

# INTI INTERNATIONAL UNIVERSITY

## MASTER OF BUSINESS ADMINISTRATION

### EMPIRICAL STUDY OF CAPITAL ASSETS PRICING MODEL IN CHINA MARKET

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**Submission Date** : 27<sup>th</sup> August 2014  
**Ethics Number** : NONE  
**Final Word Count** : 13756



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# ABSTRACT

The capital asset pricing model appeared in 1970s, it is one of the most important basic theory of modern finance. It is mainly discussed in the securities market risk assets correlations between expected returns and describe the equilibrium state of market risk and asset pricing model in Chinese market, a lot of the empirical results show that does not work, it is often difficult to explain the phenomenon. And domestic scholars in the analysis of data is not the same, the analysis period is different, it leads to their conclusions are diverse from each other. The objective of this paper is to examine whether the capital assets pricing model is efficient to explain the relationship between risk and expected return in China market; to examine whether the capital assets pricing model is more efficient to explain the relationship between risk and expected return in China market than before.

This thesis is divided into five chapters. The first chapter is about the research background, research question objective and hypotheses, significant of the study. The second chapter is about literature review on the past research on capital assets pricing model. The third chapter will discuss the research methodology of this study. The fourth chapter is about the data analysis and finding. The last will include the conclusion and recommendation.

The empirical result suggest that the capital assets pricing model is inefficient to explain the relationship between risk and expect return in China market now, but it is more efficient than before.

Keywords: Capital Assets Pricing Model (CAPM), Expected return, Beta coefficient, Systemic risk

# ACKNOWLEDGEMENT

First at all, I would like to show my deepest gratitude to Mr. Chen Yin Foo, a respective, responsible and resourceful lecturer, who has provided me with valuable guidance in writing my dissertation. I appreciate much for his precious time in reviewing my work and adding valuable suggestions to my thesis. Without his enlightening instruction, impressive kindness and patience, I could not complete this work. His keen and vigorous academic observation enlightens me not only in this paper but also in my future study. He inspires me greatly to work and his willingness to motivate me contributed tremendously to my dissertation.

Besides, I would like to thank INTI University to give us this opportunity to demonstrate our ability to carry out a significant piece of independent study to achieve a Master degree successfully. And I am also very thankful to my friends for their assistances in advising me some good points. Thanks all the participants in this project for their supports and encouragement.

Last but not least, I would also like to thank my father and mother for their understandings and supports on me in fulfilling this project. They make me feel that I am not loneliness and they will stand by me. Without the help of particular that mentioned above, I would face large of difficulties and problems. Thanks all again and best wishes to all of them.

## DECLARATION

The work presented in this thesis is the fruition of mu own work and effort, never has this work been submitted for any other award but for the partial fulfillment of my MBA studies at INTI International University, Malaysia.

Any information used within this study from other sources has been acknowledged to their respective authors.

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# LIST OF ABBREVIATIONS

<b>CAPM</b>	<b>Capital Assets Pricing Model</b>
<b>SSE</b>	Shanghai Stock Exchange
<b>NYSE</b>	New York Stock Exchange
<b>BJS test</b>	Black-Jensen-Scholes test
<b>FM test</b>	Fama-MacBeth test
<b>NYSE</b>	New York Stock Exchange



# CHAPTER 1

## INTRODUCTION

### 1.1 Research background

#### 1.1.1 Basic logic of CAPM

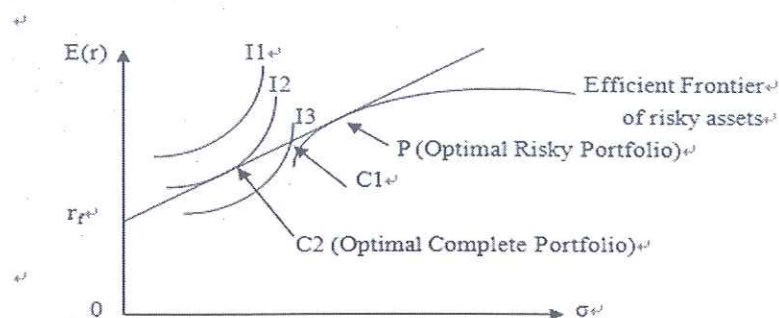
The Capital Asset Pricing Model (CAPM) is one of the most important backbones in the modern asset pricing theory of the financial market. It gives a standard explanation of the relationship of expected return and risk of individual asset and portfolio. The beta coefficient of the CAPM is recognized as a measurement of the risk in individual asset or portfolios (Sahota, 2012). Early the CAPM was issued by Sharpe (1964), Lintner (1965) and Mossin (1966), which was based on the Modern Portfolio Theory developed by Markowitz. The main idea of the CAPM is that when the market is in equilibrium, the relationship between the expected return of a security (or portfolio) and risk-free rate plus market risk premium is linear, and the beta coefficient is a complete measure of the risk of different assets in the market (Dempsey, 2013).

In 1952, Markowitz issued the mean-variance theory, which was the foundation of the CAPM. "It assumes that there is a portfolio which gives both maximum expected return and minimum variance and it commend this portfolio to the investor." (Markowitz, 1952) It suggested that an investor will choose portfolios with maximum expected return by given variance; and he will select portfolios with minimum variance by given expected return. Under this theory, there will be an efficient frontier among individual assets in a market, which includes all efficient portfolios.

Introducing a risk-free asset, in 1958 Tobin noted the separation theorem to divide portfolios selecting into two stages: asset allocation and capital allocation. Asset allocation chooses weight of each risky asset, and capital allocation

selects weight of risky assets portfolios and risk-free asset. (Tobin, 1958) Using a capital allocation line (CAL) started from risk-free rate and cut efficient frontier of risky assets on tangency P, then P is the optimal risky portfolio with best asset allocation. With indifference curves cutting the CAL, the optimal complete portfolio C2 is found, which has best capital allocation. (Graph 1.1)

Graph 1.1



Source form: (Tobin, 1958)

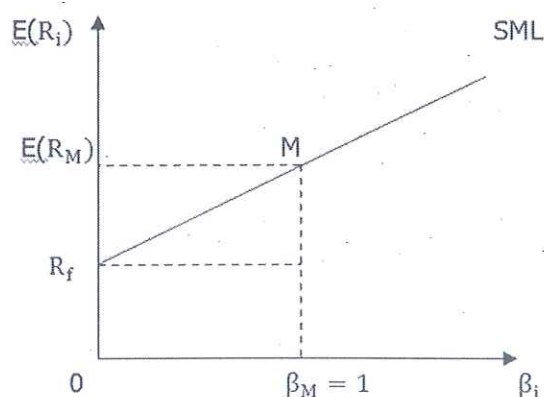
There are some assumptions of the CAPM have been noted early in Markowitz' theory and model: many investors in a market and each one is small relative to market then they act as price-takers; all investors plan for one identical holding period; investors pay no taxes and transaction costs; investors are risk-averse and mean-variance optimizers. Later, Sharpe, Mossin and Lintner introduced two more assumptions: First, investors can risk-free borrowing and lending to arrange their assets, which was matched Tobin's separation theorem. "Any investor may, if he wishes, borrow funds to invest in risk assets." (Lintner, 1965) Second, investors hold homogenous expectation. "Investors are assumed to agree on the prospects of various investments" (Sharpe, 1964) From Markowitz and Tobin's theory, it is known that diversification can help to avoid nonsystematic risk and expected return is linear with risk. Then under above assumptions all investors will hold a market portfolio, which is concerned with all individual assets and totally diversified. Finally, the expected return was noted just be linear with risk-free rate and systematic risk. "In effect, the market presents him with two prices: the price of time, or the pure interest rate and the price of risk, the additional expected return per unit of risk borne." (Sharpe, 1964)

The CAPM model issued by Sharpe, Mossin and Lintner can be expressed as following functions. (Function 1.1 and 1.2)  $E(r_i)$  is the expected return of asset  $i$ ,  $E(r_M)$  is the expected return of the market portfolios,  $r_f$  is risk-free rate and  $\beta_i$  is the beta coefficient of asset  $i$ .  $\beta_i$  is the covariance of return of asset  $i$  with market return divided by the variance of the market return. "A common interpretation of beta is that it measures the sensitivity of the asset's return to variance in the market return." (Fama & French, 2004) Using a graph to describe the CAPM as below, a Security Market Line (SML) is got, which is started from risk-free rate and across the market portfolio (Point M). The SML shows some main implications of the CAPM: the expected return of an asset and risk-free rate plus market risk premium ( $E(r_M) - r_f$ ) is linear; an asset's expected return is in proportion to the beta positively; and the beta is the only explanation to measure an asset's return and pricing associated with the market.(Graph 1.2)

$$E(r_i) = r_f + \beta(E(r_M) - r_f) \quad (\text{Function 1.1})$$

$$\beta_i = \frac{\text{cov}(r_i, r_M)}{\sigma_M^2} \quad (\text{Function 1.2})$$

graph 1.2



Source from : (Fama & French, 2004)

### 1.1.1 Shanghai Stock exchange

In November 1990, the Shanghai Stock Exchange was founded and it started to offer service on December 1990. The China Securities Regulatory Commission (CSRC) directly governs the Shanghai Stock exchange. The mission of Shanghai Stock Exchange is to create an open, efficient, transparent and safe marketplace, which is based on the principle of "legislation, supervision, self-regulation and standardization". In the past 30 years, Shanghai Stock Exchange has done lots of contribution to China's economic by realizing a variety of functions. It provides facilities and marketplace for the securities trading as well as monitoring and organizing process of securities trading. (Shanghai Stock Exchange, 2014)

After 30 years' development, the Shanghai Stock Exchange has become the most representative stock market in China based on the number of shares listed, tradable market value, total market value, number of listed companies, securities turnover and others. As at the end of 2012, there were 954 listed companies on SSE, with 26 new listings in 2012. By the end of the year, there were 998 listed stocks on SSE with a total market capitalization of RMB 15,869.844 billion, decreasing by 6.96% year-on-year, and free-float market capitalization of RMB 13,429.445 billion, up 9.31% from the previous year. The year-end total share capital of all the listed companies reached 2,461.76 billion shares, of which 1,952.13 billion shares or 79.30% were tradable. A large number of companies from key industries, infrastructure and high-tech sectors have not only raised capital, but also improved their operation mechanism through listing on Shanghai stock market (Shanghai Stock Exchange, 2014). However, the Shanghai Stock Exchange is new compared with other stock markets of developed countries. It is still immature in some areas. (Gu, et al., 2013)

## 1.2 Problem statement

According to the research by Wu Yingling on the efficiency of CAPM in Shanghai Stock Exchange, the result shows that CAPM failed to explain the relationship between risk and return in China market. The report also points out the immaturity of China market that cannot meet the assumptions of CAPM is the main factor that caused this result (Wu, 2005). Other research done by Cai Sheng got the same conclusion with Wu. According to Chen and Lu, there were some factors that resulted in the weak efficiency of CAPM in China market, including the inefficiency of China market, asymmetry information, low circulation rate of stock, and immature investors. (Chen & Lu, 2006)

In 2005, the management introduced the Full Circulation Reform for Listed Company, which was a great improvement of China stock market structure (Liao & Liu, 2014). Also as the rapid development of Chinese economic, the capitalization of Shanghai Stock Exchange has increased ten times from 286.2 billion USD in 2005 to 2500 billion USD in 2013. At the end of 2012, the stock circulation rate of Shanghai Stock Exchange was about 80%. (Shanghai Stock Exchange, 2014) The investors and the Chinese stock market have also become more mature and efficient in the past ten years.

On the other hand, the CAPM is one of the important chapters on the (Beijing Financial Education Co., Ltd, 2010), which is the test book of Associate Financial Planner in China. It means that the CAPM is suggested as an important financial tool in China.

Above all, the condition of China Financial market has great improvement and change in the past ten years. So it believes that the past research of CAPM in China financial market cannot present the condition now. The efficiency of CAPM to explain the relationship between risk and expected return in China market is uncertain. As the CAPM is an important tool in financial market, the efficiency of CAPM to explain the relationship between risk and expected return in China market now should be tested.

### 1.3 Research question, objective and hypotheses

The first research question is that whether the CAPM is efficiency in China market. The main idea of the CAPM is that when the market is in equilibrium, the relationship between the expected return of a security (or portfolio) and risk-free rate plus market risk premium is linear, and the beta coefficient is a complete measure of the risk of different assets in the market. So the question also can be translate as to know that the relationship between the beta and expected return. The second research question is that whether the CAPM is more efficiency in China market than before. Above of all, there are three research questions in this study:

1. Whether the CAPM is efficient to explain the relationship between risk and expected return in China market?
2. Whether the CAPM is more efficient to explain the relationship between risk and expected return in China market than before?

The main purpose of this research is to study to efficiency of CAPM in China market. The specific objectives are:

1. To examine whether the CAPM is efficient to explain the relationship between risk and expected return in China market.
2. To examine whether CAPM is more efficient to explain the relationship between risk and expected return in China market than before.

There are two hypotheses in this study:

H<sub>10</sub>: The CAPM is efficient to explain the relationship between risk and expected return in China market.

H<sub>11</sub>: The CAPM is not efficient to explain the relationship between risk and expected return in China market.

H<sub>20</sub>: CAPM is more efficient to explain the relationship between risk and expected return in China market than before.

H<sub>21</sub>: CAPM is not more efficient to explain the relationship between risk and expected return in China market than before.

## 1.4 Significant of the study

The main aim of this research is test the efficiency of CAPM in China market. It believes that the outcome of this study will be beneficial for the academia, investors and the government.

Firstly, the outcomes of this research will benefit the academia on knowing the condition of CAPM in China market now. It will benefit academia for the further research.

Secondly, as the capitalization of China stock market are continued increased, the investors of China market need to know the efficiency of CAPM theory to help them in investment. The outcome of this research would give them this knowledge.

Last, as the past research shows that one of the main reasons that the CAPM is inefficient in China market is that the China market is young and immature which means that China market is inefficient. So the result of this study can help administration to better understanding the condition of China market now. The government would able to set up better policies to regulate the stock market.

## 1.5 Scope of the study

As this research is to study the condition of using CAPM in China Market, the sample will focus on the stock of Shanghai Stock Exchange, which is local in Shanghai City, China. The research methodology will be on a quantitative way. The main methodology is analyzing expected value and significance of estimated parameters in time series test, which is on basis of the Black-Jensen-Schole test and the FM test. The main analysis in this paper is regression analysis. The Statas software will be used to do the data analysis.