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The Performance Evaluation of Equity Mutual Funds in China

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MA Finance and Investment
The Performance Evaluation of Equity Mutual funds in China

by

Ying Zhang

2007

A dissertation presented in part consideration for the degree of MA Finance and Investment
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Abstract

Chinese mutual funds are growing rapidly, which have achieved a phenomenal amount of return in 2006. However, figures may lead to an overoptimistic view of Chinese mutual fund market; hence overestimate fund managers’ performance. This study attempts to provide a true and fair opinion in this regard with realistic data.

This dissertation studies performance of Chinese equity mutual funds over the period from 29th July 2005 to 29th June 2007, testing if the sample equity funds could beat the market. This research also examines if Chinese fund managers have selection abilities and market timing abilities. Jensen’s Alpha, Treynor Index and Sharpe Ratio are used in the experiment to evaluate the overall performance. Then Fama Decomposition model and Treynor & Mazuy model are employed to assess the fund manager’s ability to select undervalued stocks and time the market. A hypothesis test is incorporated in this research to examine the validity of data results.

The conclusion of this study is consistent with the Efficient Market Hypothesis, i.e. Chinese equity mutual funds cannot beat the market, but it does not suggest that Chinese market is strong-form efficient. Actually, fund managers can neither select undervalued stocks nor time the market. They primarily earn profits from bearing high risk and good luck. In addition, the current bullish stock market has also made a considerable contribution.
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Ⅰ. Chapter One: Introduction

1.1. Backgrounds of mutual funds

Mutual funds were well-developed in the last decade, and became extremely popular in recent years. According to Financial Times, in 2005, Americans put about 170bn dollars into stock funds; only a small proportion they invested in the mutual fund industry as a whole. In the UK, unit and investment trusts also heavily attract people’s attention and billions of pounds have been invested into this industry.

Apparently investing in mutual funds is a wise choice for most of investors. Common sense suggests that dividends offered by mutual funds are much higher than interests provided by bank. In addition, by doing this, investors can get professional services in managing their cash and have a steady and secured income without spending too much time on the stock board. Furthermore, individual investors can achieve their dreams of getting a well diversified portfolio by a small amount of money and much lower transaction costs.

What is a mutual fund? Many people have a misconception there. In reality, “a mutual fund is simply a financial intermediary that allows a group of investors to pool their money together with a predetermined investment objective.” (Investopedia.com, 2006). In a mutual fund, the fund managers will be responsible for picking different securities to construct a portfolio and they get profits from generalizing capital gains or collecting dividends. Individuals who want
to invest in a mutual fund will buy shares of the fund; actually they have bought a small piece of the whole market. When an investor wants to convert his shares into cash, a mutual fund then provides a high quality service in terms of liquidity.

Within the mutual fund industry, the investment companies can be classified into different types according to different investment objectives. Basically, there are three main types of mutual funds, i.e. money market funds, fixed-income funds and equity funds. First, the rationale behind investing in a money market fund is to find a place to “park” your money. The fund manager principally constructs his portfolio with short-term debt instruments, e.g. treasury bills. Hence, although investors cannot get great returns, they would never face the risk of losing the principal. Second, individuals who invest in fixed-income funds will get higher returns than the customers of money market funds, but they will face higher risk accordingly. The fund manager primarily uses investors’ money to buy government or corporate debts. Third, equity funds are the most risky one among these three varieties, but investors also have greater opportunities to get higher returns than the other two. The fund manager primarily invests in stocks with growth potential or those can be used to replicate the performance of a chosen index. Individuals could pick a mutual fund according to their risk preferences. Some mutual funds may provide high return with relatively low risk, but they may also charge heavily for transaction costs and other fees. Besides, tax is another factor should be considered before buying any mutual funds.

To sum up, mutual fund is an easy and convenient financial instrument for individual
investors, who can benefit a lot from its unique characteristics of high liquidity, low costs and good diversification.

1.2. Chinese Mutual fund Industry

India and China are the two leading emerging markets in Asia and their mutual fund industries have also benefited from the fast growing economy. Compared with Indian mutual fund market, whose history is over 50 years, Chinese mutual fund market only has 16 years history. More specifically, China’s first investment fund was set up in November 1992, which was named Zibo fund, and then it was traded on the Shanghai stock exchange in August 1993. The launch of Zibo fund lead to further development of Chinese mutual fund industry, but the market became overheated soon. In reality, Chinese mutual fund industry has never been running smoothly, but thanks to durative development, it has got great achievements in every area.

Shortly after the birth of first investment fund in China, China Securities Regulatory Commission (CSRC) published a temporary regulation on supervision of the market on 14th November 1997. It is regarded as the cornerstone of Chinese mutual fund industry. According to CSRC, two closed-end funds were launched under the supervision of CSRC on 27th March 1998, which are named as Kaiyuan fund and Jintai fund. The mutual fund industry was then subjected to a secondary growth. In early 1999, there were 10 fund management companies in the market. In addition, 47 closed-end funds have been launched until September 2001, which
raised RMB689bn.

Open-end funds began to raise people’s attention after September 2001. CSRC released a temporary rule to regulate the management of open-end funds on 8th October 2000. This time next year, the first open-end fund was launched in Chinese market, named Hua’an Creative fund. Apparently, it opened a new door to small investors. According to CSRC, Chinese mutual fund industry has some special characteristics. First, there are only limited financial instruments available in the market, which needs further development. Second, current regulations are not adequate to supervise the general operation of the whole industry. Third, the market will continuously expand and rapid changes will take place accordingly. Financial Times suggested that, on 12th September 2007, “a Chinese investment management company raised at least Rmb50bn ($6.6bn) for an overseas equity fund in a single day.”

Official statistics from the CSRC survey shows that there were 58 fund management companies in China until late 2006. Among the 307 managed mutual funds, 254 of them are open-end funds and 53 of them are closed-end funds, which raised RMB8565.05bn in total. In addition, the net asset value of all open-end funds is RMB6941.4bn, taking 81 percent of the whole market.

While Chinese mutual funds are growing rapidly, foreign fund management companies are getting interested in Chinese stock market as well. However, some of them have suffered great loss in China. Financial Times offered a case study of a UK fund management group,
which expected to expand its capital in China but actually was subjected to a great loss. Then, Financial Times attributed its failure to China’s bearish stock market in recent years. Apparently, emerging Chinese mutual fund market is a place worth of investigation, hence this study will focus on evaluating the performance of Chinese mutual funds.

1.3. Research Objectives

The purpose of this study is to provide an in-depth look into Chinese mutual fund industry, particularly those which heavily invest in domestic stock market. The experiment partially focuses on testing the overall performance of Chinese equity mutual funds, i.e. if the sample funds could outperform the market, and partially focuses on measuring fund managers’ timing ability and selection ability. In reality, performance evaluation of mutual funds is obviously an old topic; however, people have never successfully conducted an accurate study in this field for there are so many factors influencing the investigation quality. In fact, empirical studies based on different benchmark, time of occupation and criteria may generate totally different results.

Chapter Two will first review four important theories closely related to the subject and introduce five performance criteria which will be applied latter. Next, a brief description of methodology will be offered in Chapter Three. This chapter will not only specify the benchmark, risk-free rate and the sample profile, but also explain how to generate the crucial measures and test the validity of calculated number. Then, Chapter Four will provide a careful
interpretation of the data results, which may lead to further discussion in this field. A separate section will be used to reveal any limitations existed in this study. Consequentially, the abovementioned steps will help me to form an overall opinion to Chinese equity mutual fund market.

More specifically, the equity mutual funds included in the sample are those issued more than 3 years and their monthly portfolio returns will be observed during the period from 29\textsuperscript{th} July 2005 to 29\textsuperscript{th} June 2007. Then they will be compared to the average quarterly returns of the Shanghai Shenzhen 300 Index to test if they can outperform the market. Their risk premiums will be decomposed into different factors to test where do their profits come from.

In this way, this dissertation examines the current status of Chinese equity mutual fund market and helps investors to understand it accordingly.
Regarding wealth protection, people’s opinions differ. Miguel de Cervantes Saavedra said, "It is the part of a wise man to keep himself today for tomorrow, and not venture all his eggs in one basket", while Mark Twain believed, "Put all your eggs in one basket, and watch that basket." Apparently, most investors are in favor of “don’t put all your eggs in one basket” since it is thought to be a vivid figuration of investment diversification strategy. Meanwhile, People can figure out that most of fund managers are busy everyday playing a game of portfolio selection. To win this game, a manager must acquire profound understanding of various economics theories. In this dissertation, four most influential and important theories dealing with mutual fund performance evaluation are mentioned. They are Modern Portfolio Theory, Capital Asset Pricing Model, Efficient market Hypothesis and Random Walk Theory. These theories help to guide investors to a highly perceptive decision on different aspects.

**Figure 1 Theoretical Framework**

![Theoretical Framework Diagram]

The following passages offer a careful discussion of the theories.
2.1. **Modern Portfolio Theory**

Before the publication of Markowitz’s paper (1952), *portfolio selection*, investors focused on the risks and rewards of individual securities. The general response to preserve and enhance wealth was adding more securities to portfolio, hence achieving a spread of assets. However, some thoughtful investors and researchers questioned the theory of individual stock analysis. Markowitz regularized these ideas and pointed out that the weightiest element, which influences investment decision making and portfolio construction, is the trade-off between risk and return. Moreover, the previous emphasis on investment management, i.e. stock picking, was of relatively less weightiness. Indeed, later in-depth research into investment cases highlighted the truth that a properly constructed asset allocation rather than others is the root of each successful investment. According to Financial Times, asset allocation can account for up to 90 per cent of investment returns with market timing and individual manager selection contributing the remainder (Batchelor, 2007). Undoubtedly, as the basis for what is known as asset allocation, the Markowitz approach to portfolio optimization has become dominantly influential on the investment management industry.

Taking a closer look at the theory, the idea is to create an optimal portfolio that is on the efficient frontier. Through plentiful observations and analysis, Markowitz raised a thought-provoking awareness. Given two securities offer the same expected return, an investor would definitely prefer the less risky one. Correspondingly, the essence of investment decision-making can be captured by the phrase Markowitz assumes that investors are risk-
averse (Sharpe, 1965). In addition, if an investor decides to put money in a high-return project, he will be exposed to high risk. Hence, investors always attempt to find the best trade-off between risk and reward. To explain investor’s risk and reward preference in a mathematical model, Markowitz applied mean and variance to describe these two elements via a quadratic utility function. In general, the expected return of an investment portfolio is expressed by mean, which is “a proportion-weighted combination of the constituent assets’ returns” (wikipedia.com, 2007). The variance of the function further represents the portfolio volatility (i.e. standard deviation), which is used to weigh the risk subjected. Mathematically, portfolio return and portfolio volatility could be estimated by use of the following equations.

Expected return:  
\[ E(R_p) = \sum_{i} w_i E(R_i) \]  
where \( R \) is return.

Portfolio variance:  
\[ \sigma_p^2 = \sum_{i} \sum_{j} w_i w_j \sigma_{ij} = \sum_{i} \sum_{j} w_i w_j \sigma_i \sigma_j \rho_{ij} \]  
(2)

Portfolio volatility:  
\[ \sigma_p = \sqrt{\sigma_p^2} \]  
(3)

Given a portfolio is composed of two assets,

Portfolio return is:  
\[ E(R_p) = w_A E(R_A) + (1 - w_A) E(R_B) = w_A E(R_A) + w_B E(R_B) \]  
(4)

Portfolio variance is:  
\[ \sigma_p^2 = w_A^2 \sigma_A^2 + w_B^2 \sigma_B^2 + 2 w_A w_B \rho_{AB} \sigma_A \sigma_B \]  
(5)

Given a portfolio is composed of three assets,

Portfolio variance is:

\[ \sigma_p^2 = w_A^2 \sigma_A^2 + w_B^2 \sigma_B^2 + w_C^2 \sigma_C^2 + 2 w_A w_B \rho_{AB} \sigma_A \sigma_B + 2 w_A w_C \rho_{AC} \sigma_A \sigma_C + 2 w_B w_C \rho_{BC} \sigma_B \sigma_C \]  
(6)

Additionally, investors often hold diversified investment portfolios based on the consideration of avoiding risk. By quantifying the relationship between risk and reward, Markowitz’s study indicates diversification has an effect on portfolio risk. In other words, a well-diversified
Chapter Two: Literature Review

portfolio could offer the same expected return with reduced risk. The rationale behind this risk management technique further contends that diversification will work only if the component securities are not perfectly correlated. As can be seen from the above equations (5) and (6), given the correlation coefficient $\rho_i$ equal to zero, the portfolio variance will be a proportion-weighted combination of component securities’ variance (Bodie et al., 2002).

Given the correlation is less than zero, i.e. securities are inversely correlated, the portfolio variance is less than the weighted average. Apparently, the portfolio variance is positively related to individual securities’ variance, weight and covariance among component securities. Low correlation coefficient will yield a small value of covariance, which further ensures a lower risk than any individual security found within the portfolio. Therefore, further diversification benefits will be yield by investing in more securities which are not perfectly correlated.

How to pick securities and meet investors’ requirements? To solve this question, Markowitz generalized an analysis model based on the risk aversion assumption, which strives to find out “a portfolio that provides the highest expected return for a given level of risk, or equivalently, the lowest risk for a given expected return” (Yahoo! Financial Glossary, 2006). Therefore, the utility of a portfolio is risk adjusted return:

Markowitz Model Utility $= reward(\chi) - \mu \times risk(\chi)$

(7)

$\sum_j \chi_j = 1 \quad \chi_j \geq 0 \text{ for all investments } j$

In equation (7), $\mu$ denotes risk tolerance. The model further develops a mathematical programming model where selected securities are involved in so that weight of each security
in the portfolio can be figure out.

After collecting data related to these optimized portfolios and plotting them in a 2D-coordinate system, where the horizontal axis expresses risk and the expected return is shown on the vertical axis, we will graph a curve. The upper curve, i.e. the part above the minimum variance point, is known as Markowitz efficient frontier. In the risk-return space, every possible security combination can be plotted on the efficient frontier or the line along the lower edge of the curve. Portfolios that lie below the efficient frontier are not efficient, because that they have greater risk than is necessary to achieve the same return. Portfolios above the curve are not attainable. Since points below the efficient frontier are not optimal portfolios, a rational investor will only pick a portfolio only on the frontier (Bodie, 2006).

**Figure 2 Efficient Frontier**

![Diagram: Efficient Frontier](Source: Bodie et al., 2002)
2.2. The Capital Asset Pricing Model

William Sharpe (1963) simplified Markowitz’s mean-variance model of portfolio selection and put forward the single-index model. It was a first class start which laid the basis for what is known as capital asset pricing model. CAPM is basically an economic theory used to express the relationship between risk and expected return, and serves as a model for the pricing of risky securities. Later on, it was clarified and thrashed out by William Sharpe (1964), John Lintner (1965) and Jack Treynor (1966) independently, which starts with the idea that rationale investors demand additional expected returns for bearing additional risk.

According to availability in diversification, Sharpe (1964) classified the portfolio risk into two classes, i.e. systematic risk and unsystematic risk. Systematic risk is also known as “market risk” which cannot be diversified away simply through increasing the number of securities in a portfolio. Since systematic risk is a kind of risk “inherent to the entire market” (investopedia.com, 2007), investors can only mitigate the risk subjected by hedging. On the other hand, unsystematic risk is referred to as “specific risk” which can be avoided through diversification by adding more securities into investors’ portfolio. To solve the problem of diversification, Markowitz’s portfolio selection theory can be applied.

Sharpe followed Markowitz’s suggestion and developed a way to measure risk-adjusted performance. Since all optimal portfolios are plotted on the Markowitz efficient frontier, he contended that rationale investors can find a superior portfolio by subtracting the risk-free rate
from the portfolio rate of return and dividing the result by the portfolio’s standard deviation, i.e. the quantity known as the Sharpe Ratio (Scholz & Wilkens, 2005).

He further developed this argument that the higher the Sharpe Ratio, the greater the expected return per unit of systematic risk. Therefore, a concept of market portfolio was formed to describe the best performing portfolio as the one with the highest Sharpe Ratio on the efficient frontier.

To further mitigate the risk subjected, Markowitz’s theory was applied to help decide the most effective capital allocation. Hypothetically, a financial asset carried zero degree of risk, i.e. risk-free asset, is available on the market. It pays relatively low return but has been secured by government. Investors who strive to smooth out risk and reap certain returns will invest a portion of their money in risk-free assets and devote the remainder to well-diversified portfolios (Bodie et al., 2002). In order to assess the weight of them, Modern portfolio theory was required to be further developed and capital allocation line (CAL) was created ready to solve it. Technically, CAL can be represented by the formula,

$$CAL : E(R_c) = R_f + \sigma_c \frac{E(R_p) - R_f}{\sigma_p}$$

(8)

In equation (8), $R_p$ denotes rate of return from the risky asset, $R_f$ is the risk-free rate of return and $R_c$ is portfolio return which combines asset P and F. The graph below displays all available investment choices for investors which help to determine the appropriate asset allocation.
As can be seen, a line is drawn from the risk-free rate and tangent to the efficient frontier to plot all possible combinations of risky and risk-free assets, also referred to as the capital allocation line. If the CAL is tangent at the market portfolio point, the CAL is also known as the capital market line (CML).

After ascertaining the level of risk tolerance and clarifying individual financial situations, investors will determine how the portfolio should be constructed. The second issue to consider is the price of the portfolio. How to estimate the value of a portfolio appropriately? CAPM answers this question and satisfies the need of valuing securities. It can only work based on the assumption that the market is efficiently priced to ensure the positive relationship between market portfolio’s return and risk. Mathematically, the expected return for any particular security is determined based on its relationship with the market portfolio. Hence its
price can be estimated. The relationship is expressed by the following formula:

\[ E(R_i) = R_f + \beta_{im}(E(R_m) - R_f) \]  \hspace{1cm} (9)

In equation (9), \( E(R_i) \) is the expected return on the capital asset, \( R_f \) is the risk-free rate, \( \beta_{im} \) is the beta coefficient which indicates an asset return’s sensitivity to market returns and \( E(R_m) \) is the expected return of the market. For factors to price a particular security, some can be gained from historical observation directly, where others are usually found via regression. Obviously, beta is the key component for CAPM which measures the volatility of a security in relation to the market. Followers of CAPM commented that, all other things being equal, a higher beta implies a higher expected return placed on the security and further a lower present value of the company’s share. To investors who want to calculate beta, the regression analysis functions properly, or alternatively it can be obtained by using the equation:

\[ \beta_{im} = \frac{Cov(R_i, R_m)}{Var(R_m)} \]  \hspace{1cm} (10)

Intuitively, the graph below helps explain the rationale behind CAPM, where the horizontal axis represents beta (i.e. the risk), and the vertical-axis indicates the expected return.
Chapter Two: Literature Review

Figure 4 Security Market Line

The result shows the slope of the line (i.e. security market line) examines market risk premium (i.e. $E(R_m) - R_f$). One theory is that the application of SML graph makes all individual securities being plotted, making it easier for analyst to select a security for a portfolio. If a security is plotted below the SML, it is regarded as being overvalued; but if it is above the SML, it is undervalued since it offers a higher expected return for bearing the same risk. Once the expected return is assessed by CAPM, the exact price for the security can be measured through discounting the future cash flow of the security to its present value. Analyst can alternatively find the undervalued security by comparing the calculated price with the observed one.

The CAPM, therefore, is regarded as a cornerstone of modern financial analysis marking the birth of asset pricing theory. It is also appreciated by most financial investors, which functions
as an essential tool in determining if a security should be integrated into a portfolio.

**Critics of Capital Asset Pricing Model**

CAPM is supposed to boost asset price predictions. But do the facts really stack up? Loads of investigations went in search of the evidence. Fama and MacBeth (1973) and Richard Roll (1977) critized the CAPM model and conducted empirical tests for CAPM.

In Fama and MacBeth’s article (1973), they questioned the validity of the CAPM and a statistical test was done to prove a relationship between average return and risk. Their study was carried out under the assumption that the market portfolio is efficient and the evidence shows that a positive linear relationship was found between a portfolio’s beta and return, although the slope of SML is not steeper. Fama and Macbeth’s test also checked whether other measure of risk (i.e. non-beta risk) affects the average return by adding $S_i^2$ to the regression. But there is a problem. Although Fama and Macbeth choose to observe portfolios instead of individual securities and formed them on the basis of sorted betas to ensure accurate test result, errors still exist. In addition, errors from measured beta should be responsible for the downward estimate of the slope. But Richard Roll (1977) criticized previous tests of the CAPM for claiming that there is no logical behind them. He explained that since researchers’ empirical tests were based on proxy portfolios rather than true market portfolios, the efficiency of the proxy portfolio truly matters. Therefore, Roll concluded that since no one has successfully found the true market portfolio, we cannot comment on the CAPM.
In 2004, Fama and French published the result of their research that CAPM is “nevertheless a theoretical tour de force” (Fama & French, 2004, p.28). The study was based on a highly representative sample that included all stocks on NYSE, Nasdaq and the American Stock Exchange over a period of 80 years. Fama and French stated that while increasing number of variables have been added to test the relationship between risk and average return, massive evidences show that the CAPM has a poor performance in empirical studies and hence is useless in the real world. They demonstrated that the CAPM tends to understate or overstate a portfolio’s return to relatively low or high beta coefficients and the relationship does not exist for long term conditions.

Apparently, the flaws in the CAPM lie in its assumptions. Most critics contend that previous compliments on assumptions, in particular of those used to derive an efficient portfolio, are proved ridiculous. They further state that these serious assumptions are used to simplify the estimation process. Hence the empirical results do not match the expectation. Although the validity of the CAPM is now widely debated, no one can deny that the model is still influential in financial markets to test stock price rationality and offer investment guides.

2.3. Efficient Market Hypothesis

There is a joke going around the finance community: A person is walking along and says to an economist, look, there is a $20 bill on the sidewalk. The economist disputes it without looking,
on grounds that if it were there, someone else would have already picked it up. It is absolutely
delight and vividly describe a world-wide thought that the price on traded stock always fully
reflects all known and relevant information. In addition, further adjustment to new
information will affect stock prices almost instantaneously. Therefore, if you are confused
with the fast-moving market and feel anxious about the sudden soar and drop, the economics
professor Malkiel (1973) suggests that “a blindfolded chimpanzee throwing darts at the Wall
Street Journal could select a portfolio that would do as well as experts.” Apparently, these
words are very entertaining and notorious. Although stock picking process could not be
replaced so readily, there are still some valid and persuasive points in his claim, which help to
develop the random walk theory and further make the Efficient Market Hypothesis “shine”.

In finance, the efficient market hypothesis (EMH) is regarded as the core theory furnished a
useful framework for studying professional investment management. It is also the cornerstone
of CAPM theory and boosts the evolution of MPT theory. For the past hundred years or so,
the theory has experienced steady growth.

In the early 20th century, a French mathematician Louis Bachelier published an article saying
“the mathematical expectation of the speculator is zero”, which raised a novel theory. Osborne
(1959; 1962) followed his research and applied Brownian motion in analyzing stock market.
He specified Bachelier’s finding and suggested that stock price movement is similar to
Brownian motion, possessing characteristics of random walk. In other words, stocks take a
random and unpredictable path. Fama proofed this view in his PhD thesis (1965) and further
deepened his research by showing that stock prices have no memory and the past movement of stock price cannot be adapted to predict its future movement.

The efficient Market Hypothesis was then generated as a corollary to the Random Walk Theory, which asserts that security prices can reflect all publicly available information at any given time. In an efficient market, the stock price may fluctuate but competition among rationale market participants will always lead it back to equilibrium. Therefore, in an efficient market at any point in time the actual price of a security will be a good estimate of its intrinsic value. In the article by Fama (1970), he then identified three different forms of the efficient market hypothesis: strong-form EMH, Semi-strong-form EMH and Weak-form EMH. The weak form contends that all historical market prices and information are fully reflected in current stock prices; the semi-strong form contends that all publicly available information is fully reflected in current stock prices; the strong form then contends that all information is fully reflected in current stock prices. Fama further concluded that, in a world of finance, greater dissemination of public information would enhance market efficiency (Malkiel, 2003).

According to The efficient market hypothesis, by trading on the basis of information that the market already knows, it is not possible for individual investors to CONSISTENTLY outwit the market. This conclusion will inevitably frustrate many financial analysts who are looking for chances to buy an undervalued security or sell an overvalued security. Since the rationale behind the EMH implies that current prices fully reflect all available information and future price movement do not follow any patterns or trends, any attempt to outperform the market
will not build on analysis of past data but a luck-game. In particular, availability related to analytical technique varies with the form of EMH. In a weak-form efficient market, technical analysis will become useless and there are no arbitrage opportunities at all; in a semi-strong form efficient market, fundamental analysis is of no use; in a strong form efficient market, there are no private information and hence no excess profit opportunities (Malkiel, 2003).

The proponents of the EMH then assert that investors can never beat the market, and they regard the superior return performance as an incidental circumstance, since there is always a statistical chance that some people will get the above average profit and others blow. However, if this statement is true, how are we supposed to invest? Why thousands of well-educated talents still flood into Wall Street and London Stock Exchange seeking profits? Controversy then arises, especially when abundant evidence indicates the existence of long-term anomalies in the stock market.

**Critics of Efficient Market Hypothesis**

Studies revealing anomalies are started in 1960’s. Basu (1977), in his observation, demonstrates that stocks with low price/earning ratios relatively outperform those with high P/E ratios in the short run, which could be interpreted as a case for market inefficiency. His follower Banz (1981) extended the research and focused his study on the long-run rate of return. The conclusion of Banz’s study raised investors’ attention which asserted the stock performance of small firm beats that of large firm. Phenomena like these have been uncovered
gradually, for example the January effect, “blue Monday on Wall Street”, the election cycle, etc., and the existence of the regularities in returns (i.e. anomalies) has been well accepted through investors. However, there is still a question left: whether the implication of those anomalies can suggest some trading strategies to earn extra profit?

This controversy sequentially led to the formation of behavioral finance, which claims that active investors can beat the market by identifying price movement pattern and discovering profitable clues. Some behavioral finance theorists even contend that the game winner can only be those highly intelligent investors who can observe and exploit their rivals’ judgment errors.

Fama as a solid believer in EMH rejects that theory and the defense article published in 1998 is the best way to express his view. Fama (1998) suggests that the majority of long-term return anomalies can be attribute to chance, since they behave sensitive to methodology. He tests those fragile evidences provided by behavioral finance believers and pointed out the earnings regularity in returns will disappear when exposed to different approaches. Fama (1998) and his colleagues then refute the behavioral finance supporters’ argument of taking advantages of rivals’ errors to earn profit, and they explain that investors can only yield higher profits than others by taking on higher risk.

On the one hand, Fama (1998) adds that every theory has its limitation and there are no exceptions to EMH. He further asserts that the behavioral finance CAMP is not good enough
to replace EMH. Considering the prevalence of behavioral finance, it seems that Fama has ignored his rivals’ contribution, who first studied investment psychology. Apparently behavioral finance challenges the basic assumption of EMH, which suggests investors are always rationale. Proponents of this new theory believe that past experiences can affect one’s decision during the investment process. To defend EMH, Fama has not made any changes to the theory’s assumption. He emphatically rejects behavioral finance by testing the validity of the evidence.

Debate on EMH never stops. Active investors may favor behavioral finance and some professors recognized as experts hold the contrary opinion. Richard Roll, a professor of finance in University of California, says that “I have personally tried to invest money, my client's money and my own, in every single anomaly and predictive device that academics have dreamed up--and I have yet to make a nickel on any of these supposed market inefficiencies” (Roll, 2000). Hence, as for me, his words have become the best way to pragmatize the statement of EMH.

2.4. Mutual Fund Performance Criteria

There are a mass of factors affecting a mutual fund’s record and it is suggested that investors should mainly consider two factors, investment performance and the risk involved, when evaluating an investment company’s record and managing to put money into it (Kothari & Warner, 2001).
The risk factor, which is frequently ignored when evaluating an investment fund's record, is difficult to measure. Consistent with the CAPM, the risk undertaken by a mutual fund is estimated by the standard deviation of its return. In addition, it is commonly assumed in the finance world that an investment instrument with higher level of risk will provide greater return in the long term for the compensation purpose. Mutual funds work in the same way.

On the other hand, the subject of mutual fund performance evaluation has received heavier attention and plenty of previous literatures have discussed possible methods to measure its returns. Apparently, the basic rationale behind the fund performance measurement is that the greater the rate of return per unit risk, the higher the fund ranking. Consequently, return measurement is the most significant one in an investment measure toolkit.

In addition, the mutual fund portfolios are comprised of a variety of companies’ stocks, dividends of which are distributed to the fund shareholders. Therefore, mutual funds are supposed to trade at the net asset value. Consistent with what proponents of CAPM assert, the rate of return is generated by the following equation:

\[ R_t = \frac{NAV_t - NAV_{t-1} + D_t}{NAV_{t-1}} \]  

(11)

In equation (11), \( NAV_t \) denotes the net asset value of the fund at the end of period t, \( NAV_{t-1} \) is the net asset value of the fund at the end of period t-1, \( D_t \) represents dividends.

However, the availability of the CAPM has subjected to criticism, and hence many other
performance criteria are introduced gradually to make up for shortcomings of the risk-adjusted performance measures. Novel findings suggest that non-market factors should also be considered and comprise the model, e.g. Size, book-to-market and momentum (Kothari and Warner, 2001). As researches of mutual fund performance evolved, multifactor benchmarks are applied to improve the performance of the CAPM. Fama and French (1993), as the head of CAPM, comment that the use of multifactor benchmarks is simple and straightforward because they are cross-sectionally well specified. Criticism on fund measurement methods is still moving on.

This dissertation includes a quantitative performance evaluation in later chapter. Basically, both the overall return and the relative risk will be taken into account. Therefore, those risk-adjusted performance measures, which assess the trade-off between risk and return, are more appropriate to help determine whether a fund manager is earning excess returns and hence beat the market. In addition, this study also considers market timing performance.

This section intends to introduce five conventional methods on which empirical study is based. These techniques combine risk and return and are well known as Treynor Index, Sharpe Ratio, Jensen’s Alpha, Fama Decomposition and Treynor & Mazuy model.
2.4.1. Treynor Index

In 1965, Jack Treynor generalized the first formal technique for risk-adjusted performance analysis, which is known as Treynor Index. According to Treynor, the Index is basically introduced as a measure to assess the portfolio excess return per unit of risk, which can be expressed as follow:

\[ T = \frac{R_p - R_f}{\beta_p} \]  

(12)

In the above equation, \( R_p \) denotes the portfolio’s return, \( R_f \) represents the risk-free rate of return, and \( \beta_p \) is the portfolio’s beta which characterizes the portfolio’s sensitivity to market fluctuations. Consequently, the reward to volatility ratio is measured with the help of Treynor Index.

In Treynor’s article, who helped developed the CAPM, the application of the characteristic line was incorporated to demonstrate the relationship between the portfolio return and the market return. The slope of the characteristic line, which measures the relative volatility of the portfolio return in relation to returns for the aggregate market, is exactly equal to what we known as Treynor Index. He further asserted that since each investor, regardless of his or her risk preference, tries to maximize the portfolio’s excess return per unit, a characteristic line with a steeper slope would be preferred. In addition, since Treynor’s study was based on the assumption that the portfolio is adequately diversified, Treynor Index only measures systematic risk.
Treynor’s performance measure is useful for assessing each mutual fund’s profit-gaining ability each unit of systematic risk, enabling investors to conduct performance comparison and decide whether to invest in. To demonstrate the comparison process, the T value of the market is required and can be generated by the following expression,

$$T_m = \frac{R_m - R_f}{\beta_m}$$  \hspace{1cm} (13)

In equation (13), the market beta is equal to one.

Given there are three mutual funds A, B and C available in the market yielding different T values, a comparison with the market T would help to measure how they have performed. If the T values of A, B and C have formed a steady upward rank in turn, where T value for A is below the market T and the other two is above the market T, the fund with the largest T (i.e. C
in this example) yields the best performance and fund with the smallest T (i.e. A) generates the worst performance. Hence, the fund with higher T demonstrates better performance. Furthermore, the fund A fails to reach the market level T, which denotes A does not beat the market. On the other hand, both fund B and C, whose T values are greater than market T, succeed to beat the market.

2.4.2. Sharp Ratio

William Sharpe (1966) extended Treynor’s research and introduced an alternative measure for fund performance evaluation. Sharpe Ratio is known as a measure of risk-adjusted performance which is very similar to Treynor Index. Apparently both of them apply a benchmark based on the security market line, but they are still slightly different in the way of
measuring the reward to variability. Instead of using the systematic risk as Treynor Index, Sharpe Ratio uses the total risk of the portfolio to capture the risk premium yielded per unit of risk. Therefore, the Sharpe Ratio can be developed by the following equation,

\[ S_p = \frac{E(R_p) - R_f}{\sigma_p} \]  

In equation (14), \( \sigma_p \) represents the standard deviation of the rate of return for the portfolio during the same time period. Consequently, Sharpe’s performance Index applies total risk to compare portfolios to the Capital Market Line, whereas the Treynor Index measures portfolio performance in relation to the Security Market Line.

**Figure 7 Performance Measures based on Total Risk**

Apparently, the above graph depicts the relationship between the expected return and standard deviation. Consistent with the CAPM, sophisticated investors would prefer investing in portfolios which have a superior risk-return performance. Therefore, empirical studies suggest that if rates of return on a mutual fund against the market return are plotted in the graph, a
consistently stable performance pattern should be shown off. In addition, it is generally positioned on a simple line (i.e. Capital market Line). Since a higher Sharpe ratio indicates a greater risk premium of a portfolio, which further implies a superior performance, investors would be more interested in a mutual fund with relatively high S value.

To make application of the comparative Sharpe measure, Sharpe Ratio of the market portfolio should be calculated in advance. By plotting all available mutual funds on the risk-return graph, the decision can be drawn accordingly. The mutual fund, whose S value yielded is smaller than the market Sharpe Value, will be positioned below the Capital Market Line, and hence fail to beat the market. A Sharpe Ratio higher than the market Sharpe value indicates the relative fund would perform superior to the market, and further succeed to beat the market.

In empirical studies, both Sharpe Ratio and Treynor Index are often used to rank the performance of mutual funds on the basis of risk-return relationship. However, they may attain different results while the level of diversification differs. Normally Sharpe Ratio and Treynor measure will provide the same result, since it is assumed that mutual funds will hold fully diversified portfolios. But if the portfolio held by the fund manager is not well diversified, Sharpe and Treynor techniques will yield different ranks. Since the Treynor Index fails to capture the unsystematic risk subjected, it will give a higher ranking for the poorly diversified portfolio than Sharpe Ratio.
Therefore, Sharpe’s technique of measuring the fund performance dedicated to give a more efficient rank than Treynor index.

### 2.4.3. Jensen’s Alpha

Shortly after Sharpe’s technique was published in 1966, Michael Jensen developed a new ranking criterion. According to Jensen (1968), the rank of mutual funds based on the Jensen’s Alpha is predicted by the CAPM directly. Consistent with the CAPM, the alpha can be generated by regressing a fund’s excess return on the market excess return, and quantitatively expressed as,

\[
E(R_p - R_f) = \alpha_p + \beta_p \times E(R_m - R_f)
\]  

(15)

By rearranging the equation (15) with the help of CAPM, The Jensen’s Alpha is alternatively equal to the investment’s average return in excess of the risk free rate minus the Beta multiplied by the benchmark’s average return in excess of the risk free rate, which can be captured by the following equation,

\[
\alpha_p = R_p - (R_f + \beta_p \times (R_m - R_f))
\]  

(16)

In equation (16), \(\alpha_p\) represents Jensen Alpha, \(R_p\) denotes the average return of the portfolio, \(R_f\) is the risk free rate of return, \(R_m\) is the market return, and \(\beta_p\) is the beta of the portfolio. Recall the linear regression equation (15), it is clearly that alpha is the intercept in the CAPM formula which represents the random error term. Obviously, the perfect CAPM exists when its random error equals to zero, i.e. alpha is zero. Consequently, Jensen Alpha measures abnormal performance relative to the CAPM.
On the other hand, Jensen’s technique is widely used to ascertain a fund manager’s ability to increase returns in excess of the pure reward for the market risk undertaken. Since sophisticated investors are always seeking for investment opportunities on undervalued assets, which will yield a higher rate of return than the market return, a superior manager who yields a significant and positive alpha would be regarded as the winner of the stock selection game. Hence, Jensen’s Alpha is also very appropriate for this study, which assesses fund manager’s ability to derive a risk adjusted excess return.

The graph below shows how to apply Jensen’s Alpha for performance evaluation, i.e. to what extent the portfolio return should be attributed to fund manager’s profit gaining ability. As what is indicated in the graph, a mass of stocks are plotted by their individual excess returns against dependent market excess returns. Since the intercept of the regression line is above zero, the fund manager has a positive Jensen’s Alpha signaling a superior performance.

**Figure 8 Superior Stock Selection**
However, investors sometimes tend to blame Jensen’s measure for general Alpha related problems. The most crucial problem with Jensen’s Alpha is that it may provide an incorrect performance measure when a fund manager has a distinct market timing ability to influence the ultimate performance. The attached graphs indicate two scenarios of how market timing ability affects the manager’s performance.

As Steven Jones has criticized the application of Jensen’s alpha in his article, some fund managers may be not competent to pick undervalued stocks among a considerable large-scale, however, they may be adept in predicting market-wide movements (i.e. a shift from a bull to bear market), which is named as market timing strategy. Given the fund manager forecasts an upward movement is going to happen in the stock market, he will change his portfolio position and hold stocks whose prices will rise up even further than the market (i.e. high beta stocks) accordingly. If the fund manager forecasts an opposite movement is about to occur, he will shift his portfolio position into holding low beta stocks, whose prices will fall down less intense than the market. Apparently, the fund manager’s market timing strategy can be regarded as a compensation for the unsatisfied stock selecting results. Figure 2.8 indicates that although the fund has yielded a positive alpha, its manager’s market timing performance is so poor that negatively influences its overall performance.
However, cases are not always the same. Figure 2.9 illustrates an exceptional case indicating how market timing strategy affects fund performance. Some fund managers may be sophisticated brilliant and never yield negative returns. While situated in a downward moving stock market, the possible choice for them is to invest in treasury bills. Given the manager presents superior performance on applying market timing strategies, his fund will sour up more heavily than the market when the market rises. An interesting finding in this graph is that the fund manager bears null Jensen Alpha. So the problem with Jensen’s measure is that even though this manager has exhibited strong market timing abilities, the performance evaluation criteria suggests he is not doing a superior job.
Empirical studies also indicates that while applying Treynor, Sharpe and Jensen’s measures to examine the performance of a fully diversified portfolio respectively, the ranking results are quite similar. In addition, these three measures exhibit a 90 percent correlation among them.

Individually, each performance measure encounters some biases when examine the fund performance. Therefore, although Jensen’s Alpha has been widely accepted to evaluate mutual fund performance and financial manager’s ability, it is still reasonable to apply it in conjunction with the Sharpe ratio and the Treynor ratio.

2.4.4. Decomposition of Risk-Adjusted Performance

Another way to evaluate mutual fund performance is decomposing overall performance into different components, which are related to specific elements of performance (e.g. broad allocation, security choice, up and down markets etc.).
Fama’s decomposition of the excess return was the first attempt at an attribution model. In 1972, Fama decomposed excess return into two main components: risk and selectivity.

**Figure 11 Fama Decomposition**

In the above graph, AC denotes the total risk premium, AB denotes the risk premium due to selectivity, BC denotes the risk premium due to risk. Therefore, Fama’s attribution model can be quantitatively expressed as:

\[
R_p - R_f = R_p - R(\beta_p) + R(\beta_p) - R_f
\]  

(17)

While measuring fund managers’ selectivity, Fama further decomposed it into two components, which are net selectivity and diversification. Therefore, by subtracting diversification from selectivity, analysts can determine how much of the risk premium comes from ability to select stocks. Unfortunately, Fama’s attribution model has never really caught on.
Other attribution systems have been proposed and currently the most widely used is the additive attribution model developed by Brinson et al. (1986). In Brinson et al.’s article, the portfolio return in excess of the benchmark return could be broken into three components, which are allocation, selection and interaction. In Brinson model, interaction is employed to measure a combination of the different weightings and different returns and is difficult to explain. For this reason, many analysts allocate the interaction term into both allocation and selection, which then looks quite similar to the Fama attribution model.

However, there are two main problems associated with the attribution model. First, to ensure an accurate estimation, a large pool of observations is required when portfolio mean and variance are constant. Second, active management may lead to shifts in parameters making measurement more difficult.

2.4.5. Market Timing Performance Measures

An intense debate are generated on the above mentioned measures of performance evaluation, since Treynor (1965), Sharpe (1966) and Jensen (1968) solely measured fund managers’ portfolio selection abilities and assumed that the portfolio’s risk level is stationary through time. Obviously, fund managers can deliberately gain profits in anticipation of general price movements.

In this context, Treynor and Mazuy (1966) generalized the first formal technique for detecting
timing ability, which is also known as squared regression model. According to Treynor, a quadratic term is added to the equation to test the fund managers’ market timing ability as follows:

\[ R_{pt} - R_f = \alpha_p + \beta_p(R_{mt} - R_f) + \gamma_p(R_{mt} - R_f)^2 + \epsilon_{pt} \]  \hspace{1cm} (18)

In the above equation, \( R_{pt} \) denotes Return on a portfolio in the period t, \( R_f \) represents the risk-free rate of return, \( \alpha_p \) is the measure of security selection ability, \( \gamma_p \) indicates the timing ability, \( \beta_p \) is the portfolio’s beta which characterizes the portfolio’s sensitivity to market fluctuations, \( R_{mt} \) is the return on the market portfolio in the period t and \( \epsilon_{pt} \) denotes random error which has an expected value of zero and a constant variance in the period t. Consequently, positive \( \alpha_p \) and \( \gamma_p \) indicate that fund managers are capable of selecting the undervalued assets and timing the market correctly.

The squared regression model is further developed by Henriksson and Merton (1981). In their article, a different test of market timing was generated by adding an option factor to the regression formula:

\[ R_p = \alpha + \beta(R_m - R_f) + \delta \max((R_m - R_f), 0) \]  \hspace{1cm} (19)

If \( \delta > 0 \), the fund manager could successfully time the market. Conversely, the manager does
not have the market timing ability.

Since this research partially focuses on testing if Chinese open-ended equity funds can beat the market, and then partially focuses on assessing fund managers’ timing abilities and selection abilities, TM model and HM model will not take much proportion in the empirical study.
Chapter Three: Methodology

In order to carry out a performance evaluation, the research will cover a quantitative analysis. This dissertation will strictly follow the proposed procedure to design and execute the quantitative research employed. In this way, this study offers an in-depth measurement of the subject matter.

The first step is to collect information on 37 open-ended equity funds, conduct basic data processing in Excel and calculate the monthly rates of return of each domestic fund. Information collection is of significance to the whole experiment process. At this stage, the monthly return of the benchmark index should be well-prepared and ready for analysis.

The second step is to estimate Jensen’s Alpha, Sharpe Ratio, Treynor Index and Treynor & Mazuy measure on 37 sample funds respectively. An important part in this stage is that hypothesis analysis will be used to test the validity of experimental results. It means that the statistical outcome may be inconclusive and will result in limitation in the experiment and further findings.

To further support my conclusion and underpin the previous experimental outcome, the next step is to decompose the risk premium yielded. I will conduct a proportional analysis with the help of an attribution model and rank the observations correspondingly.
The final step is to rank the observations, interpret the statistical results and provide a further analysis combined of picking out any superior performed funds and drawing a comparison among 37 observations. The test results will be analyzed with the knowledge discussed in the literature review chapter. At this stage, the whole experiment will be done.

The following paragraphs will discuss all the methods included in this experiment in detail.

3.1. **Benchmark Selection**

In order to satisfy the purpose of research, a sound data collection plan is developed to gather reliable and statistically valid data.

3.1.1. **Data Collection and Sample Period Selection**

The research on emerging markets is often difficult due to shortcoming in the data resources and there are no exceptions to Chinese open-ended mutual fund. CSRC (China Securities Regulatory Commission) statistics show that China currently has 254 open-end funds and the majority of them were launched recently. Since this research primarily focuses on measuring the long-term performance of equity funds, domestic equity mutual funds to be included in the research sample need to have been existed over the whole period from 1\textsuperscript{st} July 2005 to 29\textsuperscript{th} June 2007. Therefore, within 147 domestic equity funds, only 37 can be included in this research sample. During this period, each sample fund has 24 monthly rates of return.
3.1.2. Risk-free Rate

The rate of three-year treasury bill is used as the risk-free rate in this study. Since its effective annual rate is 3.39%, the corresponding monthly risk-free rate is 0.002782 and the conversion process can be expressed as follows:

\[ R_i = \left(1 + R_y \right)^{\frac{1}{m}} - 1 \]  

(21)

In equation (21), \( R_y \) denotes the annual rate and \( R_i \) represents the Periodic rate.

3.1.3. Market Return

The Shanghai Shenzhen 300 Index is adopted as an approximation of the market portfolio. The chosen index is a “cap-weighted index which tracks the daily price performance of the 300 most representative A-share stocks listed on the Shanghai or Shenzhen Stock Exchanges. The index was launched on 8th April 2005 and has a base of 1000 on 31st December 2004” (Bloomberg.com, 2007).

3.2. Risk-Adjusted Performance Evaluation

The most widely used performance measures are Treynor Index, Sharpe Ratio and Jensen’s Alpha. In addition, the former two ratios can be applied as ranking criteria and provide abundant information about a fund’s profitability against different volatility measures. In particular, these criteria can be employed to measure the fund manager’s risk-adjusted
performance and further estimate if the observed funds can beat the benchmark market.

### 3.2.1. Regression Analysis for Jensen’s Alpha

The ordinary least square (OLS) regression model is a well-known descriptive technique to determine the values of unknown quantities and it will be employed in this research to calculate different performance criteria. Normally, the OLS regression takes the form as follows:

\[ y = \alpha + \beta \chi_i + \varepsilon_i \]

Where \( y \) is the dependent variable, the \( \chi_i \) \((i = 1, 2, \ldots n)\) is the independent variables and \( \alpha \) is the intercept term (Weisberg, 2005). The steps for running an OLS regression will be described in the following paragraphs.

The first step is to create the variables required for the regression analysis and make a transformation on the raw data. After arrange the raw data in order, the rate of return for an open-end fund is required to examine fund performance criteria. To set this variable, the changes in net asset value will be calculated by the following equation:

\[ R_i = \frac{NAV_i - NAV_{i-1} + D_i}{NAV_{i-1}} \]  

This procedure will be achieved via the sum function in Excel.

The second step is to perform the OLS regression. To satisfy the research purpose, regression test will be applied to estimate Jensen’s Alpha and market timing coefficient respectively.
Jensen’s Alpha and beta are usually generated by the OLS regression model at the beginning, which can be expressed as follows:

\[ E(R_p - R_f) = \alpha_p + \beta_p \times E(R_m - R_f) \]  

(15)

Based on the above equation, it is obvious that the portfolio beta can be gained from the coefficient value and Jensen’s Alpha is equal to the error term. Since Jensen’s technique measures individual fund manager’s ability to yield excess return, i.e. whether the fund can beat the market, it is commonly employed to detect the fund manager’s performance. If Alpha is significant and positive, it indicates that the fund has generated a higher rate of return compared with the market, and further demonstrates the fund manager’s ability to outwit the market. If the alpha is negative, it means that the fund fails to derive any excess returns and performs worse than the market. The beta estimated from this regression equation can help us to calculate the Treynor Index later.

### 3.2.2. Testing of Assumptions

The next step is to assess the validity of regression studies, i.e. whether the sample data violate the regression assumptions. Although there are several assumptions of multiple regression analysis, this study only focus on those could not be achieved by arranging a proper design. In particular, this section will test if the data fulfils the assumptions of linearity, heteroscedasticity and autocorrelation (Hair et al., 1998).
Chapter Three: Methodology

Linearity

OLS regression model assumes that the dependent variable is linearly related to the independent variables through the $\beta$ parameters. A simple visual test will be used to check if the majority of observations are plotted on a straight line.

Heterogeneity and Autocorrelation

The OLS regression model generalizes two assumptions on the error term, i.e. heterogeneity and autocorrelation. Basically, OLS estimation assumes the error terms in the equation are not correlated with each other. If autocorrelation is detected, it means that the independent variable is correlated with unmeasured variables which are influencing the dependent variable, and further we can conclude that the results of t statistics, residual SS and R square are invalid. Common sense compels analysts to remove the autocorrelation before drawing any conclusions. Normally, the Durbin-Watson method is applied to test autocorrelation. To conduct the DW test, the hypotheses are formed as:

$H_0 : \rho = 0$

$H_1 : \rho > 0$

The test statistic is defined as:

$$d = \frac{\sum_{i=2}^{n} (e_i - e_{i-1})^2}{\sum_{i=1}^{n} e_i^2}$$  \hspace{1cm} (23)$$

In equation (22), $e_i$ is the difference between the observed value and predicted value of the
response variable. If $d < d_L$, it means that the error terms are autocorrelated to each other and it is reasonable to reject $H_0$, if $d < d_U$, the statistical evidence shows the error terms does not suffer from autocorrelation and I will not reject $H_0$, if $d_L < d < d_U$, the test is inconclusive.

OLS estimation further assumes that the error term has a constant variance, which implies there should be no heterogeneity of variance among the residuals. Heteroscedasticity does not cause OLS coefficient estimates to be biased. However, if the data suffers from heteroscedasticity, the statistic result of t statistics, residual SS and R square are invalid.

It is theoretically easy to list the possible results of heteroscedasticity, but will encounter some difficulty when assessing the problem. Goldfeld & Quandt (1965), Park (1966), Glejser (1969), Ramsey (1969), Szroeter (1978), Breusch & Pagan (1979) and White (1980) developed different methods to detect the presence of heteroscedasticity respectively (Carapeto & Holt, 2003). In this empirical research, White test will be employed due to practicability and time concerns. The white test is computed by regressing the squared residuals from a regression of the error terms onto the regressor. In the empirical study, this test will be conducted with the help of statistical software tools.

Statistical results yielded by an OLS regression model will be regarded as efficient only if statisticians can find proper evidence to prove that none of these assumptions is violated.
3.2.3. Hypothesis Testing for Jensen’s Alpha

Before interpreting the experimental results of the above statistical tests, I will carefully examine whether the findings could have occurred by chance. Hypothesis testing is then employed to measure whether chance is a plausible explanation of the statistical finding.

The first step in hypothesis testing is to formalize statistical hypotheses, i.e. null hypothesis and alternative hypothesis. Normally, the null hypothesis is specified as the statistical result which is due to chance. To proof-test Jensen’s Alpha in the experiment, a two tailed test is expected to run and the null hypothesis is described as that the mean value of alphas of open-ended equity funds is equal to zero. Correspondingly, the alternative hypothesis is simply the reverse of the null hypothesis, which assumes the mean of alpha does not equal zero. This null hypothesis can be written as:

\[ H_0 : \mu_a = 0 \]
\[ H_1 : \mu_a \neq 0 \]

Since the null hypotheses specified above is opposite to this research expectation, in which I predict that China’s open-ended equity fund can beat the market, the rejection of the \( H_0 \) will logically lead to consistence in opinions and further indicates a superior performance of the observation. However, the statistical testing is not always perfect and errors may arise when the decision based on sample is not coherent with the truth about population. If the sample results lead to rejection of the null hypothesis when it is true, type I error occurs; If the sample results lead to non-rejection of the null hypothesis when it is false, type II error is
committed. Generally, statisticians measures the probability of making a type I error by the significance level, which is also the threshold for rejecting the null hypothesis (Allchin, 2001).

To test the null hypothesis, it is necessary to select a test statistic which summarizes the information in the sample and measures how close the sample has come to the null hypothesis as well, i.e. can be used to calculate the probability sets of possible values. Since the population standard deviation is unknown and the number of observation is smaller than 30, it is properly to apply T-test in the experiment (Hair et al., 1998). Mathematically, the T value can be expressed as follows:

\[
t = \frac{\bar{X} - \pi}{S / \sqrt{n}}
\]  

(24)

In equation (23), \(\bar{X}\) is the sample mean, \(\pi\) is the value specified in hypothesis and \(S / \sqrt{n}\) is the sample standard deviation applied to replace population standard deviation.

Consequently, the third step is to identify the significance level before analyzing the data. Traditionally, statisticians set the significance level at 0.05 and more conservative experimenters may prefer a level of significance at 0.01. Given the null hypothesis is true, a probability value will be computed to compare with the significance level. If the probability is greater than the significance level, the null hypothesis will be accepted; if it is not, then the null hypothesis will be rejected and the outcome is said to be statistically significant. According to this perspective, the significance level is crucial to the experiment. If the selected criterion is too large, there is a great chance to commit the type I error; If the
selected criterion is too small, the chance to detect true effects would be limited.

Since a type I error is twice as bad as the type II error, the criterion therefore is better to be considerably small. A conventional significance level of 0.05 will be adopted in my experiment.

The next step is to compute the probability value (i.e. the P value) and compare the P value with the significance level. The P value is the probability of obtaining a sample statistic as unfavorable or more unfavorable to the parameter specified in the null hypothesis given that the null hypothesis is true, which is crucial to the correct interpretation. The smaller the probability value, the stronger the evidence rejecting the null hypothesis.

It is common sense that rejecting the null hypothesis is not an all-or-none decision. If the probability value yielded is lower than expectation, statisticians can be more confident to reject the null hypothesis and the alternative hypothesis is valid; if the calculated probability value is greater than the significance level, i.e. 0.05 in this dissertation, the statistical findings will become inconclusive. The experiment will be done through the statistical software.

3.2.4. **Sharpe Ratio**

Then Sharpe Ratio will be measured to detect a mutual fund’s risk adjusted performance. Sharpe ratio evaluates the risk premium yielded per unit of risk, which can be expressed as follows:
A higher Sharpe ratio implies a greater risk premium yielded by the fund, which may further indicates a superior performance. Therefore, a mutual fund with relatively high Sharpe Ratio will be preferred by investors.

3.2.5. Treynor Index

Next, I will use the following equation will be applied to estimate the Treynor values for individual sample funds:

$$ T = \frac{R_p - R_f}{\beta_p} \quad (12) $$

The portfolio beta applied in equation (12) is calculated from OLS. Basically, Treynor Index measures a fund manager’s profit-gaining ability per unit of systematic risk. The higher the Treynor value, the better the fund manager’s performance.

Treynor Index provides investors with access to make performance comparison as well. In order to compare with the market, the market T is required and can be developed by the following equation:

$$ T_m = \frac{R_m - R_f}{\beta_m} \quad (13) $$

In equation (13), the market beta is equal to one. If the fund yields a T value higher than the market T, it will demonstrate that the fund manager has a superior performance; if the fund T value is smaller than the market T, we can conclude that the fund manager cannot beat the
Chapter Three: Methodology

In addition, if portfolios have been well diversified, rankings by Sharpe and Treynor ratios will be the same.

3.2.6. Decomposition of Risk-Adjusted Performance

Jensen’s Alpha, Sharpe Ratio and Treynor Index will not be enough to evaluate the fund’s ability to beat the market, because that they fail to provide in depth analysis. Given a specific mutual fund is detected and evidence shows that it has gained excess returns against the market, then where do the profits come from exactly? The above mentioned parameters could not offer considerable proof to answer the question. Therefore, after exploiting these insights, I will further adopt another measure to assess the investment performance and provide a proportional analysis of the influential factors involved in, which is known as Fama’s decomposition.

Among a group of attribution techniques, Fama’s decomposition method exhibits a superior performance in assessing the mutual fund’s ability to yield excess return, decomposing the return at different risk level and conducting return attribution analysis. In theory, Fama decomposes the portion of the return in excess of the risk free rate into two main components: risk premium for bearing risk and risk premium due to selectivity.

Then, he asserts that the overall risk is made up with two components, i.e. manager’s risk and investor’s risk, and specified the risk premium yielded by selectivity as profit gained from
diversification and net selectivity. However, “manger’s risk might in part result from a timing decision” (Fama, 1972, p. 560). Therefore, Fama believes that a fund manager’s profit ability could be decomposed into two components, i.e. ability to make a good stock selection and ability to forecast price movements of the stock market. At this stage, Fama’s model examines both selectivity and market timing. However, since the calculation of the market timing components is too complicated, then the effects of the timing decision will not be specified in this experiment. Therefore, the Fama decomposition model is regarded as a measure to evaluate risk-adjusted performance.

In order to derive the Fama Decomposition model, I will first collect data on the realized return of the mutual fund, ex post market risk of the fund, total ex post volatility, realized index return, benchmark volatility and risk free rate. Then the expected return of the mutual fund can be generated by the following equation:

\[ R(\beta_p) = R_f + \beta_p \times (R_m - R_f) \]  

Equation (25)

In equation (24), \( R_m \) denotes the realized index return, \( \beta_p \) represents the fund’s ex post market risk, \( R(\beta_p) \) is, therefore, the risk premium for incurring market risk. Consequently, the profit yielded by selectivity is the difference between the realized and the expected return of the mutual fund. Mathematically, it can be expressed as follows:

\[ S_p = R_p - R(\beta_p) \]  

Equation (26)

In the above equation, \( R_p \) denotes the realized return. In regard to measuring selectivity, common sense suggests that fund managers who purpose to construct a more profitable portfolio may have insufficient notion of diversification, which will further result in a sudden
rise in the additional total portfolio risk. To estimate the portfolio return, rationale of the capital market line (CML) can be used. The equation below shows how to generate the portfolio return with the portfolio’s total risk.

\[
R(\gamma_p) = R_f + \left[ R(\beta) - R_f \right] \times \frac{\gamma_p}{\gamma_p}
\]  

(27)

In equation (26), \( \gamma_\beta \) represents the benchmark volatility, \( \gamma_p \) denotes total ex post volatility, \( R(\gamma_p) \), therefore, is the normal portfolio return. Accordingly, the additional return for diversification can be estimated by subtracting the expected portfolio return from the normal portfolio return and the corresponding equation is given as follows:

\[
D_p = R(\gamma_p) - R(\beta_p)
\]  

(28)

In equation (27), \( D_p \) represents the additional return for diversification. It is obvious that the profit attributed to net selectivity of the portfolio is the difference between the overall profit from selectivity and the profit from diversification. Quantitatively, this relationship can be expressed by the following equation:

\[
NS_p = S_p - D_p
\]  

(29)

In equation (28), the net selectivity of the portfolio is represented by \( NS_p \) (Steiner, 2007). Furthermore, according to the assumptions of CAPM, the diversification measure will be always above zero, hence the risk premium due to selectivity cannot be attributed solely to the net selectivity. The above calculations will be done via self-defined functions in Excel.

3.3. Market Timing Performance Evaluation

The profit-gaining ability of a fund will not only be affected by the manager’s selectivity, but
also his ability to forecast the market movement. However, Jensen’s Alpha, Sharpe Ratio and Treynor Index “assume that the portfolio characteristics do not change over time or because of other variables” (Steiner, 2005). Therefore, they are not capable to measure the fund manager’s timing ability. The most commonly used models to detect a manager’s ability to time the market are Treynor & Mazuy model (1966) and Henriksson & Merton model (1981). Basically, the rationales behind these models are similar to each other.

3.3.1. Regression Analysis for Market Timing Coefficient

To enhance the quality of this research, Treynor & Mazuy model is also employed in the regression analysis. Considering that the study partially focuses on measuring if the sample funds can beat the market, the result of Treynor and Mazuy model will be incorporated into the findings but take only a small percentage. Mathematically, the regression equation can be expressed as follows:

\[
R_{pt} - R_f = \alpha_p + \beta_p (R_{mt} - R_f) + \gamma_p (R_{mt} - R_f)^2 + \epsilon_{pt}
\]  

(18)

Essentially, the simple OLS regression above takes a similar look to Jensen’s formula, where \( \alpha_p \) measures selectivity capabilities as before. However, a novel parameter \( \gamma_p \) is brought in, which helps to measure timing ability. If the market timing coefficient \( \gamma_p \) is significant and positive, a superior timing ability will be implied.
3.3.2. Hypothesis Testing for Market Timing Coefficient

Then the validity of market timing coefficient $\gamma_p$ will be examined with the $H_0$, which is specified as that the value of each timing coefficient tends to be zero. When conduct hypothesis testing to measure the validity of TM value, the parameter of timing ability is about to be test under the following hypotheses:

$$H_0 : \mu_{\gamma_p} = 0$$

$$H_1 : \mu_{\gamma_p} \neq 0$$

In other words, the mean value of the sample market timing coefficients is equal to zero.

3.4. Statistics Software for Experimental Purpose

The data analysis and statistical software used in the above experiment is Stata 7.0 and Microsoft Excel for their simplicity in design and usage. The statistical program Stata 7.0 will be employed to offer a performance analysis on each individual fund by conducting regression analysis and hypothesis analysis. Excel will be used to collect data from the calculated statistical results, rank the statistical outcome and provide a comparison among 37 open-ended equity funds. All the experimental results will be attached in the Appendix. The next chapter will assess the validity of the statistical results and discuss them in depth.
Proponents of behavioral finance suggest that the majority of mutual funds have the ability to earn excess returns. No obvious evidence has been found in this experiment to support this argument. Therefore, the result of this study is consistent with the idea of standard finance. In addition, this dissertation will partially focus on examining the major sources of the excess profits, i.e. if such profit is attributed to fund managers’ selectivity capacity or timing ability. This issue is of great significance to both practitioners and academicians. Since government policies influence the performance of Chinese stock market as much as economics does, fund managers who are capable to interpret the policies and time the market will definitely win excess profits. Apparently, fund management companies expect to recruit people with different abilities and arrange them in particular groups, so that they can yield greater returns and make the company much more attractive to different groups of investors. In regard to academic research, if fund managers CONSISTENTLY have profit abilities, the Efficient Market Hypothesis will be offended, which will boost research and lead to further discussion.

In an emerging market, researchers face a number of difficulties in data gathering process, and there are no exceptions to my experiment. Such circumstance has led to a certain degree of limitation and affects research quality. These difficulties will be discussed in the following paragraphs.
4.1. Jensen’s Alpha

Jensen’s Alpha is a general fund performance criterion which measures the difference between the rate of return we expect from a fund and its actual rate of return. If Alpha is above zero, it indicates that the investment decision made by the fund manager could help to increase the excess return. Otherwise, its profit ability does not reach the market level. The experimental result of this dissertation shows that, on average, the 37 sample funds perform better than the benchmark market. Then we assume that their excess returns should be attributed to professional management skills, in particular the fund managers’ timing ability and selectivity capacity. Table 4.1 shows the statistical outcome of the Jensen’s Alpha.
## Table 1. Regression Results

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<tr>
<th>Fund Code</th>
<th>R square</th>
<th>Standard Deviation</th>
<th>Alpha</th>
<th>P value</th>
<th>Beta</th>
<th>P value</th>
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<td>0.076160288</td>
<td>0.0001920</td>
<td>0.989</td>
<td>0.6573129</td>
<td>0.000</td>
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<td>0.373</td>
<td>0.9513596</td>
<td>0.000</td>
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<td>0.252</td>
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</tr>
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</table>

The summary result for the regression test shows that 26 out of 37 mutual funds appear to have positive Alphas over the investment period, which further implies that the majority of fund managers are good at stock picks. However, there is a significant limitation of the regression results, that is, 13 out of 37 samples yield unpleasant results in terms of R-Square.
(i.e. R-Square is less than 0.3).

Statistically, R-Square is ‘the proportion of variance in the dependent variable which can be predicted from the independent variables’ (UCLA.com., 2007). A small value of R-Square means that the overall measure of the strength of association is not very pleasant, hence, the independent variables fail to explain the dependent variables. In addition, Croome-Carther (2003) suggests that the R-Square of a mutual fund indicates ‘if the beta of a mutual fund is measured against an appropriate benchmark’. In his article, R-Square is defined as a mathematical term describing the correlation between the fund’s movements and the benchmark Index activities, which further helps to explain the relationship between the fund’s volatility and the market risk. According to Croome-Carther (2003), a higher R-Square indicates a more valid beta figure. Generally, if a fund’s R-Square is close to 1.0, it implies that the beta of that fund is more reliable. In contrast, if the R-Square is close to 0, then we can conclude that ‘the beta is less relevant to the fund’s performance’. Consequently, the beta figure is not convincing at all. Furthermore, a low R-Square indicates poor correlation to its benchmark index, i.e. the fund may not only invest in stocks listed in the corresponding Index. This might be a reasonable explanation to the statistical results.

Recent research suggests that no single index can be used as an appropriate benchmark for all stocks and stock mutual funds, ‘in particular small-cap funds, mid-cap funds and funds which invest primarily overseas’(Israelsen, 2001). Yet even with S&P 500, the movements of benchmark index sometimes cannot fully capture the movements of all mutual funds. In
regard to this experiment, some interesting findings are supporting the above argument.

First, the regression result shows that the R-Squares of some sample funds are extremely low. Generally, there are two reasons could help to explain this phenomenon, i.e. the fund’s movements have a very poor correlation to the benchmark index or some extremely large or small monthly rates of returns are observed in the samples. According to the experimental outcome, when the portfolio’s rate of return shows an extremely unusual movement against that of the index, the R-Square value falls significantly. If we wipe off these extreme values, a pleasant R-Square value will be generated, which further helps to increase the fitness level. Statistically, these extreme observations are known as outliers and their location can draw a significant impact on the regression outcome (Wulder, 2005). Citing Fund 162201 with the R-Square value of 0.0256 as an example, if we delete the seventh sample data, the regression outcome will be improved considerably. Instead its R-Square value has become 0.5054. Table 4.2 illustrates this improvement. Hence, in some experiments, researchers might have deleted some outlier points and replaced them with some estimated values. However, the rejection of outliers is still a controversial practice, especially in small sets (Hampel, 2001). In order to maintain the validity of the results, no extreme values are removed from the data set in this experiment.
Table 2. Comparison of Regression Outputs

<table>
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<th></th>
<th>No. of Obs</th>
<th>Total R² P-value</th>
<th>Coef.</th>
<th>t</th>
<th>P-value</th>
<th>Cons.</th>
<th>t</th>
<th>P-value</th>
</tr>
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<tr>
<td>Original</td>
<td>24</td>
<td>0.4553</td>
<td>0.0256</td>
<td>0.1918347</td>
<td>0.76</td>
<td>0.455</td>
<td>0.0132813</td>
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<td>Remove outlier</td>
<td>23</td>
<td>0.0001</td>
<td>0.5054</td>
<td>0.4865763</td>
<td>4.63</td>
<td>0.000</td>
<td>0.0142511</td>
<td>1.37</td>
</tr>
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</table>

Second, regarding investment timing and trading strategies, fund management companies’ responses differ. Through the investment management activities, fund managers follow different strategies to achieve their investment objectives by establishing different investment styles (Romacho & Cortez, 2004). According to the profiles of sample funds, the mutual funds, which get high R-Squares, primarily invest in stocks listed in Shanghai & Shenzhen 300 Index. The mutual funds, which yield relatively low R-Squares, set much different investment strategies. Taking Fund 162201 as an example, its managers appear to hold mixed-asset portfolios, which of course allocate approximately 70 percent of its member’s money on stocks. Besides, the managers invest a considerable proportion of total wealth in treasury bills and money markets.

Third, as regards the stock selection, the Shanghai & Shenzhen 300 Index cannot fully measure the performance of sample funds. Coggin, Fabozzi and Rahman assert that ‘both selectivity and timing appear to be somewhat sensitive to the choice of a benchmark when managers are classified by investment style.’ (Coggin et al., 2005, p. 1039). In regard to the fund performance sensibility against benchmark indices, the weighting of an index will heavily influence the evaluation results. In order to estimate accurate Alpha and beta, an appropriate capitalization-weighted index should be applied to the regression test.
Unfortunately, none of these equity funds have specified their best-fit indices, and it is also unrealistic to calculate them since there are changes occurring in strategic asset allocation every other day. Therefore, the inappropriate benchmark index has greatly affected the experiment quality and some of the statistical results cannot be adopted in further research.

Finally, within the fund management company, the fund manager’s asset allocation strategies are fairly similar to each other. In this experiment, the 37 sample funds belong to 21 professional fund management companies. According to the experimental results, investment products provided by the same fund manager perform similarly on regression tests. For example, within a fund management company, its investment products will simultaneously generate small R-Squares or large R-Squares. This simple phenomenon reflects a very common characteristic of China’s fund managers, i.e. they propose to compose their individual portfolios in the same way. The only exception is Fund 162204, which is provided by ABN AMRO TEDA fund management CO., LTD. The analysis based on its portfolio composition demonstrates that the fund manager has invested approximately 90 percent of total wealth in the stock market. Whereas his other products are constructed in a different way, which are comprised of 65 percent stocks and 35 percent bonds.

One important conclusion derived from the above analysis of R-Square is that some sample funds will not participate in further experiments to ensure the calculation accuracy of Sharpe Ratio and Treynor Index. Therefore, the sample size for the following experiment is reduced to 24 equity funds, which are reflected in table 4.3.
The range of Jensen’s alphas for Chinese open-ended equity funds listed in Table 4.3 varies from as low as -0.0260652 to a high of 0.0173424. Among the 24 sample funds, only six funds have negative Alphas and the others have positive values. It seems that the majority of observed equity funds have delivered superior performance in terms of earning positive excess returns. However, the t statistic from one-sample t-test is 0.7941 and the P-value is 0.4352. Consequently, we cannot reject the null hypothesis that the value of each alpha tends to be 0. Therefore, Chinese equity mutual funds cannot beat the market.
Table 4. One-sample t-test statistics for Jensen's Alpha

<table>
<thead>
<tr>
<th>variable</th>
<th>t</th>
<th>df</th>
<th>sig. (2-tailed)</th>
<th>mean difference</th>
<th>95% conf. Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>0.7941</td>
<td>23</td>
<td>0.4352</td>
<td>0.0018657</td>
<td>-0.0029943 to 0.0067258</td>
</tr>
</tbody>
</table>

The values of standard deviation for sample funds range from as low as 0.057484892 to a high of 0.128794089. It means that the returns of observations tend to drastically fluctuate over time. In addition, the betas of the sample funds vary from 0.5366501 to 1.091704, with the average value of 0.7287937. For the 24 mutual funds listed in Table 4.3, only the Fund 100020 performs more volatile than the market, which yields a beta coefficient of 1.091704. Because financial experts believe that a risk is usually positively correlated with returns (Mcnulty, 2006), the funds with a high beta will be placed on the first consideration. In this study, there are 7 out of the 24 observations yielding a beta very close to 1, i.e. between 0.9 and 1.1. It means that their performance closely matches the benchmark. However, their alphas demonstrate an exception to that rule. Taking Fund 100020 as an example, the observation fluctuated more significantly than the market did, hence it was supposed to provide a potential for higher returns, however, it actually failed to beat the performance of its dependent index. It seems that beta does not help investors tell which fund is better. McClure (2004) explains that beta fails to ‘distinguish between upside and downside price movements’, where only ‘upside ones mean opportunity’. Therefore, other ratios should be adopted by a fund manager to further assess. Of particular noteworthiness, there are three sample funds having low betas, which are less than 55 percent, and relatively high alphas. These figures indicate that they have beaten the market while posing less risk. These star funds are 260104, 240005 and 206001.
To compensate the disadvantages of using volatility measurements to evaluate fund performance, other indicators will be applied to assess a fund manager’s profit gaining ability against the risk subjected.

4.2.  Sharpe Ratio and Treynor Index

Sharpe Ratio and Treynor Index are two general performance criteria employed in the experiment. Sharpe Ratio uses portfolio’s standard deviation to evaluate the risk-adjusted performance, while at the same time, Treynor Index uses portfolio’s beta to estimate a fund’s risk-adjusted return. The application of Treynor Index is based on the assumption that the portfolio is fully diversified. Hence Treynor Index fails to measure unsystematic risk. Table 4.5 illustrates the statistical results for Sharpe Ratio and Treynor Index. The T value for the market is also listed in the table.
Table 5. Risk-adjusted Performance Measurements

<table>
<thead>
<tr>
<th>Fund Code</th>
<th>Average Return</th>
<th>Standard Deviation</th>
<th>Beta</th>
<th>Treynor Index</th>
<th>Sharpe Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.043580275</td>
<td>0.076160288</td>
<td>0.6573129</td>
<td>0.062068270</td>
<td>0.535689609</td>
</tr>
<tr>
<td>2</td>
<td>0.072534353</td>
<td>0.091673480</td>
<td>0.9513596</td>
<td>0.073318599</td>
<td>0.760878213</td>
</tr>
<tr>
<td>3</td>
<td>0.021058808</td>
<td>0.078065814</td>
<td>0.5960198</td>
<td>0.030664766</td>
<td>0.234120507</td>
</tr>
<tr>
<td>4</td>
<td>0.064084898</td>
<td>0.087696280</td>
<td>0.8590922</td>
<td>0.071357763</td>
<td>0.699036473</td>
</tr>
<tr>
<td>5</td>
<td>0.059820424</td>
<td>0.085677906</td>
<td>0.9356520</td>
<td>0.060961152</td>
<td>0.665730828</td>
</tr>
<tr>
<td>6</td>
<td>0.043274201</td>
<td>0.099396160</td>
<td>0.7769118</td>
<td>0.052119431</td>
<td>0.407381947</td>
</tr>
<tr>
<td>7</td>
<td>0.039905570</td>
<td>0.071751162</td>
<td>0.5366501</td>
<td>0.069176490</td>
<td>0.517393300</td>
</tr>
<tr>
<td>8</td>
<td>0.057385482</td>
<td>0.079035642</td>
<td>0.6037725</td>
<td>0.090437179</td>
<td>0.690871620</td>
</tr>
<tr>
<td>9</td>
<td>0.059385348</td>
<td>0.076134484</td>
<td>0.8510530</td>
<td>0.066509781</td>
<td>0.743465313</td>
</tr>
<tr>
<td>10</td>
<td>0.061511331</td>
<td>0.079456392</td>
<td>0.9442374</td>
<td>0.062197633</td>
<td>0.739139160</td>
</tr>
<tr>
<td>11</td>
<td>0.056439180</td>
<td>0.066517476</td>
<td>0.6709093</td>
<td>0.079976801</td>
<td>0.80662894</td>
</tr>
<tr>
<td>12</td>
<td>0.056245693</td>
<td>0.057484892</td>
<td>0.5847119</td>
<td>0.091435958</td>
<td>0.930047731</td>
</tr>
<tr>
<td>13</td>
<td>0.038889631</td>
<td>0.071518789</td>
<td>0.5489868</td>
<td>0.065771402</td>
<td>0.504869168</td>
</tr>
<tr>
<td>14</td>
<td>0.052552307</td>
<td>0.079643211</td>
<td>0.6921251</td>
<td>0.071909409</td>
<td>0.624915875</td>
</tr>
<tr>
<td>15</td>
<td>0.045416309</td>
<td>0.089189029</td>
<td>0.7019772</td>
<td>0.060777343</td>
<td>0.47838263</td>
</tr>
<tr>
<td>16</td>
<td>0.045196243</td>
<td>0.091322850</td>
<td>0.6044862</td>
<td>0.070165776</td>
<td>0.46442833</td>
</tr>
<tr>
<td>17</td>
<td>0.059823836</td>
<td>0.074224687</td>
<td>0.7769277</td>
<td>0.073419748</td>
<td>0.768502210</td>
</tr>
<tr>
<td>18</td>
<td>0.044798141</td>
<td>0.128794089</td>
<td>1.0917040</td>
<td>0.038486752</td>
<td>0.326227246</td>
</tr>
<tr>
<td>19</td>
<td>0.041680162</td>
<td>0.100670538</td>
<td>0.6604193</td>
<td>0.06144004</td>
<td>0.386390726</td>
</tr>
<tr>
<td>20</td>
<td>0.016717173</td>
<td>0.072045733</td>
<td>0.6475047</td>
<td>0.021521346</td>
<td>0.193421209</td>
</tr>
<tr>
<td>21</td>
<td>0.053207957</td>
<td>0.063845496</td>
<td>0.7021614</td>
<td>0.071815336</td>
<td>0.78981285</td>
</tr>
<tr>
<td>22</td>
<td>0.067750878</td>
<td>0.076741703</td>
<td>0.9099731</td>
<td>0.071396481</td>
<td>0.846591554</td>
</tr>
<tr>
<td>23</td>
<td>0.040205813</td>
<td>0.071335406</td>
<td>0.5557262</td>
<td>0.067342179</td>
<td>0.524617651</td>
</tr>
<tr>
<td>24</td>
<td>0.051887123</td>
<td>0.078167626</td>
<td>0.6853744</td>
<td>0.071647150</td>
<td>0.628202810</td>
</tr>
</tbody>
</table>

Other Information

| Market T | 0.064558 |

The values of Sharpe Ratios of sample funds vary from 0.19342109 to 0.930047731. Among the 24 observed funds, none of them have negative Sharpe Ratios. It means that all of the listed funds are able to provide returns greater than the risk-free rate of return, i.e. beat the money market. In addition, if we plot all observed equity funds on a risk-return graph, none of them will be positioned below the Capital Market Line. Hence, individual investors will never feel disappointed about the sample funds. Common sense suggests that the bigger the Sharpe ratio, the better a fund performed against risk (Yih, 2002). Therefore, fund 206001 with the
highest Sharpe Ratio 0.930047731 will be the premier choice for investors. The ranking result for Sharpe Ratio is consistent with that of Jensen’s Alpha, i.e. fund 206601 performs better than the others.

The values of Treynor Index of the 24 funds vary from 0.021521346 to 0.091435958. In addition, the T value for the market is 0.061776247. If a fund fails to reach the market level T, it does not beat the market. Evidence shows that 18 out of 24 sample funds have a T value higher than the market T. However, the t statistic yielded from one-sample t-test is 0.1168 and the p-value is 0.9080. Therefore, we do not reject the null hypothesis that the population mean of the T values is equal to the market T at the 0.05 level. So far, we found that Chinese equity mutual funds performed better than the money market but failed to outperform the benchmark market.

<table>
<thead>
<tr>
<th>variable</th>
<th>t</th>
<th>df</th>
<th>sig. (2-tailed)</th>
<th>mean difference</th>
<th>95% conf. Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>T Index</td>
<td>0.1168</td>
<td>23</td>
<td>0.9080</td>
<td>0.0649425</td>
<td>0.58138 0.717467</td>
</tr>
</tbody>
</table>

In general, ‘the Treynor and Sharpe index values give reasonably consistent ratings between comparable investment levels.’ (Fielitz, 1974, p.54). Table 4.7 shows the rank of observed funds generated by different performance criteria. Obviously, the statistical result is largely consistent with Fielitz’s argument, but ranks based on different performance measures are not exactly identical, i.e. there some different situations exist. Among all the observations, 10 equity funds have higher rank under the Treynor criterion than that of the Sharpe criterion, e.g.
Fund 000011, 260101 and 260104 etc. It implies that these fund managers have not fully diversified their portfolios.

In conclusion, the experimental result indicates that calculated T values substantially differ from the values of Sharpe Ratio. It indicates that Chinese equity funds are subject to high unsystematic risks and investors expect to yield greater rates of returns in compensation for the higher risk.

<table>
<thead>
<tr>
<th>Table 7. Ranking of Performance Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>----</td>
</tr>
<tr>
<td>1</td>
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<tr>
<td>2</td>
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<tr>
<td>22</td>
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<tr>
<td>23</td>
</tr>
<tr>
<td>24</td>
</tr>
</tbody>
</table>
4.3. Decomposition of Risk-Adjusted Performance

In 1972, Fama published a paper evaluating investment performance. He defined his work as a follower of Sharpe, Treynor and Jensen to measure risk-adjusted performance. However, he also introduced that a fund’s excess return should be attributed to a good stock selection and bearing risk. The following sections will provide an explanation of decomposed results derived from the sample data. In addition, this study assumes the investor’s target beta is equal to one, i.e. market beta.

The risk premiums of observed funds range from 1.39% to 6.98%, which means that all the observed Chinese equity mutual funds have performed well. In regard to risk premium for bearing risk, all sample funds have yielded a high value. A fund’s risk premium for bearing risk is highly correlated to the fund’s portfolio beta. Given a fund has got a positive total risk premium, the higher the portfolio beta, the greater the risk premium due to risk.
### Table 8. Fama's Decomposition of Return

<table>
<thead>
<tr>
<th>Fund Code</th>
<th>Risk Premium</th>
<th>Risk Premium Due To</th>
<th>Risk</th>
<th>Selectivity</th>
<th>Manager's</th>
<th>Investor's</th>
<th>Diversification</th>
<th>Net Selectivity</th>
<th>Manager's Risk</th>
<th>Net Selectivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.08%</td>
<td>4.37%</td>
<td>-0.29%</td>
<td>-2.28%</td>
<td>6.65%</td>
<td>1.71%</td>
<td>-2.00%</td>
<td></td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>6.98%</td>
<td>6.32%</td>
<td>0.65%</td>
<td>-0.32%</td>
<td>6.65%</td>
<td>0.99%</td>
<td>-0.34%</td>
<td></td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>1.83%</td>
<td>3.96%</td>
<td>-2.13%</td>
<td>-2.69%</td>
<td>6.65%</td>
<td>2.27%</td>
<td>-4.40%</td>
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<td>23</td>
</tr>
<tr>
<td>4</td>
<td>6.13%</td>
<td>5.71%</td>
<td>0.42%</td>
<td>-0.94%</td>
<td>6.65%</td>
<td>1.29%</td>
<td>-0.87%</td>
<td></td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>5.70%</td>
<td>5.22%</td>
<td>-0.52%</td>
<td>-0.43%</td>
<td>6.65%</td>
<td>0.62%</td>
<td>-1.14%</td>
<td></td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>4.05%</td>
<td>5.17%</td>
<td>-1.12%</td>
<td>-1.48%</td>
<td>6.65%</td>
<td>2.77%</td>
<td>-3.88%</td>
<td></td>
<td>9</td>
<td>20</td>
</tr>
<tr>
<td>7</td>
<td>3.71%</td>
<td>3.57%</td>
<td>0.14%</td>
<td>-3.08%</td>
<td>6.65%</td>
<td>2.16%</td>
<td>-2.01%</td>
<td></td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>8</td>
<td>5.46%</td>
<td>4.01%</td>
<td>1.45%</td>
<td>-2.63%</td>
<td>6.65%</td>
<td>2.29%</td>
<td>-0.85%</td>
<td></td>
<td>19</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>5.66%</td>
<td>5.66%</td>
<td>0.00%</td>
<td>-0.99%</td>
<td>6.65%</td>
<td>0.42%</td>
<td>-0.42%</td>
<td></td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>10</td>
<td>5.87%</td>
<td>5.28%</td>
<td>-0.40%</td>
<td>-0.37%</td>
<td>6.65%</td>
<td>0.06%</td>
<td>-0.47%</td>
<td></td>
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<td>8</td>
</tr>
<tr>
<td>11</td>
<td>5.37%</td>
<td>4.46%</td>
<td>0.91%</td>
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<td>6.65%</td>
<td>0.85%</td>
<td>0.06%</td>
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<td>3.89%</td>
<td>1.46%</td>
<td>-2.76%</td>
<td>6.65%</td>
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<td>0.76%</td>
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</tr>
<tr>
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<td>3.61%</td>
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<td>-0.04%</td>
<td>-3.00%</td>
<td>6.65%</td>
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<td>-2.10%</td>
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<td>23</td>
<td>17</td>
</tr>
<tr>
<td>14</td>
<td>4.99%</td>
<td>4.60%</td>
<td>0.38%</td>
<td>-2.05%</td>
<td>6.65%</td>
<td>1.76%</td>
<td>-1.38%</td>
<td></td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>15</td>
<td>4.27%</td>
<td>4.67%</td>
<td>-0.40%</td>
<td>-1.98%</td>
<td>6.65%</td>
<td>2.45%</td>
<td>-2.95%</td>
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<tr>
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<td>4.24%</td>
<td>4.02%</td>
<td>0.22%</td>
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<td>6.65%</td>
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<td>-3.05%</td>
<td></td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>17</td>
<td>5.70%</td>
<td>5.17%</td>
<td>0.54%</td>
<td>-1.48%</td>
<td>6.65%</td>
<td>0.76%</td>
<td>-0.22%</td>
<td></td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>18</td>
<td>4.20%</td>
<td>7.26%</td>
<td>-3.06%</td>
<td>0.51%</td>
<td>6.65%</td>
<td>3.02%</td>
<td>-6.08%</td>
<td></td>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td>19</td>
<td>3.89%</td>
<td>4.03%</td>
<td>-0.14%</td>
<td>-2.62%</td>
<td>6.65%</td>
<td>4.00%</td>
<td>-4.15%</td>
<td></td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>20</td>
<td>1.39%</td>
<td>4.30%</td>
<td>-2.91%</td>
<td>-2.34%</td>
<td>6.65%</td>
<td>1.45%</td>
<td>-4.36%</td>
<td></td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>21</td>
<td>5.04%</td>
<td>4.67%</td>
<td>0.37%</td>
<td>-1.98%</td>
<td>6.65%</td>
<td>0.43%</td>
<td>-0.05%</td>
<td></td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>22</td>
<td>6.50%</td>
<td>5.05%</td>
<td>0.45%</td>
<td>-0.60%</td>
<td>6.65%</td>
<td>0.08%</td>
<td>0.37%</td>
<td></td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>23</td>
<td>3.74%</td>
<td>3.69%</td>
<td>0.05%</td>
<td>-2.95%</td>
<td>6.65%</td>
<td>2.00%</td>
<td>-1.95%</td>
<td></td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td>24</td>
<td>4.91%</td>
<td>4.56%</td>
<td>0.35%</td>
<td>-2.09%</td>
<td>6.65%</td>
<td>1.68%</td>
<td>-1.33%</td>
<td></td>
<td>13</td>
<td>12</td>
</tr>
</tbody>
</table>

**Other Information**

- Shanghai & Shenzhen 300 Index: 6.93%
- 3-year T-Bill Rate (monthly): 0.28%
In addition, 14 funds out of 24 observations have yielded positive value for risk premium from good stock selection. The rest of observed fund managers do not have the skill to pick undervalued stocks. In addition, the t statistic for one-sample t-test is -0.6434, and its p-value is 0.5263. Therefore, we cannot reject the null hypothesis that the population mean of the risk premium due to selectivity is equal to zero at the 0.05 level. Furthermore, the difference between risk premium due to risk and that due to selectivity is also very significant. It implies that Chinese fund managers tend to make money from bearing risk and good luck.

### Table 9. One-sample t-test statistics for Selectivity

<table>
<thead>
<tr>
<th>variable</th>
<th>t</th>
<th>df</th>
<th>sig. (2-tailed)</th>
<th>mean difference</th>
<th>95% conf. Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selectivity</td>
<td>-0.6434</td>
<td>23</td>
<td>0.5263</td>
<td>-0.0015093</td>
<td>-0.0063621 0.0033435</td>
</tr>
</tbody>
</table>

In addition, Fama (1972) suggests that a manager is subjected to the risk from his timing decision. Therefore, it is reasonable to infer a manager’s market timing performance from this value. Evidence shows that only one fund has yielded positive value for risk premium due to manager’s risk. It is obvious that the majority of observed funds do not have the ability to time the market.

The benefits yielded by diversification vary from a low of 0.06% to a high of 4.00%. Since this is a compensation for the specific risk, the evidence indicates that Chinese equity mutual funds generally profit from diversifying high unsystematic risk. This finding is consistent with the conclusion of Treynor measure. The returns from net selectivity vary from -6.08% to 0.76%. Half of the observations have positive values for selectivity, while at the same time,
negative values for net selectivity. In regard to this, an explanation is offered by Fama, that is ‘though the manager chose a portfolio that outperformed the naively selected portfolio with the same level of market risk, his selectivity was not sufficient to make up for the avoidable risk taken, so that net selectivity was negative’ (Fama, 1972, p.559).

In conclusion, all sample funds have yielded greater return than the money market, which should be regarded as a compensation for bearing a relatively high risk. The majority of sample funds fail to time the market while half of them generate positive returns from constructing a good portfolio. In particular, these profits should be attributed to the fund manager’s ability to diversify the portfolio rather than pick undervalued stocks.

### 4.4. Market Timing Performance

This section aims to study market timing abilities of mutual fund managers. The excess return earned by a fund manager should be attributed to stock selection and market timing simultaneously. Given two fund managers perform equally in stock selection abilities, the one who is more adept at timing the market will yield higher excess returns. Treynor and Mazuy (1966) asserts that if a fund manager could accurately predict the future direction of stock market movement in advance, he will be able to make adjustments to his stock holdings, buying and selling stocks at the best time. Some academicians assert that it is impossible to time the market continuously over the long-run. Therefore, the issue of the possibility of market timing is still under debate. This dissertation has employed Treynor & Mazuy model
to measure fund managers’ timing ability. If the timing parameter is greater than zero, it time
the market.

Table 10. Selectivity and Timing Measurements

<table>
<thead>
<tr>
<th>Fund Code</th>
<th>$R^2$</th>
<th>Alpha</th>
<th>Beta</th>
<th>TM</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>0.5174</td>
<td>0.0002815</td>
<td>0.6178057</td>
<td>0.2246772</td>
</tr>
<tr>
<td>2</td>
<td>0.7471</td>
<td>0.0109536</td>
<td>0.9634083</td>
<td>-0.0685209</td>
</tr>
<tr>
<td>3</td>
<td>0.4101</td>
<td>-0.0188056</td>
<td>0.7118582</td>
<td>-0.6587719</td>
</tr>
<tr>
<td>4</td>
<td>0.6838</td>
<td>0.0077069</td>
<td>1.0904970</td>
<td>-1.3159960</td>
</tr>
<tr>
<td>5</td>
<td>0.8276</td>
<td>-0.008266</td>
<td>0.9638588</td>
<td>-0.1604118</td>
</tr>
<tr>
<td>6</td>
<td>0.4358</td>
<td>-0.0070192</td>
<td>0.5637101</td>
<td>1.2124760</td>
</tr>
<tr>
<td>7</td>
<td>0.3936</td>
<td>0.0037338</td>
<td>0.6414358</td>
<td>-0.5959157</td>
</tr>
<tr>
<td>8</td>
<td>0.4395</td>
<td>0.0166504</td>
<td>0.8924044</td>
<td>-1.6414470</td>
</tr>
<tr>
<td>9</td>
<td>0.8669</td>
<td>0.0039989</td>
<td>0.8641138</td>
<td>-0.0742765</td>
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<tr>
<td>10</td>
<td>0.9821</td>
<td>0.0002228</td>
<td>1.0214850</td>
<td>-0.4393072</td>
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<tr>
<td>11</td>
<td>0.7227</td>
<td>0.0125962</td>
<td>0.5009398</td>
<td>0.9666148</td>
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<tr>
<td>12</td>
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<td>-1.1090610</td>
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<tr>
<td>13</td>
<td>0.4163</td>
<td>0.0019166</td>
<td>0.6710552</td>
<td>-0.6942023</td>
</tr>
<tr>
<td>14</td>
<td>0.5241</td>
<td>0.0070607</td>
<td>0.6712590</td>
<td>0.1186653</td>
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<tr>
<td>15</td>
<td>0.4430</td>
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<td>0.5004057</td>
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<td>16</td>
<td>0.3850</td>
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<td>0.0941885</td>
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<tr>
<td>17</td>
<td>0.7786</td>
<td>0.0094959</td>
<td>0.5784976</td>
<td>1.1284700</td>
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<tr>
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<td>0.6242</td>
<td>-0.0274567</td>
<td>1.9879230</td>
<td>-5.0967880</td>
</tr>
<tr>
<td>19</td>
<td>0.2520</td>
<td>0.0015112</td>
<td>0.5731938</td>
<td>0.1889533</td>
</tr>
<tr>
<td>20</td>
<td>0.5626</td>
<td>-0.0259135</td>
<td>0.5805619</td>
<td>0.3807029</td>
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<tr>
<td>21</td>
<td>0.8443</td>
<td>0.0072544</td>
<td>0.6124824</td>
<td>0.5157076</td>
</tr>
<tr>
<td>22</td>
<td>0.9788</td>
<td>0.0085533</td>
<td>0.9985908</td>
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</tr>
<tr>
<td>23</td>
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<td>0.0027555</td>
<td>0.7046969</td>
<td>-0.8470411</td>
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<tr>
<td>24</td>
<td>0.5507</td>
<td>0.0072239</td>
<td>0.4830542</td>
<td>1.1505930</td>
</tr>
</tbody>
</table>

Table 4.10 reflects the numerical results for T & M regression. The values of the timing parameter range from -5.0967880 to 2.9020580. Half of the 24 sample funds yielded negative values for timing parameter. It seems that observed equity funds failed to generate profits from predicting the market movements. Evidence from one-sample t-test further supports this argument, where the t statistic is -0.4578 and p-value is 0.6514. Hence, there is no strong evidence against the null hypothesis that the value of each timing parameter tends to be zero.
Table 11. One-sample t-test statistics for Timing Coefficient

<table>
<thead>
<tr>
<th>variable</th>
<th>t</th>
<th>df</th>
<th>sig. (2-tailed)</th>
<th>mean difference</th>
<th>lower</th>
<th>upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>gamma</td>
<td>-0.458</td>
<td>23</td>
<td>0.6514</td>
<td>-0.1362689</td>
<td>-0.7520263</td>
<td>0.4794885</td>
</tr>
</tbody>
</table>

This finding is consistent with the conclusion generated from Fama Decomposition model. A noteworthy case is the fund 100020’s dramatic failure of time prediction, which has the lowest value of timing parameter, i.e. -5.096788. Its value of Alpha yielded by T & M regression is -0.0274567. Therefore, the fund manager neither outperforms the market. This finding offers further evidence to explain its poor performance in the single-factor regression test for Jensen’s alpha.

According to Table 4.10, some equity funds are solely adept at stock selection and exhibit the opposite performance in terms of timing, e.g. fund 206001 ranks top for T value, Alpha and Sharpe Ratio but ranks at bottom for the timing ability. Apparently, the fund manager’s stock selection ability has compensated for the unsatisfied market timing strategy. It is also important to note that the equity funds which exhibit good timing abilities may have poor stock selection abilities. Taking fund 110003 as an example, it has a remarkable timing ability, ranking top 2 in terms of T & M measure. However, its overall performance is not good, i.e. it got ranking number 21. This reflects that there is a negative correlation existed between selection ability and market timing ability.

In addition, after adding the quadratic term to the equation to test the fund manager’s market timing ability, the numerical results of beta and Jensen’s alpha are slightly different from the
former conclusion generated by the single-factor model. The value of Alpha decreased and the average value of beta increased a little bit. However, these changes do not influence my experimental conclusion.

The R-Square values have been generally improved as well, but the fitness level is still shown to be unsatisfactory. As a consequence, it is reasonable to infer that there are still other factors affecting a fund manager’s performance.
V. Chapter Five: Further Discussion and Conclusion

5.1. Further Discussion

5.1.1. Evaluation of Overall Performance

From the above evidence, we can see all sample funds have yielded a positive Sharpe ratio, which implies their portfolio returns are higher than that of risk-free investments. In addition, evidence from Jensen’s alpha and Treynor measure suggests that the amounts are too small to infer that they can beat the market, although the majority of them can generate excess returns against the benchmark index. Evidence from t-test shows that, the mean of alphas is not higher than zero; neither the difference between the average T value for sample funds and the market T is obvious. Consequently, it is reasonable to infer that a fund manager’s ability to generate significant positive risk premium is largely depended on the existence of a bullish stock market.

This conclusion is obviously consistent with the results of many previous researches, which confirm the idea of efficient market hypothesis, i.e. all of these studies suggest that mutual funds cannot outperform the market. Friend et al. (1962) first carried out a study on performance evaluation, which investigated 152 funds over the period from 1953 to 1958. They found a negative risk-adjusted performance existed in the industry, which implied an efficient market. Treynor (1965), Sharpe (1966) and Jensen (1968) assessed the mutual fund
performance in US respectively. Their conclusions are quite similar to each other, which contend that the observations are not able to beat the benchmark market.

Then, Friend, Blume and Crockett (1970) published their findings, whose conclusion is opposite to the classic studies, i.e. the study yielded a positive alpha. Strength of their study lies in the use of the risk-class benchmark portfolio approach, which helps to overcome the shortcoming of single-parameter techniques. In 1974, McDonald found that some observations exhibited positive selectivity performance and timing performance as well. After that, Carlson (1977) found evidence inconsistent with Sharpe and Jensen; Mains (1977) yielded slightly positive alpha in his research; Kon and Jen (1979) showed evidence contradicting Jensen. However, these findings cannot suggest that the market is inefficient. According to efficient market hypothesis, the stock prices move in a random pattern. In addition, there may be some undervalued or overvalued stocks existed in the market, but investors will soon discover these investment opportunities and the prices will resort back to normal through extensive trading. Accordingly, mutual funds could generate excess returns but “beating the market cannot be consistent phenomena” (Heakal, 2002).

Their findings are very helpful to explain what happens in Chinese mutual fund industry. Although some equity mutual funds outperformed the market, it is largely due to chance. We cannot infer that Chinese mutual funds can beat the market. Some researchers (Wu et al., 2002; 2004) contend that Chinese mutual funds can outperform the market. However, a significant limitation exists in their studies, which is they haven’t conducted any hypothesis
tests to examine the validity of data results. Besides, the majority of researches based on Chinese market fail to take P-values of each parameter into consideration, e.g. Tu & Zhang, 2003. The most recent research on Chinese mutual funds performance is the one carried out by Yang (2006), who investigated 54 Chinese closed-end funds over the period from 2<sup>nd</sup> Jan 2003 to 31<sup>st</sup> Dec 2005. In her article, the t-tests on Jensen’s Alpha, Sharpe Ratio and Treynor Index are brought in and then she asserted that Chinese closed-end mutual funds cannot beat the market. Yang’s conclusion is consistent with this study.

5.1.2. Evaluation of Selection Ability and Timing Ability

The experimental results from Fama decomposition model and Treynor & Mazuy model indicate that the majority of observed managers cannot time the market; neither generates profits from making a good stock pick. Chinese fund managers are expected to make money from bearing risk and constructing a diversified portfolio combined with bond and other financial instruments. Experiment result suggests that there is no significant positive correlation between portfolio risk and portfolio return. A case study of Fund 100020 shows that the observed fund manager intended to yield high excess return from holding a great amount of stocks in his portfolio. However, he failed to achieve this financial target and unfortunately has been subjected to a significant volatility.

The evaluation of overall performance suggests that the alpha value of each observation tends to be zero, and hence the average equity fund cannot beat the market. This is an obvious
evidence of efficient market. Ironically, data results from later experiments are contradictory to this expectation. The efficient market hypothesis assumes that portfolio return is positively correlated with portfolio risk and there is no such evidence found in this study. Therefore, we cannot come to the conclusion that Chinese market is strong-form efficient.

In regard to the lack of market timing ability, a reasonable explanation is that, the government policy has a great impact on stock prices in China. On the one hand, Fund managers can predict the market movements by interpreting it correctly. On the other hand, frequently changed policies add more uncertainty to the industry as a whole, which makes timing the market more difficult.

Furthermore, there are some defections existed in Chinese capital market, which may help to explain fund manager’s failure for not being able to time the market. According to CSRC (China Securities Regulatory Commission), there are only limited categories of stocks traded on the market. Therefore, an explanation is that fund managers do not have many choices to hedge their portfolios when they detect a downward or upward market movement which is going to occur. As a consequence, fund manager’s timing ability cannot be fully developed.

5.2. Limitations

The above experimental results are generally consistent with the idea of standard finance, but it does not mean that Chinese market is strong-form efficient. This is partly due to the
defection of the market and partly due to experimental limitations, which will be discussed in this section.

The first limitation is that the selected benchmark index cannot fully capture the performance of sample funds. The majority of previous empirical studies tend to apply multiple benchmark indices to evaluate investment performance. Coggin, Fabozzi and Rahman (1993) have employed S&P 500 Index, Russell 3000 Index and four style indices as benchmarks in their study. Ferson and Schadt (1996) have used the value-weighted CRSP index in their experiment. Wermers (2000) further introduced how to establish a benchmark by actual stockholdings to replace the inaccurate benchmarks. However, these suggestions are not very applicable to my study because it is difficult to obtain relevant information in an emerging market. To overcome this defection, I have deleted 13 observations which have got a low fitness level from the original sample.

The second limitation is that, in Fama’s Decomposition model the target beta is assumed equal to 1. The value of target beta will significantly influence the attribution analysis related to manager’s risk and investor’s risk, but will not affect remainder components. Therefore, the assumption on target beta will not heavily influence my research quality.

5.3. Summary of Findings

“For years, China's stock market was an anomaly: the economy was going one way up and it
was going in the opposite direction.” (Zhang, 2006). In reality, this bullish stock market has driven the growth and development of Chinese mutual fund industry. News from Beijing Youth newspaper suggests that 2006 is a year of Chinese mutual funds, in which funds have performed best since the first investment fund launched in 1992. In particular, the INVESCO Great Wall Domestic Demand Growth fund has generated a portfolio return of 182%, topped the market. These figures may lead to an overoptimistic view of Chinese mutual fund market; hence overestimate fund manager’s performance. This study attempts to provide a true and fair opinion in this regard with realistic data.

The sample of this study includes a number of Chinese domestic equity mutual funds, which have a history of more than 3 years. The observations are used to compare with Shanghai Shenzhen 300 Index to test if they can outperform the market. The experimental result suggests that, all sample mutual funds have achieved a significant value for profits; hence no matter which fund investors decide to put their money in, they can earn a plenty of risk premiums. However, the statistical results of alpha and Treynor Index indicate that although some of them can generate higher returns than the benchmark market, this difference is inconspicuous. Evidence from one-sample t-test has further proved that Chinese equity mutual fund cannot beat the market. To sum up, the current bullish stock market has boosted economic growth as well as Chinese equity funds’ profits; however, this cannot help to infer that they can beat the market.

While testing fund manager’s ability to time the market and make a good stock pick, Fama
decomposition model and Treynor & Mazuy model have been applied. Evidence from Fama decomposition suggests that the majority of fund managers cannot time the market neither identify undervalued stocks; however, they do have the ability to construct a well diversified portfolio spreading risk away. Turning to Treynor & Mazuy model, the statistical results further support that almost none of them can accurately predict the market movements. Besides, the fund manager’s timing ability and selection ability are sometimes negatively correlated. It indicates that fund management companies fail to recruit staffs with different capacities and pair them accordingly.

Therefore, Chinese equity mutual funds cannot beat the market. Actually, fund managers can neither select undervalued stocks nor time the market. They primarily earn profits from bearing high risk and good luck. In addition, the current bullish stock market has also made a considerable contribution.
References


Batchelor, C. (2007). FT.com. Asset allocation: This matters more than anything. Available from:


References


Investopedia.com. Web site:
http://www.investopedia.com/articles/mutualfund/03/072303.asp [Accessed: 
August 25, 2007].

Journal*, vol. 21, no. 5, pp. 55-59.

38, no. 1, pp. 34-105.


vol. 27, no. 3, pp. 551-567.


Fama, E.F. & French, K.R. (1993), "Common risk factors in the returns on stocks and 
bonds", *Journal of Finance*, vol. 51, pp. 55-84.


References

Working paper.


## Appendix

### Appendix 1. List of Open-End Equity Funds*

<table>
<thead>
<tr>
<th>Fund Code</th>
<th>Fund Name</th>
<th>Inception Date</th>
<th>Top Equity Holdings</th>
<th>Fund Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ChinaAMC Growth Fund</td>
<td>18 December 2001</td>
<td>3.24E+09</td>
<td>China Asset Management co.,Ltd</td>
</tr>
<tr>
<td>2</td>
<td>ChinaAMC Large-cap Select Fund</td>
<td>11 August 2004</td>
<td>1.93E+09</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ChinaAMC Return Fund</td>
<td>5 September 2003</td>
<td>3.80E+09</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Value Optimization Growth Industry</td>
<td>25 April 2003</td>
<td>1.02E+09</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Value Optimization Cycle Industry Fund</td>
<td>25 April 2003</td>
<td>6.27E+08</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Value Optimization Sustaining Industry Fund</td>
<td>25 April 2003</td>
<td>9.81E+08</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Value Optimization Selection Fund</td>
<td>9 July 2004</td>
<td>2.02E+09</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>E Fund Strategic Growth Fund</td>
<td>9 December 2003</td>
<td>2.04E+09</td>
<td>E Fund Management Co., Ltd</td>
</tr>
<tr>
<td>9</td>
<td>E Fund 50 Fund</td>
<td>22 March 2004</td>
<td>5.05E+09</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>INVEESCO Selected Blue Chip Fund</td>
<td>24 October 2003</td>
<td>8.21E+08</td>
<td>INVEESCO Great Wall Management Co.,Ltd</td>
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<tr>
<td>11</td>
<td>INVEESCO Domestic Demand Growth Harvest Service Valued-Added Industry Open-ended Fund</td>
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<td>Harvest Fund Management Co.,Ltd</td>
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<td>13</td>
<td>Hua An China A Share Fund</td>
<td>8 November 2002</td>
<td>3.09E+09</td>
<td>Hua An Fund Management Co., Ltd</td>
</tr>
<tr>
<td>14</td>
<td>Fortune SGAM Multi-strategic Growth Fund</td>
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<td>5.23E+09</td>
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<tr>
<td>15</td>
<td>Peng Hua Industrial Growth Fund</td>
<td>24 May 2002</td>
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<td>PuTian Income Fund</td>
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<td>17</td>
<td>Peng Hua China 50 Fund</td>
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<td>Date</td>
<td>Amount</td>
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<td>18</td>
<td>020001</td>
<td>Guo Tai JinYing Growth Fund</td>
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<td>19</td>
<td>020003</td>
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<td>5 December 2003</td>
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<td>020005</td>
<td>Sustaining Return Fund</td>
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<td>1.23E+09</td>
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<td>100020</td>
<td>Fullgoal Tianyi Value Fund</td>
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<td>Wanjia Sse 180 Index Fund</td>
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<td>23</td>
<td>050001</td>
<td>Bo Shi Value Growth Fund</td>
<td>9 October 2002</td>
<td>3.05E+09</td>
</tr>
<tr>
<td>24</td>
<td>050002</td>
<td>Bo Shi Fu Yu Fund</td>
<td>26 August 2003</td>
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<td>25</td>
<td>050004</td>
<td>Bo Shi Selection Stock Fund</td>
<td>22 June 2004</td>
<td>6.10E+09</td>
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<td>26</td>
<td>161604</td>
<td>Rong Tong 100 Fund</td>
<td>30 September 2003</td>
<td>4.78E+08</td>
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<tr>
<td>27</td>
<td>161606</td>
<td>Rong Tong Industrial Prosperity Fund</td>
<td>29 April 2004</td>
<td>2.55E+09</td>
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<tr>
<td>28</td>
<td>200002</td>
<td>Great Wall Jiutai Index Fund</td>
<td>21 May 2004</td>
<td>1.51E+09</td>
</tr>
<tr>
<td>29</td>
<td>090001</td>
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<td>30</td>
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<td>Da Cheng Blue Chips Prudent Fund</td>
<td>3 June 2004</td>
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<tr>
<td>31</td>
<td>202001</td>
<td>Csfmc Prudent Growth Fund</td>
<td>28 September 2001</td>
<td>3.49E+09</td>
</tr>
<tr>
<td>32</td>
<td>270001</td>
<td>Gf Jufu Fund</td>
<td>3 December 2003</td>
<td>3.13E+09</td>
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<tr>
<td>33</td>
<td>510081</td>
<td>Chang Sheng Dynamic Select Fund</td>
<td>21 May 2004</td>
<td>4.11E+09</td>
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<td>3.17E+08</td>
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<td>Everbright Pramerica Quantified Core Fund</td>
<td>27 August 2004</td>
<td>2.54E+09</td>
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<td>180003</td>
<td>Yinhua-Dow Jones China 88 Select Equity Fund</td>
<td>11 August 2004</td>
<td>1.09E+09</td>
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<td>37</td>
<td>290002</td>
<td>First-Trust Leading Strategy Fund</td>
<td>28 June 2004</td>
<td>7.49E+08</td>
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*Note: Initial sample*