mean returns, while Tuesday and Thursday have negative returns. The lowest mean return is on Thursday, and the highest is on Friday, but not big difference from the second lowest day or highest day.

<table>
<thead>
<tr>
<th>Weekday</th>
<th>n</th>
<th>Mean</th>
<th>Sd</th>
<th>F-test</th>
<th>Sig.</th>
<th>T-test</th>
<th>df</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>250</td>
<td>0.0098</td>
<td>1.8457</td>
<td>6.784</td>
<td>0.009</td>
<td>S</td>
<td>-0.403</td>
<td>1242</td>
</tr>
<tr>
<td>other days</td>
<td>994</td>
<td>0.0561</td>
<td>1.5681</td>
<td></td>
<td></td>
<td>D</td>
<td>-0.365</td>
<td>344,769</td>
</tr>
<tr>
<td>Tuesday</td>
<td>250</td>
<td>-0.0419</td>
<td>1.5792</td>
<td>2.093</td>
<td>0.148</td>
<td>S</td>
<td>-0.964</td>
<td>1242</td>
</tr>
<tr>
<td>other days</td>
<td>994</td>
<td>0.0691</td>
<td>1.6389</td>
<td></td>
<td></td>
<td>D</td>
<td>-0.985</td>
<td>394,905</td>
</tr>
<tr>
<td>Wednesday</td>
<td>250</td>
<td>0.1545</td>
<td>1.5986</td>
<td>0.21</td>
<td>0.647</td>
<td>S</td>
<td>1.171</td>
<td>1242</td>
</tr>
<tr>
<td>other days</td>
<td>994</td>
<td>0.0197</td>
<td>1.6338</td>
<td></td>
<td></td>
<td>D</td>
<td>1.186</td>
<td>390,255</td>
</tr>
<tr>
<td>Thursday</td>
<td>248</td>
<td>-0.0846</td>
<td>1.6124</td>
<td>0.095</td>
<td>0.758</td>
<td>S</td>
<td>-1.422</td>
<td>1242</td>
</tr>
<tr>
<td>other days</td>
<td>996</td>
<td>0.0795</td>
<td>1.6298</td>
<td></td>
<td></td>
<td>D</td>
<td>-1.432</td>
<td>382,517</td>
</tr>
<tr>
<td>Friday</td>
<td>246</td>
<td>0.1977</td>
<td>1.4676</td>
<td>1.572</td>
<td>0.21</td>
<td>S</td>
<td>1.624</td>
<td>1242</td>
</tr>
<tr>
<td>other days</td>
<td>998</td>
<td>0.0096</td>
<td>1.6625</td>
<td></td>
<td></td>
<td>D</td>
<td>1.751</td>
<td>414,314</td>
</tr>
</tbody>
</table>

Table 2: The day of the week effect 1997-2001

It is shown that Monday has a highest standard deviation of 1.8457, but with such a high volatility, the return of Monday is very return. Thursday also has higher volatility and lowest return. As to Friday, it is the highest mean return of 0.1977, with the lowest volatility of 1.4676.

The result of T-test is also shown in the table above. Comparing with that of the other
trading days in the week, the mean return of Friday has the biggest difference, but T-test significance level of 0.105 is larger than 0.05, the hypothesis can’t be rejected, so the mean returns between Friday and the other days are not statistically different. Thursday presents the lowest return of -0.0846, but the P-value is 0.155, much higher than $\alpha=0.05$, concluding that the mean return of Thursday is not significant different from that of the other days, therefore there is no Thursday effect. In fact, all the P-value of T-test is insignificant; indicating that the mean return difference between any investigated day and the other days is not significant for this period. In a word, there is no significant day of week effect found during 1997 to 2001.

5.1.3 Results of Day of the Week Effect for the Time Period 2002 to 2006

As can be seen, all the means of daily return for the weekdays are positive except that of Thursday, holding the lowest negative value. Both Tuesday and Wednesday’s mean returns are more than 0.1, but not much difference from each other. Tuesday has the highest positive mean return for the first time, for during the previous two periods1992 to 1996, 1997 to 2001, it is negative return, even the lowest during the first investigated period.

<table>
<thead>
<tr>
<th>Weekday</th>
<th>n</th>
<th>Mean</th>
<th>Sd</th>
<th>F-test</th>
<th>Sig.</th>
<th>T-test</th>
<th>df</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>260</td>
<td>0.0651</td>
<td>1.4863</td>
<td>6.367</td>
<td>0.012</td>
<td>S</td>
<td>0.387</td>
<td>1301</td>
</tr>
<tr>
<td>other days</td>
<td>1043</td>
<td>0.0303</td>
<td>1.2480</td>
<td></td>
<td>D</td>
<td>0.348</td>
<td>355,318</td>
<td>0.728</td>
</tr>
<tr>
<td>Tuesday</td>
<td>260</td>
<td>0.1194</td>
<td>1.1265</td>
<td>3.849</td>
<td>0.05</td>
<td>S</td>
<td>1.14</td>
<td>1301</td>
</tr>
<tr>
<td>other days</td>
<td>1043</td>
<td>0.0168</td>
<td>1.3377</td>
<td></td>
<td>D</td>
<td>1.263</td>
<td>459,013</td>
<td>0.207</td>
</tr>
<tr>
<td>Wednesday</td>
<td>261</td>
<td>0.1082</td>
<td>1.3301</td>
<td>0.002</td>
<td>0.963</td>
<td>S</td>
<td>0.986</td>
<td>1301</td>
</tr>
<tr>
<td>other days</td>
<td>1042</td>
<td>0.0195</td>
<td>1.2906</td>
<td></td>
<td>D</td>
<td>0.968</td>
<td>391,632</td>
<td>0.334</td>
</tr>
<tr>
<td>Thursday</td>
<td>261</td>
<td>-0.1076</td>
<td>1.2859</td>
<td>0.112</td>
<td>0.738</td>
<td>S</td>
<td>-2.018</td>
<td>1301</td>
</tr>
<tr>
<td>other days</td>
<td>1042</td>
<td>0.0736</td>
<td>1.2998</td>
<td></td>
<td>D</td>
<td>-2.031</td>
<td>403,503</td>
<td>0.043</td>
</tr>
<tr>
<td>Friday</td>
<td>261</td>
<td>0.0018</td>
<td>1.2336</td>
<td>0.659</td>
<td>0.417</td>
<td>S</td>
<td>-0.494</td>
<td>1301</td>
</tr>
<tr>
<td>other days</td>
<td>1042</td>
<td>0.0462</td>
<td>1.3147</td>
<td></td>
<td>D</td>
<td>-0.514</td>
<td>420,495</td>
<td>0.608</td>
</tr>
</tbody>
</table>

P-value: 2-tailed P-value for T-test significance level $\alpha=0.05$
Table 3: The day of the week effect 2002-2006

The table above presents the average daily return and standard deviations over the 2002-2006 period. It is shown that the standard deviation of Monday return is the largest with number of 1.4863 but the mean value of 0.0651 is not high. Tuesday is found to have the lowest standard deviation, but highest mean return. Thursday is the only day having the negative return and its volatility is in the middle level. Friday has lower mean return and also a lower volatility.

The table also describes the results of T-test for period 2002-2006. Tuesday has the highest mean value of 0.1194, but the P-value of 0.207 is not significant. The significance of Thursday (0.044) is less than 0.05, so the T-test is statistically significant, and we can reject the hypothesis that the average daily return of Thursday is equal to the average daily return of the other days of the week. For other investigated days, the significance value is larger than 0.05, so all the other weekdays is insignificant. Therefore, a Thursday effect takes place and the direction is negative during the period 2002-2006. It is the same case with the results of the Netherlands and New Zealand that have the negative Thursday effect (Balaban, Bayer and Kan (2001)).

5.1.4 Results of Day of the Week Effect for the Time Period 1992 to 2006

![Average daily percentage return 1992-2006](image)

Figure 4: Average daily percentage return for day of the week 1992-2006

The figure directly shows the mean return of weekdays for the whole studying period. As can be seen, the mean returns of Monday and Tuesday are negative, while those of Wednesday, Thursday, Friday are positive through the whole period. Same as period 1992-1996, 1997-2001, Friday mean return is still the highest during the whole period. It is Tuesday that has the lowest mean return for the entire period, which is same situation...

<table>
<thead>
<tr>
<th>Weekday</th>
<th>n</th>
<th>Mean</th>
<th>Sd</th>
<th>F-test</th>
<th>Sig.</th>
<th>T-test</th>
<th>df</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>759</td>
<td>-0.0385</td>
<td>2.8244</td>
<td>14.638</td>
<td>0</td>
<td>-1.106</td>
<td>3805</td>
<td>0.269</td>
</tr>
<tr>
<td>other days</td>
<td>3048</td>
<td>0.0821</td>
<td>2.6538</td>
<td></td>
<td>D</td>
<td>-1.065</td>
<td>1114.514</td>
<td>0.287 N</td>
</tr>
<tr>
<td>Tuesday</td>
<td>762</td>
<td>-0.1190</td>
<td>2.2004</td>
<td>3.26</td>
<td>0.071</td>
<td>S</td>
<td>3805</td>
<td>0.042 Y</td>
</tr>
<tr>
<td>other days</td>
<td>3045</td>
<td>0.1024</td>
<td>2.7962</td>
<td></td>
<td>D</td>
<td>-2.343</td>
<td>1441.43</td>
<td>0.019</td>
</tr>
<tr>
<td>Wednesday</td>
<td>763</td>
<td>0.1440</td>
<td>2.4578</td>
<td>0.241</td>
<td>0.624</td>
<td>S</td>
<td>3805</td>
<td>0.324 N</td>
</tr>
<tr>
<td>other days</td>
<td>3044</td>
<td>0.0365</td>
<td>2.7435</td>
<td></td>
<td>D</td>
<td>1.054</td>
<td>1281.013</td>
<td>0.292</td>
</tr>
<tr>
<td>Thursday</td>
<td>763</td>
<td>0.0435</td>
<td>3.5397</td>
<td>0.523</td>
<td>0.47</td>
<td>S</td>
<td>3805</td>
<td>0.867 N</td>
</tr>
<tr>
<td>other days</td>
<td>3044</td>
<td>0.0617</td>
<td>2.4299</td>
<td></td>
<td>D</td>
<td>-0.134</td>
<td>949.324</td>
<td>0.893</td>
</tr>
<tr>
<td>Friday</td>
<td>760</td>
<td>0.2603</td>
<td>2.1671</td>
<td>3.624</td>
<td>0.057</td>
<td>S</td>
<td>3805</td>
<td>0.020 Y</td>
</tr>
<tr>
<td>other days</td>
<td>3047</td>
<td>0.0076</td>
<td>2.8018</td>
<td></td>
<td>D</td>
<td>2.7</td>
<td>1460.57</td>
<td>0.007</td>
</tr>
</tbody>
</table>

P-value: 2-tailed P-value for T-test  significance level α=0.05

Table 4: The day of the week effect 1992-2006

From the table above, we can see that Monday has a higher volatility but a lower mean return, while Friday has the lowest volatility of 2.1671 but a highest mean return of 0.2603, which is in accord with the empirical studies in other stock markets. Thursday is found to have a highest volatility of 3.5397 but a lower return, compared with other days.

The table also describes the results of T-test for the whole period 1992-2006. Tuesday is found to be significantly different from the other days, since the level of significance is lower than 0.05, and the direction is negative. So we find a negative Tuesday effect during the whole period. This result is consistent with what Jaffe and Westerfield (1985) found ----very significant lower returns on Tuesday in both Japan and Australia. The T-test for Friday is also significant, and then we can reject the hypothesis that the average return on Friday is equal to that of all the other days in the week, so Friday is statistically different from the other days and there exists a positive Friday effect for this period.

5.1.5 Stability of Day of the Week Effect

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Weekday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>1992-1996</td>
<td>-0.1952</td>
<td>-0.4415</td>
<td>0.1707</td>
<td>0.3239</td>
<td>0.5879</td>
</tr>
<tr>
<td></td>
<td>1997-2001</td>
<td>0.0098</td>
<td>-0.0419</td>
<td>0.1545</td>
<td>-0.0846</td>
<td>0.1977</td>
</tr>
<tr>
<td></td>
<td>2002-2006</td>
<td>0.0651</td>
<td>0.1194</td>
<td>0.1082</td>
<td>-0.1076</td>
<td>0.0018</td>
</tr>
<tr>
<td></td>
<td>Whole period</td>
<td>-0.0385</td>
<td>-0.1190</td>
<td>0.1440</td>
<td>0.0435</td>
<td>0.2603</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------</td>
<td>-----------</td>
<td>-----------</td>
<td>--------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.3146</td>
<td>1.8457</td>
<td>1.4863</td>
<td>2.8244</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.2753</td>
<td>1.5792</td>
<td>1.1265</td>
<td>2.2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.7375</td>
<td>1.5986</td>
<td>1.3301</td>
<td>2.4578</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.7776</td>
<td>1.6124</td>
<td>1.2859</td>
<td>3.5397</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.2093</td>
<td>1.4676</td>
<td>1.2336</td>
<td>2.1671</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-value</td>
<td>1992-1996</td>
<td>0.241</td>
<td>0.715</td>
<td>0.699</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.024</td>
<td>0.335</td>
<td>0.207</td>
<td>0.287</td>
<td></td>
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<tr>
<td></td>
<td>0.734</td>
<td>0.242</td>
<td>0.324</td>
<td>0.324</td>
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<tr>
<td></td>
<td>0.320</td>
<td>0.155</td>
<td>0.105</td>
<td>0.867</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>0.034</td>
<td>0.105</td>
<td>0.621</td>
<td>0.020</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: The stability of the day of the week effect between the study periods

5.1.5.1 Stability of the mean between the study periods

The mean return is obviously found to be different between the study periods, when focusing on the stability of the results over time periods. According to the theoretical framework in the western stock, Monday is usually the day to present the lowest return, however, in our study we haven’t found the significant similar result, but we find that Monday has a lower return; it generally presents the second or third lowest return. In some stock markets, Tuesday presents the lowest return. This is true for the first and the whole periods of study where Tuesday has a lowest negative return, also for the second period it has a quite low negative return. However, for the third period of study Tuesday has a positive return and even presents the highest return. This is such an abnormal result that the mean return can go from being the lowest one to being the highest one. For Wednesday, the return is positive for the four periods, and it presents the second highest return for the second, the third and the whole periods. Although it presents the third highest return in the first period, the value of return is still higher than the other periods. As to Thursday, it has the lowest return in the second and third period and a very low positive return in the whole period. During the four time periods, it is only Wednesday and Friday that consistently present positive returns. In accord with the theoretical study, Friday is usually the day to present the highest return. This is also true for the first, second and the whole period in China’s stock market where Friday has the highest return. Surprisingly, for the third period of study, the return of Friday turns to a very low positive level. To sum up, the mean returns for the study periods are found to be instable.

5.1.5.2 Stability of the standard deviation between the study periods

Generally speaking, the standard deviation for the first period is much higher than the other periods, which means the return for the first period has the highest volatility, and for investors, the risk is quite high. The volatility of the third period is the lowest of the four periods, so investing in the Chinese stock market during 2002-2006 is of low risk. According to the study of the western stock market, the standard deviation of Monday is
usually higher than that of the other weekdays. This is true for the second and the third period where the volatility for Monday is the highest one. During the first and the whole period, the standard deviation of Monday is also high, presenting the second highest position. Another weekday having a high standard deviation is Thursday, which presents the highest value at 5.7776 for the first period, the highest value at 3.5397 for the whole period and the second highest at 1.6724 for the second period of study. Only for the third period the value of standard deviation of Thursday is in a middle position. As to Tuesday and Wednesday, the volatility respectively presents second and third lowest value during the first, the second and the whole period. When it comes to the third period, Tuesday has the lowest standard deviation and Wednesday has increased to the second highest position. At last, we find Friday has the lowest standard deviation through the time period of study except the third period where Tuesday has the lowest value of volatility while Friday has the second lowest value. The figure below can clearly show the different standard deviation level between weekdays. Considering the return of weekdays, Friday usually presents a highest return with a lowest volatility, so investing on Friday is a good choice. As we analysis above, no weekday presents stable results when it comes to the standard deviation, but generally Friday and Tuesday have a low volatility, Wednesday has a middle volatility and Monday, Thursday have a high volatility. However, from the value of standard deviation of all weekdays, no stability is found between the study periods.

![Diagram: Comparison of the standard deviation over study periods](image)

**5.1.5.3 Stability of the P-value between the study periods**

By analysis of the stability of the P-value, the stability of Day-of-the-Week can be found. According to the theoretical framework, the P-value for Monday is usually lower than the significant level $\alpha$, meaning that the mean return of Monday is usually significantly different from all the other days. However, in our study, the P-value of Monday is higher than $\alpha = 0.05$ through the four time periods, so the T-test is insignificant; there is no Monday effect through the periods of study. The same as Monday, Wednesday
has a P-value higher than 0.05 for all the four time periods; there is no Wednesday effect for any period of this study either. A significant P-value for Tuesday is found in the first and the whole period of study, which is 0.024 and 0.042 respectively. A Tuesday effect exists in the study of Japan and Australian stock market, it is the same case that Chinese stock market has during the 1992-1996 period and the whole period. What’s more, the first period (1992-1996) is more significant than the whole period, since 0.024 is smaller than 0.042. However, for the second and third period, the P-level of Tuesday is 0.335 and 0.207 respectively, both of which is larger than 0.05 and therefore is insignificant. Although the mean return of Tuesday is higher than that of any other weekday for the third period, it is still much far away from the significant level. As to Thursday, the P-value is not significant except the third period where the value is 0.044, lower than 0.05, so there is Thursday effect that the return of Thursday is significantly lower than all the other days during the 2002-2006 period. When looking at Friday, the p-value for the first period is 0.034, lower than 0.05, and increase to 0.105(>0.05) in the second period and then reach to a higher value of 0.621(>0.05) in the third period, however, the P-value is 0.02, which is lower than 0.05 for the whole period, implying that the return of Friday is significantly different from all the other weekdays during the first and the whole period, while insignificantly different during the second and the third period. So we get a result that positive Friday effect exists in Chinese stock market but it is not stable for all the time periods of study. As can be seen, the p-value is obviously not stable between the four periods, and therefore the Day of the week effect like Tuesday effect, Thursday effect and Friday effect is not stable as well.
5.2 The January Effect (Month of the Year Effect)

The month of the year effect is described by the existence of patterns in stock returns during a particular month of the year, and the most discussed effect is the January effect. The January effect is associated with the higher average stock returns in January compared with the other months of the years84.

To test the January effect in Chinese stock market, we compare the average daily return of January with that of all the other months of the year. Since we don’t know what kind of Month-of-the-Year effect exists in Chinese stock market, every month has been tested whether it is significantly different from all the other months. Here, the studying period is also divided into four periods: 1992-1996, 1997-2001, 2002-2006 and the whole period 1992-2006. To analysis the stability of the Month-of -the-Year effect between the time periods, a comparison of the empirical findings from the four investigated time series has been done in the end of this part.

We use T-test to compare the mean equality of two populations, and the hypotheses constructed for testing the Month-of-the-Year effect are:

\[
H_0: \mu_1 = \mu_2 \\
H_A: \mu_1 \neq \mu_2
\]

\(\mu_1\): The average daily log return of the investigated month in percentage
\(\mu_2\): The average daily log return of rest of the months in percentage

For example, the hypothesis \(H_0\) for testing January effect is that the average daily log return of January is equal to that of all the other months together of the year.

For each investigated period, the analysis structure is, firstly we analyze the descriptive statistics of daily return of separate month, like mean, standard deviation, to see which month has the highest or lowest mean return and the direction of the mean return of each month and also the relationship between the mean and the standard deviation of the daily return. All these can be clearly shown by the tables and column charts. Secondly, we compare the mean daily return of each investigated month with that of all the other months of the year (all the month of the year except the investigated month), and use T-test to test whether the difference is statistically significant or not. If P-value of T-test is larger than the significant level \(\alpha\) (\(\alpha=0.05\)), the T-test is not significant, then the hypothesis \((H_0: \mu_1 = \mu_2)\) can’t be rejected, which means there is no existence of January effect for the period in Chinese stock market; if P-value is smaller than the significant level \(\alpha\), the T-test is statistically significant, then the hypothesis \(H_0\) can be rejected ,which can conclude that there is January effect for the period.

5.2.1 Result of Month of the Year Effect for the Time Period 1992 to 1996

![Average daily percentage return in month 1992-1996](image)

Figure 6: Average daily percentage return for January effect 1992-1996

From the figure, we can see that the negative mean returns is March, June, July, September, October, and December, the lowest of which is October with value of -0.5006. May has the highest mean return, but just a little higher than the second high August. As to the mean return of January is positive, but just a middle place, neither significantly higher nor lower than the most of the other months.
Table 6: The January effect 1992-1996

The table above presents the means and standard deviations of daily return in month over the 1992-1996 period. For most of months, that is the higher volatility, the higher return. However, October and November are abnormally higher volatility with lower return. Compared with November (3.9236), October has similar volatility of 3.9647, but a much lower negative return (-0.5006). May has the highest volatility of 8.3677 and also the highest mean of daily percentage return of 0.6749.

The table also describes the results of T-test for period 1992-1996. The P-value for January is 0.548, which is higher than 0.05, so there is no significant January effect. Although May has the highest return of all the months, the difference from others is still far away from the significant level. So there is no positive Month-of-the-Year effect for this period. October presents the lowest mean return of all, but the P-value for October is 0.141 (>α=0.05), not significant either. Actually, the result is that none of the months is significantly higher or lower than the other months, so there is no significant Month-of-the-Year effect found for 1992-1996.

<table>
<thead>
<tr>
<th>Calendar month</th>
<th>n</th>
<th>Mean</th>
<th>Sd</th>
<th>F-test</th>
<th>Sig.</th>
<th>T-test</th>
<th>df</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>102</td>
<td>0.2386</td>
<td>2.3833</td>
<td>4.672</td>
<td>0.031</td>
<td>0.373</td>
<td>1258</td>
<td>0.709</td>
</tr>
<tr>
<td>other months</td>
<td>1158</td>
<td>0.0776</td>
<td>4.3057</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>81</td>
<td>0.3222</td>
<td>3.0328</td>
<td>0.762</td>
<td>0.383</td>
<td>0.537</td>
<td>1258</td>
<td>0.591</td>
</tr>
<tr>
<td>other months</td>
<td>1179</td>
<td>0.0740</td>
<td>4.2508</td>
<td></td>
<td></td>
<td>0.719</td>
<td>102,925</td>
<td>0.474</td>
</tr>
<tr>
<td>March</td>
<td>111</td>
<td>-0.2211</td>
<td>3.2652</td>
<td>0.891</td>
<td>0.345</td>
<td>-0.822</td>
<td>1258</td>
<td>0.411</td>
</tr>
<tr>
<td>other months</td>
<td>1149</td>
<td>0.1207</td>
<td>4.2608</td>
<td></td>
<td></td>
<td>-1.022</td>
<td>148,782</td>
<td>0.308</td>
</tr>
<tr>
<td>April</td>
<td>107</td>
<td>0.4291</td>
<td>3.0185</td>
<td>1.034</td>
<td>0.309</td>
<td>0.875</td>
<td>1258</td>
<td>0.382</td>
</tr>
<tr>
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<td>1153</td>
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<td>4.2743</td>
<td></td>
<td></td>
<td>1.164</td>
<td>148,648</td>
<td>0.246</td>
</tr>
<tr>
<td>May</td>
<td>106</td>
<td>0.6749</td>
<td>8.3677</td>
<td>12.385</td>
<td>0</td>
<td>1.504</td>
<td>1258</td>
<td>0.133</td>
</tr>
<tr>
<td>other months</td>
<td>1154</td>
<td>0.0370</td>
<td>3.5627</td>
<td></td>
<td></td>
<td>0.779</td>
<td>108,523</td>
<td>0.438</td>
</tr>
<tr>
<td>June</td>
<td>107</td>
<td>-0.0136</td>
<td>2.8697</td>
<td>2.716</td>
<td>0.1</td>
<td>-0.269</td>
<td>1258</td>
<td>0.788</td>
</tr>
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<td>other months</td>
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<td>0.1003</td>
<td>4.2850</td>
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<td></td>
<td>-0.374</td>
<td>153,798</td>
<td>0.709</td>
</tr>
<tr>
<td>July</td>
<td>110</td>
<td>-0.4343</td>
<td>2.8914</td>
<td>0.531</td>
<td>0.466</td>
<td>-1.378</td>
<td>1258</td>
<td>0.168</td>
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<tr>
<td>other months</td>
<td>1150</td>
<td>0.1408</td>
<td>4.2834</td>
<td></td>
<td></td>
<td>-1.896</td>
<td>158,902</td>
<td>0.06</td>
</tr>
<tr>
<td>August</td>
<td>111</td>
<td>0.5865</td>
<td>5.3445</td>
<td>7.694</td>
<td>0.006</td>
<td>1.308</td>
<td>1258</td>
<td>0.191</td>
</tr>
<tr>
<td>other months</td>
<td>1149</td>
<td>0.0427</td>
<td>4.0526</td>
<td></td>
<td></td>
<td>1.043</td>
<td>122,523</td>
<td>0.299</td>
</tr>
<tr>
<td>September</td>
<td>107</td>
<td>-0.0764</td>
<td>3.4613</td>
<td>0.011</td>
<td>0.918</td>
<td>-0.432</td>
<td>1258</td>
<td>0.666</td>
</tr>
<tr>
<td>other months</td>
<td>1153</td>
<td>0.1061</td>
<td>4.2444</td>
<td></td>
<td></td>
<td>-0.511</td>
<td>137,4</td>
<td>0.61</td>
</tr>
<tr>
<td>October</td>
<td>100</td>
<td>-0.5006</td>
<td>3.9647</td>
<td>0.945</td>
<td>0.331</td>
<td>-1.474</td>
<td>1258</td>
<td>0.141</td>
</tr>
<tr>
<td>other months</td>
<td>1160</td>
<td>0.1416</td>
<td>4.1987</td>
<td></td>
<td></td>
<td>-1.547</td>
<td>118,973</td>
<td>0.125</td>
</tr>
<tr>
<td>November</td>
<td>108</td>
<td>0.4932</td>
<td>3.9236</td>
<td>0.102</td>
<td>0.75</td>
<td>1.046</td>
<td>1258</td>
<td>0.296</td>
</tr>
<tr>
<td>other months</td>
<td>1152</td>
<td>0.0529</td>
<td>4.2058</td>
<td></td>
<td></td>
<td>1.108</td>
<td>131,152</td>
<td>0.27</td>
</tr>
<tr>
<td>December</td>
<td>110</td>
<td>-0.3717</td>
<td>3.8583</td>
<td>0.24</td>
<td>0.624</td>
<td>-1.214</td>
<td>1258</td>
<td>0.225</td>
</tr>
<tr>
<td>other months</td>
<td>1150</td>
<td>0.1348</td>
<td>4.2113</td>
<td></td>
<td></td>
<td>-1.305</td>
<td>135,091</td>
<td>0.194</td>
</tr>
</tbody>
</table>

P-value: 2-tailed P-value for T-test significance level α=0.05
5.2.2 Result of Month of the Year Effect for the Time Period 1997 to 2001

For the period 1997-2001, all the first 6 months have positive mean return, while the other 6 months all have negative mean return except November. The highest mean return is March while the lowest is July. January still keeps a positive mean return and December remains a negative mean return in the second period.

Figure 7: Average daily percentage return for January effect 1997-2001
Table 7: The January effect 1997-2001

The table above presents the means and standard deviations of daily return in month over the 1992-1996 period. The mean returns for each month are low in general, so is the volatility, compared with the first period. But we can still see the difference between each other. The most risky month is February with a standard deviation of 2.2364, and the second is May for this period. March has the best mean return of 0.3507 with a lower volatility of 1.3391.

The table also describes the results of T-test for period 1997-2001. From it, we can see July presents the lowest mean return of -0.1961, but P-value is not significant, therefore, there is no statistically negative July effect. P-value for March is 0.04, which is lower than \( \alpha = 0.05 \), so the hypothesis \( H_0 \): the average daily return of March is equal to that of all the other months together of the year can be rejected. The mean return of March is significantly different from that of other months, and it is much higher than the others, therefore there is positive March effect during this period.
5.2.3 Result of Month of the Year Effect for the Time Period 2002 to 2006

![Average daily percentage return in month 2002-2006](image)

Figure 8: Average daily percentage return for January effect 2002-2006

As can be seen, for period 2002-2006, the return for February is higher than all the others and October is lower than all the others. Instead of negative mean return in the first two periods, December has a positive mean return and presents the second highest position in this period. The return of March decreases to a negative value, though, it is the highest mean return in last study period. January, March, April, May, June, August and September are fluctuating around zero. All the months have a positive mean return except March, May, July and October in this period.
Table 8: The January effect 2002-2006

The value of mean return and standard deviation for every month can be seen from the table above. Generally speaking, most of the volatility and return of this period is lower, comparing with the first two periods. It is shown that the volatility of June (1.8059) is higher than that of every other month, but the return of -0.0889 is very low. October’s volatility (0.9929) is the lowest and the return (-0.1147) is the lowest as well.
The table also describes the results of T-test for period 2002-2006. Although, February presents the highest mean return of 0.2710, and October has the lowest mean return of -0.1147, since all the mean return for months is at a very low level, the difference between each other is quite insignificant. And we notice that the t-test for all the months is not statistically significant. So for this time period, there is no Month-of-the-Year effect and thereby no January effect either.

5.2.4 Result of Month of the Year Effect for Time Period 1992 to 2006

![Average daily percentage return in month 1992-2006](image)

The Figure 9 shows the mean return of every month through the whole period from 1992 to 2006. We can notice that the months that have negative mean return are July, September, October, December, while the rest of months have positive mean return. July has the lowest return, and May has the highest.

<table>
<thead>
<tr>
<th>Calendar month</th>
<th>n</th>
<th>Mean</th>
<th>Sd</th>
<th>F-test</th>
<th>Sig.</th>
<th>T-test</th>
<th>df</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>310</td>
<td>0.1396</td>
<td>1.8692</td>
<td>2.14</td>
<td>0.144</td>
<td>0.557</td>
<td>3805</td>
<td>0.578</td>
</tr>
<tr>
<td>other months</td>
<td>3497</td>
<td>0.0508</td>
<td>2.7497</td>
<td></td>
<td></td>
<td>0.766</td>
<td>437,502</td>
<td>0.444</td>
</tr>
<tr>
<td>February</td>
<td>254</td>
<td>0.2440</td>
<td>2.2269</td>
<td>0.439</td>
<td>0.508</td>
<td>1.141</td>
<td>3805</td>
<td>0.254</td>
</tr>
<tr>
<td>other months</td>
<td>3553</td>
<td>0.0448</td>
<td>2.7185</td>
<td>1.355</td>
<td>0.176</td>
<td>309,531</td>
<td>0.867</td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>332</td>
<td>0.0386</td>
<td>2.1537</td>
<td>1.163</td>
<td>0.281</td>
<td>-0.138</td>
<td>3805</td>
<td>0.890</td>
</tr>
<tr>
<td>other months</td>
<td>3475</td>
<td>0.0599</td>
<td>2.7346</td>
<td></td>
<td></td>
<td>-0.168</td>
<td>439,821</td>
<td>0.867</td>
</tr>
<tr>
<td>April</td>
<td>321</td>
<td>0.2155</td>
<td>1.9969</td>
<td>1.285</td>
<td>0.257</td>
<td>1.097</td>
<td>3805</td>
<td>0.273</td>
</tr>
</tbody>
</table>
Table 9: The January effect 1992-2006

As is shown from the table, for the whole period, May has the highest standard deviation (5.0004) and also the highest return (0.2624), means that the investors can get a high return in May, at the same time they have to take a high risk when investing in the Shanghai Stock Exchange. January presents the lowest standard deviation of 1.8692 and positive mean return of 0.1396.

The table also describes the results of T-test for the whole period 1992-2006. A January effect is not found in the period, either. Since January does not present the highest or the lowest mean return of all the months, and also the P-value of January is 0.578, much higher than the significance level $\alpha=0.05$, indicating that mean return of January is not significantly different from that of all the others. May presents the highest mean return through the whole period from 1992 to 2006, the value of which is 0.2624, but still far away from the significant level, so there is no positive May effect. Instead, a July effect exits during this time period. We find the mean return of July is much lower than that of other months, and the P-value of 0.035 is lower than 0.05, the T-test is significant, hence the hypothesis $H_0$: the average daily return of July is equal to that of all the other months together of the year can be rejected. A significant negative July effect is found.
### Table 10: The stability of the turn of the month effect between the study periods

<table>
<thead>
<tr>
<th>Calendar month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992-1996</td>
<td>0.2386</td>
<td>0.3322</td>
<td>-0.2211</td>
<td>0.4291</td>
<td>0.6749</td>
<td>-0.0136</td>
<td>-0.4343</td>
<td>0.5865</td>
<td>-0.0764</td>
<td>-0.5006</td>
<td>0.4932</td>
<td>-0.3717</td>
</tr>
<tr>
<td>1997-2001</td>
<td>0.1774</td>
<td>0.1090</td>
<td>0.3507</td>
<td>0.1768</td>
<td>0.1655</td>
<td>0.2032</td>
<td>-0.1961</td>
<td>-0.1278</td>
<td>-0.1497</td>
<td>-0.0077</td>
<td>0.0284</td>
<td>-0.1331</td>
</tr>
<tr>
<td>2002-2006</td>
<td>0.0141</td>
<td>0.2710</td>
<td>-0.0110</td>
<td>0.0406</td>
<td>0.0058</td>
<td>-0.0889</td>
<td>0.0343</td>
<td>-0.0027</td>
<td>-0.1147</td>
<td>0.1307</td>
<td>0.2292</td>
<td></td>
</tr>
<tr>
<td><strong>Whole period</strong></td>
<td>0.1396</td>
<td>0.2440</td>
<td>0.0386</td>
<td>0.2155</td>
<td>0.2624</td>
<td>0.0651</td>
<td>-0.2398</td>
<td>0.1652</td>
<td>-0.0761</td>
<td>-0.2047</td>
<td>0.2183</td>
<td>-0.0908</td>
</tr>
<tr>
<td><strong>Standard deviation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997-2001</td>
<td>1.4486</td>
<td>2.2364</td>
<td>1.3391</td>
<td>1.1168</td>
<td>2.1111</td>
<td>1.8125</td>
<td>1.8749</td>
<td>1.6921</td>
<td>1.7355</td>
<td>1.8317</td>
<td>1.0155</td>
<td>0.9186</td>
</tr>
<tr>
<td>2002-2006</td>
<td>1.6575</td>
<td>1.2579</td>
<td>1.1627</td>
<td>1.2654</td>
<td>1.3564</td>
<td>1.8059</td>
<td>1.2187</td>
<td>1.0068</td>
<td>1.2035</td>
<td>0.9929</td>
<td>1.2275</td>
<td>1.2110</td>
</tr>
<tr>
<td><strong>Whole period</strong></td>
<td>1.8692</td>
<td>2.2269</td>
<td>2.1537</td>
<td>1.9969</td>
<td>5.0004</td>
<td>2.2149</td>
<td>2.1089</td>
<td>3.2964</td>
<td>2.3318</td>
<td>2.5500</td>
<td>2.4515</td>
<td>2.4002</td>
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<tr>
<td><strong>P-value (two-tailed)</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992-1996</td>
<td>0.548</td>
<td>0.591</td>
<td>0.411</td>
<td>0.382</td>
<td>0.438</td>
<td>0.788</td>
<td>0.168</td>
<td>0.299</td>
<td>0.666</td>
<td>0.141</td>
<td>0.296</td>
<td>0.225</td>
</tr>
<tr>
<td>1997-2001</td>
<td>0.408</td>
<td>0.737</td>
<td>0.040</td>
<td>0.233</td>
<td>0.433</td>
<td>0.299</td>
<td>0.101</td>
<td>0.239</td>
<td>0.191</td>
<td>0.727</td>
<td>0.855</td>
<td>0.053</td>
</tr>
<tr>
<td>2002-2006</td>
<td>0.876</td>
<td>0.061</td>
<td>0.682</td>
<td>0.978</td>
<td>0.517</td>
<td>0.848</td>
<td>0.287</td>
<td>0.98</td>
<td>0.738</td>
<td>0.106</td>
<td>0.438</td>
<td>0.104</td>
</tr>
<tr>
<td><strong>Whole period</strong></td>
<td>0.578</td>
<td>0.254</td>
<td>0.89</td>
<td>0.273</td>
<td>0.428</td>
<td>0.961</td>
<td>0.035</td>
<td>0.529</td>
<td>0.35</td>
<td>0.073</td>
<td>0.264</td>
<td>0.293</td>
</tr>
</tbody>
</table>

#### 5.2.5 Stability of Month of the Year Effect

Significance level $\alpha=0.05$

Table 10: The stability of the turn of the month effect between the study periods
5.2.5.1 Stability of the mean return between the study periods

As we can see from the table above, the mean return for each month is not stable between the study periods. All months have at least one negative return through the four periods except January, February, April and November, especially July, September and October have negative mean return during all the four periods. Not like the theoretical framework in the western stock market that January has a higher return than all the other months, the positive mean return for January is on a quite average level in Chinese stock market, and April and November are in the same situation as January that has a positive return but not significantly higher than all the other months during the four periods of study. For February, the return is positive and even the highest one during the third period of study. As to March, the return is negative in the first period (1992-1996), however, it has become the highest of all months in the second period and then has a negative return again in the third period (2002-2006), and it holds a positive return for the whole period. For May, the return in the first period is the highest one with a value of 0.6749, and then reduces to 0.1655 in the second period, and goes down to a negative value of -0.0391, informing that the return of May is quite instable. Thanks to the high return of the first period, May is still the highest month in the whole period (1992-2006). The biggest difference of return between periods is the August’s reduction from the first period to the second period, which is 0.7143 from 0.5865 to -0.1278. In accord with the theoretical framework, December has a negative return in the first and second and the whole period, surprisingly, the return of December in the third period has increased very fast from a negative value to 0.2292, a second highest return of all months. From what we discuss above, it is found that none of months has a steady return between the three periods. However, investors should notice that July, September, October and December mostly have a negative return, which is not good time to invest in the stock.

5.2.5.2 Stability of the standard deviation between the study periods

The standard deviation is most commonly used to evaluate the statistical dispersion around the mean as well as functioning as a risk indicator. As we can see from the table, the standard deviation of return is not stable through the time. It is the first period (1992-1996) that has the highest standard deviation of all three periods, which means the volatility of return from 1992 to 1996 is very high and investing in Chinese stock market is more risky in that time than in the other two periods. And during that time, May has the highest standard deviation of 8.3677, the highest value of all the
periods as well. If we take mean return into consideration, May also has the highest return of all the periods, which is in accord with the “high risk, high return” rule, and it is a good time to make deal in the Chinese stock market for those risk-lover investors. During the second period, the volatility of May sharply decreases to 2.1111 and keeps decreasing to 1.3564 in the third period and due to the high volatility of first period; May still has the highest volatility of 5.0004 for the whole period. The movement of August’s volatility is almost the same as that of May, with a second highest volatility and mean return in the first period and reduced volatility in the second and third period, also the second highest volatility through the whole period of study. On the other hand, June presents the most steady volatility change from the second period to the third period, with value of 1.8125 and 1.8059 respectively. So when focusing on standard deviation, it can be seen that the standard deviation for all of the months decrease from the first time period to the second and keep a smaller difference (less than 1) from the second period to the third period.

5.2.5.3 Stability of the P-value between the study periods

Concerning the stability of the P-value between the three periods, the table shows that no month presents stable results. As to January, the P-values of all the three periods are much larger than the significant level 0.05, so there is no January effect in Chinese stock market. February presents the highest return during the third period, but the p-value 0.061 is still larger than the significance level and the other two periods are also much higher than 0.05, so there is no February effect either. As to March, we find a significant P-value during the second period, so there is March effect in Chinese stock market from 1997 to 2001, however, the P-value is insignificant in the rest of time periods, so we can conclude that the March effect is not stable through times. The P-value of July is not significant in all three periods of study, but significant in the whole period from 1992 to 2006, which means there is a July effect in Chinese stock market in the whole 1992-2006 period of study, but it is not true in each separate period. As to December, according to the western theoretical framework, the P-value of December is usually significant, meaning the return of December is usually lower than the other months. But in our study, the P-value of December is insignificant in all periods of study, so there is no December effect in Chinese stock market. In conclusion, the only two months presenting significant P-value are March (the second period), and July (the whole period); apart from March and July, no other P-value is significant.
5.3 Semi-month Effect

The semi-month effect or the half month effect refers to the anomaly that the average return of the first half month is significantly different from the average return of rest of the month. Here we take 1 to 15 calendar days of month as the first half month, while the rest of days of the month as the second half month. The sample size of two populations to be compared is different, since in some months, there are very few trading days during the first half month, but more in the other half, especially the 31th calendar days of the preceding month. We test semi-month effect in four periods: period 1992 to 2006, period 1992 to 1996, period 1997 to 2001, and the whole period 2002 to 2006.

The hypotheses to investigate in the case of the semi-month effect are:

**H0:** $\mu_1 = \mu_2$

**HA:** $\mu_1 \neq \mu_2$

$\mu_1 =$ The average daily log return of the first half of the months in percentage

$\mu_2 =$ The average daily log return of the second half of the months in percentage.

![Comparison of average daily return between 1st half month and 2nd half month](image)

Figure 10: The comparison of average daily return between the first and second half of the months

This figure reports the comparison of average daily return between the first and second half of the months. We can see that the mean return of the first half month is higher than that of the second half month in the whole period, the first and the third
period. However, the mean return of the first half month appears lower than that of the rest of the month in the second period from 1997 to 2001.

<table>
<thead>
<tr>
<th>Period</th>
<th>Statistics</th>
<th>n</th>
<th>Mean</th>
<th>Sd</th>
<th>F</th>
<th>Sig.</th>
<th>T-test</th>
<th>df</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992-1996</td>
<td>1st half</td>
<td>614</td>
<td>0.1327</td>
<td>3.7206</td>
<td>0.204</td>
<td>0.652</td>
<td>0.348</td>
<td>1258</td>
<td>0.728</td>
</tr>
<tr>
<td></td>
<td>2nd half</td>
<td>646</td>
<td>0.0507</td>
<td>4.5814</td>
<td>0.35</td>
<td>1228.366</td>
<td>0.727</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997-2001</td>
<td>1st half</td>
<td>601</td>
<td>0.0067</td>
<td>1.5532</td>
<td>0.706</td>
<td>0.401</td>
<td>-0.84</td>
<td>1242</td>
<td>0.401</td>
</tr>
<tr>
<td></td>
<td>2nd half</td>
<td>643</td>
<td>0.0843</td>
<td>1.6934</td>
<td>0.35</td>
<td>1241.563</td>
<td>0.399</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002-2006</td>
<td>1st half</td>
<td>642</td>
<td>0.0731</td>
<td>1.3290</td>
<td>0.23</td>
<td>0.632</td>
<td>0.981</td>
<td>1301</td>
<td>0.327</td>
</tr>
<tr>
<td></td>
<td>2nd half</td>
<td>661</td>
<td>0.0025</td>
<td>1.2683</td>
<td>0.23</td>
<td>0.632</td>
<td>0.981</td>
<td>1293.546</td>
<td>0.327</td>
</tr>
<tr>
<td>Whole period</td>
<td>1st half</td>
<td>1857</td>
<td>0.0713</td>
<td>2.4423</td>
<td>0.328</td>
<td>0.567</td>
<td>0.297</td>
<td>3805</td>
<td>0.767</td>
</tr>
<tr>
<td></td>
<td>2nd half</td>
<td>1950</td>
<td>0.0454</td>
<td>2.9046</td>
<td>0.328</td>
<td>0.567</td>
<td>0.297</td>
<td>3747.894</td>
<td>0.766</td>
</tr>
</tbody>
</table>

P-value: 2-tailed P-value for T-test

Table 11: The semi-month effect

From the table above, we generally find that the standard deviation in the first period is much higher than the other two periods, which means the risk of investment from 1992 to 1996 is higher than that of the other two periods. To be detailed, in the first period, the standard deviation of the 1st half month(3.7206) is lower than that of the 2nd half month (4.5814); in the second period, the standard deviation of the 1st half month and the 2nd half month has no big difference, the value of which are 1.5532 and1.6934 respectively; in the third period, the similar standard deviation of the 1st half month and the 2nd half month can also be found, with value of 1.3290 and 1.2683 respectively; through the whole period, similarly with the first period, the standard deviation of the 1st half month (2.4423) is lower than that of the 2nd half month (2.9046).

The results of T-test show that although there is return difference between the first half month and the second half month in each studying period, it is still far from being significant. All the P-value is larger than 0.05, meaning that we can’t reject the hypothesis that the average returns of each half month are equal. To sum up, no semi-month effect is significantly found in Chinese stock market.
Chapter Six :  Conclusions and Recommendations

This chapter will display the conclusions from the empirical studies concerning day of the week effect, January effect and semi-month effect. And further relative studies will be suggested.

6.1 Day of the Week Effect

Generally, it is well documented that the return of Monday is quite different from the return of other days and is usually negative, because usually bad news appearing during the weekends release the prior week, which results in the investors in a distress tending to use Monday as the opportunity to sell volume in order to satisfy the liquidity needs. It is found in some seasonality anomalies studies that the mean return on Friday is higher compared to other days. In our study, we have compared the mean return of Monday (or Tuesday etc.) with that of the other days to certify whether there is Day of the week effect in Chinese stock market.

In the first period of study (1992-1996), Tuesday has the lowest negative mean return, and the P-value of 0.024 is significant, therefore, there exists a Negative Tuesday effect, which is consistent with findings for Japan and Australian markets (Jaffe and Westerfield (1985)). During the second period of study (1997-2001), Thursday has lowest return, however, the P-value is not significant, and therefore no Thursday effect in this period. For the third period of study (2002-2006), Thursday presents the lowest negative mean return, and the P-value is significant, so there is a Negative Thursday effect during 2002 to 2006. It is consistent with Agrawal and Tandon’s study (1994) that the Netherlands and New Zealand had the negative Thursday’s effect. And for the whole period, Tuesday presents the lowest negative mean return again, and the P-value of 0.042 is significant, so there is a Negative Tuesday effect in the whole period of study.

Friday has the highest positive mean return from1992 to 1996, and the P-value of 0.034 is significant, so there is a Positive Friday effect, which is usually the case according to the western theoretical framework. In the second period of study (1997 to 2001), Friday also has the highest positive mean return, but the P-value is insignificant, therefore, there is no Friday effect during the period, what’s more, there is not any day of the week effect, either. And for the third period of study (2002-2006), Tuesday has the highest mean return for the first time, however, the P-value is not significant, so we haven’t found a positive Tuesday effect. Same as period 1992-1996 and 1997-2001, Friday mean return is still the highest during the whole period and the
T-test for Friday is also significant, so Friday is statistically higher than the other days and there exists a Positive Friday effect for the whole period.

When focusing on the stability of the statistical data over the periods of study, it is obvious that no weekday presents stable results between the four periods. Firstly, in our study we haven’t found the famous Monday effect that Monday has a lower return than the other days, but we find that Monday has a low return in most time; it generally presents the second or third lowest return. According to the study of the western stock market, the standard deviation of Monday is usually higher than that of the other weekdays. This is true for the second and the third period where the volatility for Monday is the highest one. During the first and the whole period, the standard deviation of Monday is also high, presenting the second highest position. Another weekday having a high standard deviation is Thursday. When it comes to the standard deviation, generally Friday and Tuesday have a low volatility, Wednesday has a middle volatility and Monday, Thursday have a high volatility. Secondly, instead of Monday, we has found Tuesday effect for the first and the whole periods of study where Tuesday has a lowest negative return, also for the second period it has a quite low negative return. However, negative Tuesday effect is not stable in Chinese stock market, for the third period of study Tuesday even presents the highest return. Thirdly, during each short time and long time, it is only Wednesday and Friday that consistently present positive returns. What’s more, we have found Friday is usually the day to present the highest return with a lowest volatility, which is in accord with the theoretical study.

6.2 January Effect

According to many studies of seasonality effects, January has a higher return than the other months, however, in our study about Chinese stock market, the P-value of January for all the periods are much larger than the significant level 0.05, so there is no significant January effect in Chinese stock market. Since the mean return of January has never been the highest position, we have tried to test whether other month with highest return has significantly Month-of-the-Year effect. We find that for the first period, May has the highest mean return, but the P-value is insignificant, either. For the period 1997-2001, the highest mean return is March, and P-value for March is 0.04, which is significantly, therefore there is positive March effect during this period. For the third period of study (2002-2006), February presents the highest mean return, but t-test is not significant, therefore, no February effect is in existence from 2002 to 2006. At last, we study the whole period from 1992 to 2006, May has the highest mean return again, and a insignificant P-value of 0.428. So we conclude that there is only a positive March effect found in Chinese stock market for the short period (1997-2001), no other positive Month-of-the-Year effect found either short term or long term.
During the first period 1992 to 1996, the lowest return is October with value of -0.5006, however, the P-value is not significant, what's more, we has found none of the months is significantly higher or lower than the other month; there is no Month-of-the-Year effect for 1992-1996. For the period 1997-2001, July has the lowest mean return; however, P-value is insignificant. When comes to the third period of study, October presents the lowest mean return again, but we find the t-test for any month is not statistically significant, so for this time period, there is no Month-of-the-Year effect either. For the whole period of study, we find the mean return of July is much lower than that of other months, and the p-value of 0.035 is lower than 0.05, the T-test is significant. A significant negative July effect is found in the long term.

Although January effect or December effect is found in many stock markets, in our study, the P-value of both January and December is insignificant in all period of study, so there is neither January effect nor December effect in Chinese stock market. Instead, the only two months presenting significant P-value are March (the second period), and July (the whole period); apart from March and July, no other Month-of-the-Year effect.

When investing the stability of the statistical data, it is found that not any month presents a steady result between the periods. However, investors should notice that July, September, October and December mostly have a negative return, not standing for a good time to invest in the stock market during the past time. When focusing on standard deviation, it is the first period (1992-1996) that has the highest standard deviation of all three periods, which means that the volatility of return from 1992 to 1996 is very high and investing in Chinese stock market is more risky in that time than in the other two periods. May has the highest standard deviation of 8.3677 in the first period of study, the highest value of all the periods as well. There is no stability of the seasonality effect, since the March effect (1997-2001) and the July effect (the whole period 1992-2006) only appear one time respectively.

### 6.3 Semi-month Effect

An attempt in our study has been made to test whether the semi-monthly effect exists in the Chinese stock market. By comparing the mean return of the first 15 days with that of the other 15 days of the same month, we has found that the mean return of the first half month is higher than that of the second half month in the first (1992-1996) and the third period (2001-2006) and the whole period (1992-2006); only the second period of study has an opposite result that the mean return of the first half month appears lower than that of the rest of the month from 1997 to 2001. However, all the
P-value is larger than 0.05, meaning that the difference is not statistically significant, so it can be indicated that the semi-month effect does not exist in Chinese stock market.

In all, this study has been taken to examine whether seasonal anomalies (seasonality effect) exist in Chinese stock market and whether the seasonality effect is persistent over time. To analyze this, the data has been collected from Shanghai Stock Exchange Index and has been tested in four periods: 1992-1996, 1997-2001, 2002-2006 and the whole period 1992-2006. Null hypothesis and T-test with $\alpha=0.05$ is used to test the seasonality effect. The results show that seasonal anomalies like Day of the week effect, positive March effect, and negative July effect exist in the Chinese stock market, while semi-month effect does not occur significantly; but the existing seasonal effect is not persistent over times. The above indicates that the Chinese stock market is not fully efficient yet. Investors may have opportunities to make use of the seasonal anomalies to earn abnormal return by making trading strategies. However, the study is based on the historical data, but the future stock price is affected by lots of factors; and like in other invested stock markets, as soon as the seasonal anomalies is certified by the public, the opportunity of making excessive return by profitable trading strategies will disappear.

### 6.4 Recommendations for Further Studies

This thesis represents the hard work from us, and we are very confident with the results of the study. But we would like to suggest more similar studies to improve the estimation of market efficiency anomalies in Chinese stock market, in fact, there is great room to improve this study by using other approaches.

Firstly, other indices can be applied to perform the study by using the same framework as our thesis, for instance, SSE 180 Index, SSE 50 Index, SSE Dividend Index, SSE New Composite Index, SSE Composite Index, Sector Indices, SSE Fund Index, SSE Government Bond Index, and SSE Corporate Bond Index, or by employing the indices from Shenzhen Stock Exchange. Thereby, the seasonality effect in stock market composing of big companies or the Chinese fund market or Chinese Bond market could be tested. Then more evidence of the seasonal anomalies will be given to test efficient market hypothesis in Chinese capital market.

Secondly, as we mentioned in the limitation part, it is always good to test more kinds of seasonality in the study, we would recommend the later researchers to use the same index to test other seasonality effect, like monthly effect, turn of the year and holiday effect etc. As we known that the different stock markets have different appearance, so the seasonality effect which have not touched could give some surprising outcome.
Thirdly, to extend our study, we also recommend not only to test the seasonality, but also to test some other market efficiency anomalies in Chinese stock market. Chinese stock market as an emerging market is quite possible to exist some other anomalies patterns, thus we recommend the other researchers to test price to earning ratio, book to market ratio, post-announcement earning drift and small firm effect etc by applying the indices within Chinese stock market.
Chapter Seven : Research Evaluation

In this chapter we evaluate the reliability and validity, and generalizability of our research.

Reliability and validity are important criteria for evaluating quantitative research because they are intended to assure the reader that the measuring scales are objective\textsuperscript{85}. As our study is using the quantitative approach, we have to measure the reliability and validity here.

7.1 Reliability

We can define the reliability as the way to determine whether a scale is reliable is to administer it twice\textsuperscript{86}. If we can get the statistical data result from second time same as the first time administration or almost the same, and then we can say that the measure is reliable. Conversely, if the results from first and second time administrations are very different, then the numerical result is not reliable.

We have used the index data from Shanghai Stock Exchange, and then we should think about whether the index data is reliable to measure the stock market. Here we are confident about our chosen data, because the same data has been selected by many professional researchers to test the similar phenomenon like ours, furthermore the data we choose are widely available to the public. That means, if the following researchers want to study the same topic like ours, they will have the possibility to use the same data as we did, and the result they will get are very possible to be the same like ours. Therefore, we say that our data is reliable.

7.2 Validity

However, the reliability is not enough to interpret the objective, so we need take concern about the validity. A scale is defined as valid if it measures what it claims to measure, the fact that a scale is valid proves that it is objective, because if the scale

\textsuperscript{85} Auerbach, Carl F., Silverstein, Louise B., Qualitative data: an introduction to coding and analysis, New York University Press, c2003, p.78

\textsuperscript{86} Ibid., p.79
measures what it claims to be measuring, then your subjective desires will not influence the value of the measurement\textsuperscript{87}. To relate to our study, we have used the historical stock return to test if any calendar effect exists in Chinese stock market, as our study is not the first to test the calendar effect, we have tremendous formers scale to compare. The already existing scale can tell us if our study is valid, we will also follow the sensible route of the former researchers’, so we can say that our study will be very valid.

\textbf{7.3 Generalizability}

Generalizability is an important criterion for evaluating quantitative research because it is intended to assure the person who reads the research report that the theory derived from the research is universally applicable\textsuperscript{88}. The universally applicable theory can be applied by everyone in the population you have chosen, if the people know that the theory is universally applicable, they can just cope the theory with the new situations.

But before we can develop the universally applicable theory, we need to see whether our chosen sample is representative. As our chosen sample is the Shanghai Composite Index, it is the first index generated from Shanghai Stock Exchange, and it covers all the companies who trade on the Shanghai stock exchange both from A and B share. Therefore we can see obviously that the chosen sample in our study is very representative. The theories we use in this study are from the text books and some widely used scientific articles, such like Fama’s hypothesis theory and some anomalies theories from the famous researchers and those theories have been broadly applied by many researchers. So we can say our chosen theories are universally applicable.

\textsuperscript{87} Auerbach, Carl F., Silverstein, Louise B., Qualitative data: an introduction to coding and analysis, New York University Press, c2003, p.79

\textsuperscript{88} Ibid., p.80
The References:

The Books


Auerbach, Carl F., Silverstein, Louise B., Qualitative data: an introduction to coding and analysis, New York University Press, c2003.


Hantrais Linda, Cross National Research in the social sciences, 1996.


Scientific Articles


Internet Sources

http://business.sohu.com
http://www.szse.cn/