

Министерство образования и науки РФ
Федеральное государственное бюджетное образовательное учреждение высшего
профессионального образования
«Южно-Уральский государственный университет»
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Применение модели ценообразования опционов Блэка-Шоулза для анализа
фондовых ценных бумаг

**ПОЯСНИТЕЛЬНАЯ ЗАПИСКА
К ВЫПУСКНОЙ КВАЛИФИКАЦИОННОЙ РАБОТЕ
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НА ВЫПУСКНУЮ КВАЛИФИКАЦИОННУЮ РАБОТУ СТУДЕНТА**

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Группа ЭТТ - 284.

1. Тема работы Применение модели ценообразования
аутлетов Блэка-Шоулза для анонимной франчайзинговой компании
Султон

утверждена приказом по университету от « 15 » 04 2016 г. № 661

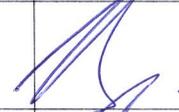
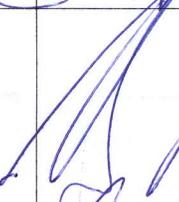
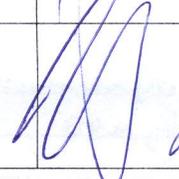
Срок сдачи студентом законченной работы « 31 » 05 2016 г.

2. Исходные данные к работе анонимные данные компании,
составленные записки франчайзера Султон, визуальный
составитель франшизы

3. Перечень вопросов, подлежащих разработке Исследовать модель
прогнозирование цен франчайзера Султон. Рассмотреть
оследрности применения модели Блэка-Шоулза. Рассмотреть
применение модели Блэка-Шоулза на примере франчайзера Султон
компания "Vanke"

4. Перечень приложений, схем, плакатов Составление исследования
цены франчайзера и исследования.

5. Календарный график:

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4	Оформление, доработка выпускной квалификационной работы,	Цыган И.М., к.э.н., доцент	15.05.16-30.05.16		
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АННОТАЦИЯ

Е Чангуй. Применение модели ценообразования опционов Блэка-Шоулза для анализа фондовых ценных бумаг. – Челябинск: ЮУрГУ, 2016. – 105 стр., библиографический список – 31 наименование, приложения – 8 стр.

Внутренняя стоимость акций составляет основу капитализации компании, таким образом, способы определения внутренней стоимости акций являются актуальными на рынках ценных бумаг. Традиционная модель определения цены акции обладает множеством недостатков и, как следствие, возникает значительная разница с фактической ценой акции. Данное исследование предполагает изучение внутренней цены акции через соотношение финансовых деривативов (опционов) и акций. В данном исследовании рассматриваются данные торговых площадок по акциям 130 Шанхайских компаний, проводится анализ ошибок относительно вычислений по рассматриваемым моделям и, в конечном итоге, приводится регрессионное прогнозирование относительно предположения о том, что модель ценообразования опционов может применяться с целью определения цены акции.

Объектом исследования является компания China Vanke Co., Ltd.

Предметом – стоимость компании Vanke, а также анализ модели Блэка-Шоулза.

Данное исследование представляет собой эффективный метод определения цены акции и оценки финансового состояния компании.

Abstract:

The intrinsic value of stock is the core of the company value. Therefore, how to estimate the intrinsic value of the stock has become an important subject of the securities market. There are many problems in the traditional stock valuation model, and the results of the model have a huge deviation with the actual stock price. This research studies the intrinsic value of stocks through the relationship between financial derivatives (option) and stocks. This research obtains the 130 enterprises' stock information of Shanghai A share through the quantitative trading platform, conducts the error analysis with the results calculated by models, and finally makes the regression prediction that the option pricing model can be a method of stock valuation.

Абстрактные:

Внутренняя стоимость акций является ядром стоимости компании. Поэтому, как оценить внутреннюю стоимость акций стала важным субъектом рынка ценных бумаг. Есть много проблем в традиционной модели оценки запасов, и результаты модели имеют огромное отклонение с фактической цены акций. Эта статья изучает внутреннюю стоимость акций через соотношение между производными финансовыми инструментами (опция) и запасов. Эта статья получает биржевую информацию 130 предприятий Шанхая Доля через количественной торговой платформы, проводит анализ ошибок с результатами расчетов по моделям, и, наконец, делает предсказание регрессии, что модель ценообразования вариант может быть метод оценки запасов.

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INTRODUCTION

Financial derivative security is one of the main research objects finance. Based on the traditional financial instruments, the financial derivative instruments come into being in financial market, which meet the investors' requirement of risk avoidance. In recent decades, the financial derivative market has become an important economic phenomenon. The intrinsic value of stock is the core of the company value. Therefore, how to estimate the intrinsic value of the stock has become an important subject of the securities market. There are many problems in the traditional stock valuation model, and the results of the model have a huge deviation with the actual stock price. This paper studies the intrinsic value of stocks through the relationship between financial derivatives (option) and stocks.

The option is a kind of option holders through pay a certain cost and have a on the expiry date or before the expiration date according to the specific circumstances to make specific choices. The essence of the option gives the holder a right but not the obligation. In the early 1970s, Fischer Black, Myron Scholes, and Robert Merton achieved a major breakthrough in the pricing of stock options.¹ This involved the development of what has become known as the Black-Scholes (or Black-Scholes-Merton) model. The model has had a huge influence on the way that trader's price and hedge options. It has also been pivotal to the growth and success of financial engineering in the last 30 years. In 1997, the importance of the model was recognized when Robert Merton and Myron Scholes were awarded the Nobel prize for

economics. Sadly, Fischer Black died in 1995; otherwise he too would undoubtedly have been one of the recipients of this prize.

This paper will base on the B-S model estimate the stock price of Vanke Company. China Vanke Co., Ltd. has become a leading real-estate company in China since it stepped into the housing market over thirty years ago in 1988, with its main business being real-estate development and property service. Adopting the strategy of focusing on city clusters, Vanke has established its presence in 65 cities in mainland China by the end of 2014, mainly in the Pearl River Delta centered on cities of Guangzhou and Shenzhen, the Yangtze River Delta centered on Shanghai, the Bohai Rim Region centered on Beijing, and the Chengdu Region which covers major cities in Midwest China. Since 2013, Vanke made its attempts to invest overseas. It has now been involved in six real-estate development projects in Hong Kong, Singapore, Los Angeles, and the New York City. Its sales volume in 2014 amounted to RMB215.13 billion for 18.064 million square meters, making it an industry leader globally in terms of sales performance. Vanke conducts its property service business mainly through Vanke Property Development Co., Ltd. (Vanke Property), which has the mission to provide first-class property service and building maintenance consistently. By the end of 2014, Vanke Property had 457 property service projects in 61 large- and medium-sized cities in mainland China, covering a contractual property management area of 100 million square meters.

Finally, it will compare the estimate price by the B-S model with the actual price. Then we can use the liner regression to test the results.

The option pricing theory and corporate value assessment methods combined, specifically, the use of BS model for corporate equity value assessment and the stock price made beneficial exploration, to promote the utility of BS model.

1 INTRODUCE THE STOCK MARKET AND THE STOCK PRICE

1.1The function of trading market

The existence and development of the stock market has created a favorable financing environment for the stock issuer. According to investment plans and market changes, the investors can buy and sell shares at any time. Due to the elimination of investor's worries, they can participate in the subscription activities in the stock issuing market, which is favorable for companies to raise the long-term fund. The sound circulation of stock plays an active role in stock issuing. For investors, they can turn long-term investment into short-term investment by the stock market activity. The instantaneous change between stock and money, which enhance the stock's liquidity and security. The price of stock market is a barometer of the economic trends, which can reflect the capital supply and demand, market supply and demand, industry prospects and the political situation changes. Also is an important indicator for forecasting and analysis. For enterprises, the transfer of equity and the fluctuation of stock market is the indicator of their operating status, but also provide a lot of information for enterprises to provide timely help to their management decisions and improve business management. Visible, stock market has an important role. [1]

1.1.1The way of stock trading

The way of stock trading is transaction of stock, it's the basic link of circulation stock. There are many types of trading transactions in the modern stock market, which can be divided into the following three categories from different perspectives.

1) Bargaining and auction

From the buyers and sellers to determine the price of a different way, divided into bargain sale and auction sale. Bargaining is the buyer and seller face to face talk, through the bargain to reach the equilibrium price. It is a common way of OTC transactions. Generally it adopt in the situation that stock can't exchanging, the transaction volume is less, keep secret or in order to save Commission. Auction sale refers to both the seller and the buyer is composed of several groups, both public competition double transaction, namely the transaction not only between the seller and the buyer have bid and ask price competition, and in the interior of the buyers and sellers populations also exist in the fierce competition, finally in the buyer's offer to the highest bidder and seller price lowest between transactions. In this competition, the buyer can freely choose the seller, the seller also can freely choose the buyer, so that the transaction is fair, the price is relatively reasonable. Auction sale is the main way of trading stocks in the stock exchange.

2) Direct and indirect Trading

According to the way of a transaction, the transaction is divided into direct and indirect trading. Direct trading is a direct negotiation between buyers and sellers, the stock delivered by the seller and the buyer; in the entire transaction process does not involve any intermediary transactions. The majority of OTC transactions are direct transactions. Indirect trading is not directly meet between the seller and the buyer. It's the agency to carry out the trading of the stock trading. Broker system in the stock exchange is a typical indirect trade.

3) Spot trading and Futures Trading

According to the delivery date is different, is divided into spot trading and futures trading. Spot trading refers to the stock transaction, immediately apply for settlement procedures, two money goods on the spot, futures trading is a stock transaction according to the amount stipulated in the contract price, then, after some period of settlement transactions.

1.1.2 The composition of circulation market

1. Stock market

Elements of the market circulation are: 1. stock holders, in this case the seller; 2. investor, then the buyer; 3. for shares in circulation, facilitate the transfer of credit intermediary operating mechanism, such as securities companies or stock exchange (used to call it as a stock exchange).

Exchange market is the most important component of the circulation of the stock market, is a member of the exchange and securities dealers or brokers in the securities market selling stock listing place, is the main body of the secondary market. In particular, it has a fixed exchange and a fixed trading time. Accept and handle the relevant laws and regulations of the stock market, so that the original stock holders and investors have the opportunity to free trade, transaction, settlement and delivery through brokers in the market. Securities company is the secondary market of financial intermediaries. Its most important function is for investors to buy and sell securities and provide for customers to save securities, to provide customer margin financing, stock investment information and other business services. [2]

2. Over the Counter market(OTC) as well as called market for unlisted Securities. It is a sophisticated stock exchange market system combined with the exchange market. The OTC market, in fact, consists of tens of millions of Securities Company. In the OTC market, each of the securities firm mostly also has dual identity of brokers and dealers, at any time with the purchase and sale of securities investors through direct contact or by telephone, telegram, a deal quickly. As a trader, the securities trader has the function of creating the market. Securities dealers are often based on their own characteristics, select a few trading objects. As a broker dealer, a securities trader deals with a customer and a securities firm. Here, the securities dealer is only the customer's agent, he does not take any risks, only a small amount of compensation as compensation.

[3]

In the stock market, due to the movements of the stock market depends on the capital. Strong financial strength of the institution will be able to a certain extent, and even manipulate the stock price rise. They can use their own financial strength, to take a variety of ways to create a false market and profits, which makes the stock market has a speculative side. But this does not represent all of the stock market, can not reflect the essence of the stock market.

1.1.3 The factors affecting stock prices

Many factors affect the stock price, but basically can be divided into the following three categories: internal factors, market fundamentals, policy factors.

1. The internal market factors it is mainly refers to the supply and demand of the market, namely the relative proportion of funds and the chip surface, as a stage in the stock market pace of expansion will become an important part of the factors. [4]

2. Fundamental factors, including macroeconomic factors and internal factors, macroeconomic factors is mainly to stock prices in the market impact of factors, including economic growth, economic cycle, interest rates, fiscal revenue and expenditure, money supply, prices, balance of payments, and so, the company internal factors mainly refers to the company's financial situation.

3. Policy factors is enough to affect the stock price changes of important activities at home and abroad, and government policies, measures, laws, and other major events, government's social and economic development plan, economic policy changes, the newly promulgated laws and regulations will affect the stock price changes[5]

An important economic factor affecting the stock price

Stock price refers to the sale of shares in the stock market price. In fact, the stock is a certificate, itself is not the price, it is the price, can be traded in the market, because it can bring to the holders of dividend income. The intrinsic value of the stock depends on the realization of the expected future earnings, the discount rate and the future life again. The enterprise future earnings more, the present value is bigger, the stock price is also higher, and the discount is higher, the intrinsic value of the stock is low, the stock price is low. So, in the stock market in the west, people are closely watching the future status of the enterprise profit. But in fact, stock prices determined is very complex,

because people's views on an enterprise future profitability is not all the same, the estimated more pessimistic, shares in their eyes the value of some lower, will sell; some believe that the hope for the development of enterprises, the stock in their eyes, value is high, will buy. When buyers than sellers, the price of the stock will rise; when buyers less than sellers, the price of the stock fell. So, the market price of the stock price and performance when internal more consistent, investors tend to look for those intrinsic value than market shares.

In this way, makes the price of stock market is constantly changing. It should not only be affected by the influence of various economic factors and the political situation and government policy, investor psychology, newspapers and magazines news and rumors and other social factors. The following mainly analyze the impact of stock price of the main economic factors[6]

1. Dividend

Investors buy the stock, because it can bring not less than the deposit interest dividends. The number of shares of the company shares, actual capital ownership does not depend on it, but depends on the amount of dividends paid. The higher the dividend, buy more enthusiastically, stock prices are higher. However, dividend increase depends on corporate earnings growth. If the number of companies issuing shares increased, while after the capital increase profits but for increased dividends will not be able to maintain the original level, must decrease, the stock price will fall. Some corporations in Europe and the United States, in order to continue the development of business, enterprise income growing, the company's net profit most or all leave, to expand the

capital accumulation for the production and management, issued only a small amount of dividends or payment of dividends and, countries in the tax system also positive set such volts. Because the enterprise's stock even not hair or less dividend, the stock for investors is still very attractive.

2. Financial capital and tax

The company often borrows money from the bank, with the increase in borrowing, Bank of enterprise control also gradually strengthened and made it quite right to speak. In the reduction of corporate income situation, although they hope to stabilize the dividend, but the bank for its own security, will support small businesses or stop paying dividends, thus affecting the stock price. Tax impact on investors large, investors buy shares in order to increase revenue, if the state of some profit seeking enterprise in tax give preferential, then can make these enterprises after tax profits relative increase, their stock appreciation.

3. Economic cycle

In a period of economic prosperity, corporate profits, high dividend, and stock soar; in times of economic crisis, shrinking production enterprises, decline in dividends, share price plunge; in the period of economic recession, share price gradually turn for the better; after entering the recovery period, prices began to rise. Therefore, the capitalist stock price movements are generally capitalism and adapt to the economic cycle.

4. Inflation

The society increases or decreases in the money supply are one of the reasons affecting the stock price. Usually, the money supply increases, a part of social idle funds

will to securities trading, so as to raise the stock price; on the contrary, a decrease in the money supply, social purchasing power is reduced, the stock will fall. By the money supply increasing caused by inflation, in a certain extent to produce a stimulating effect, because it can promote the increase of nominal enterprise sales revenue and stock investment return, so under the condition of bank interest rates not with the price in the same proportion rising, people in order to protect the value, will no longer eager to deposit, and turned to invest in stocks, shares to raise price again. However, if inflation rises too fast, even more than two digits, so will cause lack of people falling real income and market demand, aggravate overproduction, lead to the economic crisis, and the decline in stock price.

5. The discount rate and interest rate

The discount is a form of bank lending, is closely related to the discount rate and deposit interest rate. The deposit rate is high, the discount rate is also higher. Because the price of stock and enterprise future expected earnings is proportional, and the discount rate (interest rate) is inversely proportional to, so the discount rate (or interest rate) increased, will lead to a decline in stock price. But western countries often in bank interest rates rise, the stock market is still alive or. The reason is that investors often in between the two choices: bank deposit risk small, high interest rates, a stable income, but is not flexible, the fund was fixed in a period of time cannot divert him, and popular literature to offset inflation caused by the loss. While the stock can be traded, more flexible, the risk is great, but with good luck, can gain great benefit. So, in the case of

higher bank interest rate, there are still some adventurous investors keen on Stock Exchange

6. Science and technology invention

In the adjustment of industrial structure and the transfer period, the development of new products is becoming more and more important, the stock price will have a strong impact on their. New products from development to complete to fell during this period of time can be divided into three stages: "when, after the news, became the hot topic. At the same time, the stock price will rise, especially if someone means of speculation, easier to soaring. Has become the object of people to invest in, and this new invention to popularization, the need for a long time, then do not sell it, the price will go down. If the new method can improve the performance of the company and profit rate, the price will rise, if not the desired effect, decrease greatly.

Therefore, the stock traders will make full attention to the law, firmly grasp the initiative of stock price. The price of stock market continues to change, in the free competition in the stock market, the stock price has a very high sensitivity. The direct cause of stock price changes is the change of relationship between supply and demand. There are series of deeper reason behind the relationship between supply and demand. In addition to the operating conditions of the shares of the company itself and any political, economic, finance, trade, diplomacy, military, social changes will affect the stock market supply and demand and affect the stock price rise. In many factors that affect stock prices, some basic factors affect the stock market long-term development, some only affect the short-term price fluctuations of the temporary factors; the influence

of some factors on stock prices on a long and deep, some of which are directly and hot. Therefore, in the trend of stock price changes is to make specific analysis, comprehensive consideration, and timely focus.

1.2 The method of stock valuation

All kinds of speculation in the stock market will have a great negative effect on the development of the commodity economy, but it is not to be ignored that the speculation is an indispensable condition for the concentration of capital. We should recognize that, it is due to the speculation profits may, only to stimulate the some investors, the funds into the stock market, so as to promote the capital of a lot of concentration, the monetary fund into capital. [7]

Stock valuation theory and methods in the United States and other developed countries have been more mature and used in the value of the valuation practice. Specification of the market system and scope of the assessment, active trading market and rapid information dissemination is the perfection of the valuation of the industry development and asset valuation theory created a favorable external environment, provides a sufficient condition but also for the use of various valuation methods. In particular, the income approach has been absorbing the latest research results in the fields of Finance and finance, which has greatly broadened the horizon of enterprise value estimation, and has basically adapted to the needs of the new economic era. The company value concept originated in the century economist Alvin Fisher, he proposed to determine the capital value theory under the condition of. In the 20th century, Modigliani and Miller put forward the theory of enterprise value in the case of

uncertainty, that is, MM theorem. After decades of development, the modern enterprise value theory covers the equilibrium valuation theory, arbitrage theory and option theory, which have become the focus of the study of financial and management in foreign countries.

New York University professor Aswath - Damon Landry in the investment valuation, "a book system completely introduced to assess the value of the basic theory, method, model and its application, including discounted cash flow method, relative valuation method and option method. He believes that the value of assessing the assets and securities can be according to the fundamentals of financial, although there may be some errors, but for the vast majority of assets, from long-term look at the market price may not substantially deviate from the value of this assessment, and different valuation methods and model selection depends on the assessment of the company's characteristics to be: the source of company's level of income and growth potential, income growth, financial leverage stability and company's dividend policy. In a word, after 100 years of development, the modern enterprise value theory has been continuously enriched and improved, has gradually formed a relatively mature system. In the valuation of the level of theoretical research, and laid a solid foundation for the research and practice of foreign modern valuation theory system. Stock valuation theory origin in enterprise valuation theory, and enterprise value theory origin in at the beginning of the 20th century Alvin - Fisher Irving Fisher's capital value theory. In 1906, Fisher in the "nature of capital and income" for the first time is proposed and a more detailed exposition of the relationship between capital and income, and put forward the

value of the assets size depends on the cash flow in the future, lay the foundation for the modern theory of enterprise valuation. On the basis of, 1958, Miller (Miller and Modigliani (Modigliani): the the cost of capital, corporate finance and investment theory,, has conducted the thorough research on the correlation between the investment decision, financing decision and enterprise value, the system for the first time the uncertainty into the enterprise value assessment theory system, scientific proposed the definition of enterprise value and enterprise[8]

The value assessment method, determine the enterprise value maximization as the capital budgeting decision criteria, marking the establishment of the modern enterprise value assessment theory. In 1961, Miller and Modigliani in the business magazine "the" dividend policy, growth and stock prices, "the article, nature and impact on dividend policy has carried on the system analysis, and in the follow-up study, created the famous MM theory. In 1973, black and Scholes (Scholes and Merton (Merton) creatively established the B-S Option Pricing Model, this model is known as the many financial products pricing provides a new quantitative method. In 1977, Meyers (Myers) inspired by the B-S option pricing model, first financial option theory for real assets pricing, and puts forward the concept of real options. In 1982, the U. S. sterns company present value concept of economic growth, its core idea is only at greater than the benefits of the capital to gain access to the invested capital cost to to the shareholders of the enterprise to create value, EVA thought the biggest characteristic is will review the enterprise's cost of equity, and the correction of financial statements draws the reasonable evaluation conclusion, the evaluation values is reasonable. Through years of

management experience, created the value assessment, "a book, the book detailed illustrates the business managers are facing the main task is to shareholder value management, and puts forward the value evaluation based on the premise. Stanford University professor at Cornell in summary based on practical experience of the company to complete the creation of the "corporate value assessment" a book, the book in detail introduces four kinds of evaluation methods, that is, to adjust the book value method, stocks and bonds, direct comparison method and discounted cash flow method, also described the value assessment theories, principles and calculation tools, which realizes the combination of theory and practice.

1.2.1 The absolute value method

In many of the stock valuation model, the most classic is that cash dividend discount model proposed by Williams at the end of the 1930s. The model shows that the intrinsic value of the stock is the present value of the company issued a dividend discount. The future dividend discount model as follow:

$$V = \frac{d_1}{(1+r)} + \frac{d_2}{(1+r)^2} + \sum_{i=1}^n \frac{d_i}{(1+r)^i} \quad (1)$$

V: The intrinsic value

d_i : The expected dividend per share of i year

r: The discount rate

1. Zero dividend growth model

Zero dividend growth model is the assumption that each fixed dividend payment, and sustainable down, the model formula is as follows:

$$V = \frac{d_1}{r} \quad (2)$$

V: The intrinsic value

d_i : The expected dividend per share of i year

r: The discount rate

2. The fixed dividend growth model

Assume that dividends will grow at a fixed growth rate, fixed growth rate of G , the simplified formula:

$$V = \frac{d_1}{r-g} \quad (3)$$

V: The intrinsic value

d_i : The expected dividend per share of i year

r: The discount rate

g: Dividend growth rate

This model assumes the dividend growth rate is always lower than the expected rate of return of investors.

3. The two stage dividend growth model

The two stage dividend growth model is also applicable to the short-term stock and future stock valuations for sale. In this case, not only want to invest in the stock dividend income, also want to sell the stock in the future, to benefit from the stock price

rise. Therefore the price of the stock =held during the present value of dividend value+ end of stock price. This is the stock valuation model:

$$V = \sum_{t=1}^n \frac{d_t}{(1+r)^t} + \frac{P_n}{(1+r)^n} \quad (4)$$

V: The intrinsic value

d_i : The expected dividend per share of i year

r: The discount rate

P_n : The end of stock price

1.2.2 Free cash flow discount model

Due to the dividend discount model to the company issued as the discount factor, and can not very good reaction the financial status of the company, Murray, Copeland and 90s of the 20th century on the basis of the dividend discount model proposed to the average cost of capital WACC as the discount factor for and obtains the present value, the total present value minus the value of the bonds that equity value divided by the number of shares to get the value of a share of stock. This is the free cash flow discount model. The free cash flow (FCFF) = net operating profit after tax and capital expenditure a working capital expenditure = EBIT + depreciation of capital expenditure a working capital expenditure. The formula is

$$V = \sum_{t=1}^{\infty} \frac{FCFF_t}{(1+WACC)^t} \quad (5)$$

V: The intrinsic value

WACC: Weighted Average Cost of Capital

1.2.3 The relative valuation method

Compared with the dividend discount model absolute valuation method of complex valuation, the relative valuation method to earnings valuation method is relatively easy to grasp. Price earnings ratio that share price relative to earnings multiples, the level of earnings that investors on the profitability of listed companies' willingness to pay, also in a certain extent that investors on the stock market expected. In the same earnings per share, the higher price earnings ratio of the stock market is expected to better, while the stock price is higher. Therefore, investors can estimate the stock price earnings ratio according to the data, it is very easy to obtain and the earnings data, can be obtained by the institution or securities industry bulletin. Investors need to publish earnings and the listing Corporation report according to the collected in earnings per share of stock value can be obtained. Because in the market under the premise of effective, comparable to the fair value of the assets will be equal to or more close to its intrinsic value, true value will also more effective responses to estimated assets. But even when the market is not completely effective, the assessment of the results can also represent the stock in the market conditions of fair value at that time. When using the relative valuation method, the most important link is selecting than assets and ratio index, can generally choose the index p / E rate, city net rate, net assets yield and city pin rate etc., according to the need in this thesis, we only introduce city net rate method and P / E ratio of relevant content.

[9]

1. Price to book ratio value method

Price/Book value also known as the book value ratio, stock price per share and net assets per share ratio. The formula can be expressed as:

$$PB = \frac{P}{B} \quad (6)$$

PB: Price/Book value

P: Per stock price

B: Book value

The book value of net assets per share represents the stock market price per share, and is the current value of the stock, is a joint result of securities market supply and demand. An asset's market value can reflect the size of its profitability and cash flow in the future; and the book value of an asset is manifestation of the initial cost, when the profit ability of the assets in a degree of change, asset market value and book value have difference. When the share market value is higher than the net assets per share, indicating that investors in the market value of the assets and business ability is more optimistic. The PB rate of investment analysis, it is generally thought that the market value of listed companies is not high and the net asset value per share higher stock, said the listed company has a higher investment value, investment risk is low; on the contrary it means the stock investment value is low, with high investment risk.

The general situation of similar companies was by the company than the average net rate that the formula is:

$$P = APB \times B \quad (7)$$

P: Per stock price

APB: Average Price to book ratio

B: Book value

The PB valuation, the first to choose suitable comparable companies, generally choose the same industry or similar asset size and capital structure of the company. Secondly, with the PB ratio and PE ratio, is a dynamic variable, it must first determine an accounting report, and then find out the net assets per share and the average stock price of each period. Specific practices:

1. Choose similar stock $S_1, S_2, S_3, \dots, S_n$
2. To determine the average price of the same accounting reporting period of different stocks $P_1, P_2, P_3, \dots, P_n$
3. The same period of different stocks of the company's net assets per share $B_1, B_2, B_3, \dots, B_n$
4. Calculate the PB ratio $PB=P/B$
5. Calculate the Average Price to book ratio $APB= \frac{\sum PB}{N}$.
6. Get the stock price from the equation.

2. Price earnings ratio method.

The price earnings ratio (PE) is an important index to reflect the stock returns and risk a, also called the ratio. It represents the ratio of the price per share and earnings per share.

$$PE=\frac{P}{E} \quad (8)$$

PE: Price earnings.

P: Per price.

E: Per earning.

At present the company earnings ratio is used to determine the index of the stock price is reasonable or not is the most widely used. If the stock price earnings ratio is high, indicating that the stock price relative to earnings per share is relatively high, stock investment recovery period is long, the risk is relatively high; on the contrary, price earnings ratio is low, indicating that stock investment recovery period is short, investment risk is relatively low. While the level of earnings is not specified, is generally believed that 14-20 is the best range. In addition, talk about general price earnings ratio of the static price earnings ratio, but the static price earnings ratio only static considering the company's earnings per share, not dynamically considering the company's growth, it also has a dynamic price earnings ratio. But when the company was in running condition, it is difficult for the growth of quantitative analysis, so we only use static price earnings ratio valuation of Target Corp, and its valuation steps city net rate method for the same.

1.2.4 The option pricing model.

In 1973, F Black and M Scholes published and proposed the option pricing model. They recognized that the risk of the option is actually reflected in the price of the underlying object, and the price of the subject also reflects the market expectations. Therefore, it is also the starting point of the option pricing theory. The option pricing model is the core and basis of the option pricing [4]. It uses the analytical method as the option pricing, but it can only give the European option pricing.

The Black-Scholes model (B-S model) has the following assumptions:

1. Short term risk-free interest rate is a constant, and investors can freely borrow it without risk interest rate.

2. Stock price movements are continuous and follow the geometry of the Brown movement:

$$dS = mSdt + sSdz \quad (9)$$

3. The underlying stock does not pay dividends

4. No transaction costs

5. Stock is unlimited.

6. Allow short selling

7. European option

Under these assumptions, the partial differential equation of option pricing is derived by constructing the non-risk combination of the option and the underlying stock:

$$\frac{\partial f}{\partial t} + rS \frac{\partial f}{\partial S} + \frac{1}{2} \sigma^2 S^2 \frac{\partial^2 f}{\partial S^2} = rf \quad (10)$$

And then the analytical solution of the option value is obtained by solving the differential equation with boundary conditions

$$c = SN(d_1) - Xe^{-r(T-t)}N(d_2) \quad (11)$$

$$d_1 = \frac{\ln(S/X) + (r + \sigma^2/2)(T - t)}{\sigma\sqrt{T - t}} \quad (12)$$

$$d_2 = \frac{\ln(S/X) + (r + \sigma^2/2)(T - t)}{\sigma\sqrt{T - t}} = d_1 - \sigma\sqrt{T - t} \quad (13)$$

1.3 Introduce the option pricing model

The option is a kind of option holders through pay a certain cost and have a on the expiry date or before the expiration date according to the specific circumstances to make specific choices. Is the essence of the option gives the holder a right but not the obligation. Thought sprouted in the option at least back to 1800 BC, the code of Hammurabi, and options trading in 1200 BC in ancient Greece and ancient row Nicky country trade has appeared. Aristotle tells such a story: a great wisdom of philosophers Thales in the first half of the olive harvest, little money and some have olive press of the boss to do the transaction, he to interest rates for the ordinary buy leased the rights of the press. When olive record harvest comes, growers to press the surge in demand, he is at a higher than market rate prices will press to rent to growers, and he to press the owners only pay the original contract price of money, Thales from obtain the spread of money. In the story, Thales buy leased the right to press, but is not the responsibility and obligations (he bought a right to buy, buy or lease the right to, corresponding is sold in, that is, the sale of rights. If the olive harvest is very poor, he lost was originally very small investment, at the cost of rights. This is an ancient and typical example of real options. But after the rapid development of the option to 50 years of this century began, the real option trading floor standard is less than 30 years of history. There are two types of options. One is the call, or call option, refers to the holder at a specified time to determine the price of buying assets (such as stocks, interest rates and other rights). Another is to sell options or options, refers to the holder at a specified time to determine the price of the right to sell assets. The option is called a derivative security, which is

composed of "native stock assets" or "asset" derivative. The option can protect the investors in the price to the negative direction changes from excessive loss, and can keep the price change to the favorable direction can be obtained when the interests of investors. It is also because of the characteristics of the option, making its valuation and pricing becomes very difficult and complex: the relationship between the price of an option and the underlying price performance for nonlinear characteristics, and before the expiry of the option also has a time value. In early twentieth Century a general theory of many scholars are committed to establish a reasonable valuation of the option pricing. The earliest of the French mathematician Luoisba Chelier in 1900 doctoral thesis "speculation" mathematical theory, mathematical theory of Brownian motion determined the volatility of the stock price, first proposed the method to calculate the option price equilibrium theory, and gives the call option price formula, the formula only in two dimensions slightly defective: one is the absolute application of Brownian motion allows the stock price is negative; on the other a is expected to average price changes for the null hypothesis, it ignores the capital time value and option and stock has different risk characteristics. Early Keynes (1930) and Hicks (1934) in option pricing for a similar study. But before the 20th century until the 1960s, in on how to give the option pricing research on this problem has been stagnant, progress is slow, until Samuelsson (1965), and of Bachelor judgment interest, but he and other researchers work due to the lack of an important insight, i.e., the same risk assets should trade at the same price, otherwise, will cause the arbitrage opportunities, and there was no breakthrough. [10]

Real options concept was originally proposed by Stewart Myers (1977) at MIT, he pointed out that an investment scheme the cattle of the cash flow created by the profit, from when the head of the assets owned by the use and selection of investment opportunities in the future for a. That is to say, enterprises can obtain a right, in the future for a price or a real asset or investment plans to sell, so investment in physical assets can used a similar assessment options are generally evaluated. At the same time because of their subject matter for real assets, so will the nature of the option is called real option. Study on the black and Scholes pointed out: the financial option is to deal with the financial markets for financial assets traded for a class of financial derivatives, real options is dealing with some uncertain investment results of non-financial assets investment decision-making tool. Therefore, the real option is the relative financial option, and it is similar to financial option but not the same. Compared with the finance option, real option has the following four characteristics: (1) none trading. The difference between real option and financial option is the essence of non-character. Not only as a physical asset options subject matter there is generally no market, but the real option itself is unlikely to conduct market transactions: (2) nonexclusive. Many real options do not have exclusive ownership that it may be common to have multiple competitors, which can be shared. For sharing real option and its value depends not only on general parameters affect the value of the option and strategy but also with the competitors may choose relationship; (3) preoccupied. Preemption is by a nonexclusive caused by; it is to pre empty the implementation effect of preemptive real option can be obtained. The results show to achieve the strategic initiative and realize the maximum

value of real options; (4) composite. In most cases, a variety of real options exist certain correlation, this correlation + showed only in the same project within the sub project between before and after, but also mutual association between a number of investment projects. The important thought of real option is off the value evaluation and strategic decision-making, is the framework model of strategic decision-making and financial analysis. It is the modern financial analysis methods and techniques in the field of financial option pricing theory are applied to real investment decision. [11]

However long investors on the value of business investment or direct assessment of the most commonly used, the classic methods are the DCF, but the mountain defects of DCF method, especially the contradiction with the assumptions and the reality of the situation makes it application in the practical investment decision has limitation and prediction results have large deviation. Because of the natural defects of DCF method, often to enable investors to estimate of the value of the project is too low, or the investors in investment decision, especially with flexibility or the strategic growth of investment projects not through flexible grasp various potential investment opportunities and investors bring flexibility value, sometimes even lead to wrong decisions and the cause of loss are often large. Therefore, to explore the investors to grasp can predict the future cash flow and to determine the discount rate of the DCF method based on uncertain environment and various investment opportunities for investors to bring new value incapable of action. It is in this context, economists seeking to more accurately evaluate investment project theory and method of real value. The concept of Real Option was originally developed by MIT Stewart Myers (1977)

proposed. Black, Scholes, Merton breakthrough of financial option pricing theory is the cornerstone of the real option method. They found that Stewart and MIT Myers option pricing theory has an important application in the physical or non-financial investment at the scene.

1.4 The history of option pricing model

Option the most basic use is in order to avoid the risk of fluctuations in the underlying asset price, its greatest feature is outside of the possibility of reserving gains from the underlying assets favorable price movements, it also prevents adverse price movements may bring greater losses. Because the option has good functions of risk aversion, risk investment and the value of the discovery, and exhibit the characteristics of flexibility and diversity, so nearly 20 years, especially since the 1990s and options have become most has the vigor of derivative financial products, has been rapid development and wide application. The rapid development of benefit options market deepening in option theory. Option theory to study the key lies in two directions: one direction is how to construct a new option, to meet the needs of the changing market investment; another is how to determine the more and more complicated option value. [12]

Modern finance is based on the French scholar L.Bachelier published his doctoral dissertation "Theories de la speculation" and declared the birth of. In this paper, the first time he was given the Brown movement (Brown Motion) mathematical description, which would take five years earlier than Einstein Brown on 1905 movement. However,

the work of the L.Bachelie paid no attention to financial circles for more than 50 years. At the beginning of 1950s, Paul A.Samuelson by statistician L.J.Savsgez rediscovered L.Bachelier work. The modern finance has experienced two major Wall Street revolution. First is in 1952, H. Markowitz in his doctoral dissertation presents "portfolio mean variance theory. It describes the how to use the investment portfolio to create more choice of investment varieties, and under a certain risk level the expected return rate of the or in a given profit level so as to minimize risk. Its significance lies in the original people looking for the "best" stock ideas to guide the risks and benefits of the quantization and balanced sense.

The second revolution of Wall Street is in 1973 F. black and M. Scholes published an important achievement "the pricing of options and corporate debt" (the pricing of options and corporate thus), the first option pricing model, the Black Scholes formula, to solve the problem of option pricing the long troubled financial sector, is of theoretical and industrial circles widely accepted and used, become yet another revolution in the financial sector. In 1973, and MScholeS FBlack published option pricing model, they recognize that risk of the option actually in the price of the subject matter and its motion would be reflected and the price of the subject matter also reflects the market expectations for the future. Therefore, it is necessary to study option pricing must first describe the motion law of the subject matter of the price, which is also the option pricing theory starting point. They made the basic assumptions as follows:

(1) market risk-free interest rate is a known constant, investors can the interest rate risk borrow or lend any amount of money (continuous interest. (2) the motion of stock

price changes continuously, follow a geometric Brown motion with drift regularity in mathematics is shown as $dS = \mu S dt + \sigma S dB_t$. (3) the subject matter is not the stock dividend. (4) the option for European options. (5) the market is frictionless, no transaction costs, no tax, subject matter of infinite subdivision, free trading. (6) and the object can be short selling options. (7) the price volatility of the object is known constant. In these conditions, they found through constructing a specific portfolio: hold a stock option to sell a certain proportion, can avoid the investment risk of the stock. The change of the return of the portfolio is completely independent of the stock price, complete equilibrium conditions in the capital market, according to the capital asset pricing model, the portfolio should be equal to the risk-free rate of interest. In other words, can think of stock option income to be able to use the underlying stock and no risk asset constructs the investment portfolio to replicate, under no arbitrage equilibrium, the option price should be equal to the purchase cost of the investment portfolio. So this idea is out of the model does not depend on to stocks or options expected rate of return and any degree of market risk, in the mid-term models in prices depend only on the fluctuation of stock price rate and the risk-free rate, executive price, the maturity date, the stock price. In these variables, in addition to the volatility of the stock price are can be directly observed variables. And even to estimate the volatility of the stock price is also on the future stock prices expected value estimation is much simple and practical. After a series of rigorous and complicated mathematical derivation, get the famous Black-Scholes formula.

$$c = SN(d_1) - Xe^{-r(T-t)}N(d_2) \quad (14)$$

BS model for financial derivative products market provides a solid theoretical foundation, since birth for many economists are concerned, and are rapidly being used widely in financial practice, financial derivative product market, the impact of increasing. Later, many economists have conducted more extensive research on option pricing from the depth and breadth, option pricing theory has been further developed. The first is the extension of the option type. The BS model only gives the pricing formula of European call option does not pay dividends, its application is relatively narrow. But with the further research of other scholars and their own, the option pricing theory has been further improved. [13]

1975 Blake in the fact and fantasy in the option pricing, given the calculation pay dividends of European call option value ideas: using the current stock price minus due before the dividend payment of the present value as the adjusted stock price and the rest of the calculation method with the BS model. Subsequently, Richard Roll (1977) - Robert oeske (1979), Robert Ewhaley (1951) further research on accurate pricing model of the American call option on the payment of dividends, and give the corresponding formula. At the same time as the options market development, people for the options study have been far beyond the scope of stock option. Black (1976) proposed a commodity options and futures contracts pricing model; oarman and Kohlhagen (1983) proposed the European foreign currency option valuation model and so on.

Merton 1977 "on the pricing of contingent claims and the Modigliani Miller theorem" in an article by underlying assets and no risk asset constructs portfolio to replicate the original capital gains, is derived under certain conditions of the underlying

asset pricing model. The establishment of the model gives a general formula of the value of other similar options. The second is to further weaken the assumptions. From the BS model published until now more than 30 years, with the continuous development of options trading, some of the original model is considered not too realistic assumptions can be applied to the actual market. For example, the introduction of short selling rules; the emergence of a large number of mutual funds so that the underlying assets can become almost infinite subdivision requirements can be achieved; trading volume increases, the transaction cost is almost negligible. Other assumptions do not conform to the actual also by later generations a lot of research work to be improved: Option Pricing under stochastic interest rates. Merton through the study of the interest rate and the interest rate of the underlying assets and the variance covariance in option price effect, option pricing under stochastic interest rate is derived.

On this basis, Rbaniovithe export follows a mean reverting valuation formula of stock options and stock index options of the process conditions in the interest rate on the 1989. The underlying doesn't continuous change of price movement. 1976 Cox and RosS through long-term empirical research and on the basis of academic research from others, that changes in the price of the subject matter does not vary continuously, but with time performance for a series of jumps, under this premise, they assumed that price changes follow another probability points cloth forms: Poisson distribution, and accordingly the stochastic process to option pricing. In the same way, 1976 Merton use jump diffusion process and the process of combination, also is the so-called mixed process by the jump assumed lognormal distribution, the formula of European call

option pricing model. And the combination of Markowitz's portfolio theory, he further stated that jump type of price changes can be assumed to belong to the non-system of can through portfolio diversification methods to eliminate; continuous change of price volatility and belong to the system of price changes, such changes cannot through diversification eliminated. The results of this study revealed the full decentralization after the changes of primary asset price is assumed to be continuous.

1990 Nobel Economic Prize awarded Markowitz. Sharpe and Miller, as a reward for their role in the financial economics pioneers, their winning work of Markowitz portfolio theory and Sharpe's capital asset pricing theory and Miller's corporate finance theory are very few study. Similarly, the 1997 Nobel prize in economics was awarded to Merton and Scholes, and Black to reward them for their contribution in determining the value of derivative securities. [14]

The modern financial theory with the development of financial market, more and more mature. It's a very important research is the introduction of martingale theory. In the financial market is effective under the assumption, the price of the underlying asset can be equivalent to a martingale and stochastic process, martingale approach advocated by karatzas and Shreve et al directly to the martingale theory to the modern financial theory, using equivalent martingale measure, the concept of uncertain pricing problem of rights and interests, the result can not only prompted a profound the laws governing the operation of financial markets, and can provide a set of effective algorithm to solve complex undetermined equity pricing and risk management. Another advantage of using financial market martingale theory is the question of pricing it can successfully solve

the contingent claim when the financial market is not completely. Based on the current method of martingale pricing of contingent claims the dominant theory in modern financial theory. Due to the rapid development of the economy, which requires the financial markets continue to improve, to prevent, control and resolve the risks, thus, the financial derivatives emerge in an endless stream. In order to manage risks effectively, it is necessary to correct the valuation of financial derivative securities, how to determine the fair value of financial derivatives has become the key to their existence and healthy development. The option is not only an effective tool to avoid risks, and speculative means a very attractive, it is favored by the investors. With the exploration and development of option pricing theory, on the basis of the standard options and design various options. In all of the pricing of derivative securities, option pricing research is most extensive. This is because: (1) and other derivative securities compared option is easy to price; (2) many derivative securities can appear in the form of a combination of several options contracts; (3) all the derived pricing theory is the same, may through the option pricing methods to find the common derivative securities pricing theory (see black and Scholes, (1973), Merton (1973)). Option pricing theory is an important part of modern finance, it promotes the prosperity of financial market, it with the investment portfolio theory, capital asset pricing theory, efficient market theory and agency problems were considered together, it is one of the five theory modules in modern finance. Option market is the theme of the 1990s banking field, almost all the big banks, securities companies and other financial institutions are actively involved in the business in the options market, however how to option pricing has always been the

focus of financial theory and physical world attention, option pricing theory has several important significance:

First, option pricing theory has accelerated the establishment of a modern financial theory. Modern financial theory refers to the use of a large number of financial mathematics in financial economics, made research to prevent financial risks and control of capital market, capital operation, and asset structure and pricing results. In the modern financial theory in the process of development of the "Wall Street first revolution" and the financial market innovation and successful practice of "Wall Street" the second revolution of the modern financial theory has hitherto unknown speed[15].

Secondly, the option pricing theory to promote the development of financial technology. People used to think that only technology in the manufacturing industry, financial technology is more complex, more powerful. The option is like a double-edged sword, the option pricing theory provides an effective tool for risk management, but also provides an excellent means for speculative speculators, stimulate the psychological risk of investors.

Finally, option pricing theory has developed the theory of finance. Due to the application of option pricing theory, many problems of traditional financial theory can solve many limitations to the financial theory breakthrough, a new look. Modern economic theory, financial theory and financial theory is always communicated, derived from financial option theory, this paper studies the basic principle and method, especially related to return and risk assessment, which is widely used in the study of modern financial theory. The application in the financial aspects of the most

concentrated application value, option theory so far, the application of option theory has brought many breakthroughs in financial theory.

2 METHODS OF FORECASTING OF STOCK PRICE BY OPTION PRICING MODEL (B-S MODEL).

2.1 Introduction of B-S model

Due to the relative pricing method for option pricing, that is compared to the stock price, so as to change the option pricing must first study the prices of securities. At present, the academic circles to describe the change process of stock price by random process. This section will be introduced from the shallower to the deeper.

1. Weak efficient market hypothesis and the Markov process

In 1965, Fama (Fama) put forward the famous efficiency market hypothesis. The hypothesis that investors are trying to use available information to get higher pay. The reaction of stock price to new market information is quickly and accurately, the stock prices fully reflect all information; market competition make the prices of securities from a balanced level transition to another equilibrium level, and corresponding to the new information and price changes is independent of each other.

Efficient market hypothesis can be divided into three categories: weak, semi strong and strong.

Weak form efficiency market hypothesis believes that the history of the stock price fluctuation does not contain any information useful to future changes in the prediction of stock price, that is to say, not through technical analysis to get more income than the average rate of return.

Semi strong form efficiency market hypothesis that stock prices will quickly and accurately according to the adjustment for all public information available, so past

prices and volume technical information and published information helpless to choose prices were overvalued or undervalued securities.

Strong form efficiency market hypothesis that is not only published information, and it is possible to obtain relevant information have been reflected in the price, so any information (including "insider information") for the selection of securities are useless.

The efficient market hypothesis, many scholars have used a variety of data to conduct an empirical analysis. The results showed that the stock market in developed countries generally meet the weak form efficient market hypothesis.

Weak efficient market hypothesis express by Markov random process (Markov Stochastic Process). The so-called stochastic process is a variable value in some uncertain time-varying way process. According to whether the time does continuous stochastic process can be divided into discrete-time and continuous time stochastic process. The former is refers to the variable can only process on the separation of certain time change, the latter refers to the variables can be in continuous time segment changes. According to the variable range is continuous division, the stochastic process can be divided into discrete variables and continuous variables, the former refers to the variable can take only certain discrete values, while the latter refers to the variables can be in a certain range take any value. Strictly speaking, the discrete time stochastic process of stock price change process belongs to the discrete variables, but we can still get it for a continuous time stochastic process approximation of continuous variables[16].

Markov process is a particular type of stochastic process. In this process, only the current value of variables relevant to predicting the future, past history variables and variables from the past to the evolution of the way now has nothing to do with the future forecast.

If the stock price follows a Markov process, the future price of the probability distribution depends only on the current price of securities.

2. Brownian Motion

Brownian motion origin in physics to completely immersed in liquid or gas in the small particle motion description, discovered this kind of phenomenon of English botanist Robert - Robert Brown, brown, named. But the real definitions is describe the stochastic process of Brown motion is given by Weiner, so the Brown movement also called Weiner process.

Standard Brownian motion

A representative of a small time interval length, change represents variable Z in time, has two kinds of characteristics follow the standard of Brown motion:

To meet the characteristics of 1: and the relationship between

$$\Delta z = \varepsilon \sqrt{\Delta t} \quad (15)$$

Among them, representatives from the standard normal distribution (the mean of 0 and a standard deviation of the normal distribution of 1) a random value.

2 features: for any two different time intervals, the values are independent of each other.

From the characteristics of the 1 shows itself also has a normal distribution, the mean value is 0, standard deviation, variance.

From the characteristics of the 2 shows that the movement is in accordance with the standard Brown Markov process, which is a special form of Markov process.

Now we consider following the standard Brown motion variable Z in a long period of time in the T change. We use $Z(T) - Z(0)$ said the change variable Z in T , it can be regarded as the total change, the small time interval in the N with a length of Z and $N=T/\Delta t$, so,

$$z(T) - z(0) = \sum_{i=1}^N \varepsilon_i \sqrt{\Delta t} \quad (16)$$

Among them ($i=1, 2, \dots, N$) is the standard normal distribution random sampling value. From the 2 characteristics that are independent of each other, so the $Z(T) - z(0)$ also has a normal distribution, with mean 0 and variance was $N\Delta t=T$, standard deviation \sqrt{T} .

From this, we can find two characteristics: in arbitrary length of the time interval T , follow the standard Brownian motion variable changes value with mean 0 and standard deviation \sqrt{T} of the normal distribution. For normal distribution independent, additive variance, and standard deviation is not additive[17].

When $\Delta t \rightarrow 0$, we can get the ultimate standard of Brown motion:

$$dz = \varepsilon \sqrt{dt} \quad (17)$$

3. The ordinary Brown motion

In order to get ordinary Brown motion, we must introduce two concepts: drift rate and rate variance. Drift rate (Drift Rate) refers to the change in unit time variable Z mean value. The variance ratio (Variance Rate) is a unit of time variance.

The standard of Brown motion drift rate is 0, the variance ratio is 1. The drift rate of 0 means that in the future the mean any time Z is equal to its current value. The variance rate of 1 means that the length of time period for the T , the Z variance is $1 T$ long. We make the drift rate of the expected value is a , the rate of expected variance value is b^2 , you can get the X variable ordinary Brown motion:

$$dx = a dt + b dz \quad (18)$$

Among them, a and B are constants, follow the standard DZ Brown movement. This process is pointed out that the dynamic process variables X and DZ on time. The first ADT is uncertain, it means that the expected drift rate of x per unit time is a . The second BDZ is random, it shows that the dynamic process of X added noise. This is the noise by B times given the Wiener process. [18]

From equation shows that, after a short period of time, the change of x value Δx value:

$$\Delta x = a \Delta t + b \varepsilon \sqrt{\Delta t} \quad (19)$$

Therefore, X also has a normal distribution, the mean and standard deviation, variance. Similarly, changes in $X T$ of arbitrary length after the time has normal distribution, its mean value is aT , standard deviation, variance is $b^2 T$.

4. Ito Process

The ordinary Brown motion assumption drift rate and variance rate is constant, if the function of variable x drift rate and rate variance as the variables X and T, we can get from the Ito formula (Ito Process):

$$dx = a(x, t)dt + b(x, t)dz \quad (20)$$

Among them, DZ is a standard Brown movement, a, B is a function of variables X and t variables, X drift rate is a, the variance ratio is b².

2.1.1 The change process of stock price

The change process of stock price can be used for μS drift rate and variance rate of Ito process of $\sigma^2 S^2$ said.

$$dS = \mu S dt + \sigma S dz \quad (21)$$

With both sides divided by S:

$$\frac{dS}{S} = \mu dt + \sigma dz \quad (22)$$

Where s indicates the prices of securities, Mu said the securities in unit time to continuous compounding said the expected return rate (also known as the expected rate of return), said the securities return rate variance per unit time, said the securities return rate per unit time standard, "volatility of stock price" for short (volatility) ΔZ said standard Brownian motion. The formula (6.6) is also known as geometric Brown motion.

$$\frac{\Delta S}{S} = \mu \Delta t + \sigma \varepsilon \sqrt{\Delta t} \quad (23)$$

Therefore, $\frac{\Delta S}{S}$ also has a normal distribution, $\mu \Delta t$ the mean and $\sigma \sqrt{\Delta t}$ standard deviation, variance $\sigma^2 \Delta t$. let me put it another way

$$\frac{\Delta S}{S} \sim \phi(\mu \Delta t, \sigma \sqrt{\Delta t}) \quad (24)$$

$\phi(m, s)$ Represent the mean of m , the standard deviation of the normal distribution S .

In formula, we involved two symbols: that depends on the size of time measurement unit. In this book, if there is no special statement, we usually measure time by per year.

According to the capital asset pricing principle, depending on the value of systemic risk, the risk-free interest rate, the stock market and the risk return preferences. Because the latter involves subjective factors, so the decision itself is more complex. Fortunately, we will in the following proof, and the pricing of derivative securities underlying assets expected rate of return (μ) is irrelevant. On the contrary, the stock price volatility (σ) is very important for the pricing of derivative securities. The stock price fluctuation rate can be understood as the price of the securities "temper", we can through the historical data to observe the size of all kinds of securities "temper", then by formula to determine the probability distribution of its future price. It should be noted that the formula as a constant, in fact, the price of securities temper will change. Will change with time. Therefore the estimated value of historical data, should try to use the latest data for a period of time, but also to note that this is only an approximation. [19]

2.1.2 Ito's lemma

The price of a stock option is a function of the underlying stock's price and time. More generally, we can say that the price of any derivative is a function of the stochastic variables underlying the derivative and time. A serious student of derivatives must,

therefore acquire some understanding of the behavior of functions of stochastic variables. An important result in this area was discovered by the mathematician K. Ito in 1951, and is known as Ito's lemma. Suppose that the value of a variable x follows the Ito process.

$$dx = a(x, t)dt + b(x, t) dz \quad (25)$$

where dz is a Wiener process and a and b are functions of x and t . The variable x has a drift rate of μ and a variance rate of σ . Ito's lemma shows that a function G of x and t follows the:

$$dG = \left(\frac{\partial G}{\partial x} a + \frac{\partial G}{\partial t} + \frac{1}{2} \frac{\partial^2 G}{\partial x^2} b^2 \right) dt + \frac{\partial G}{\partial x} b dz \quad (26)$$

Where the dz is the same wiener process as in equation (12.11). Thus, G also follows an Itô process, with a drift rate of:

$$\frac{\partial G}{\partial x} a + \frac{\partial G}{\partial t} + \frac{1}{2} \frac{\partial^2 G}{\partial x^2} b^2 \quad (27)$$

And a variance rate of

$$\left(\frac{\partial G}{\partial x} \right)^2 b^2$$

A completely rigorous proof of Itô's lemma is beyond the scope of this book. In the appendix to this chapter, we show that the lemma can be viewed as an extension of well-known results in differential calculus.

Earlier, we argued that

$$dS = \mu S dt + \sigma S dz \quad (28)$$

With μ and σ a constant, is a reasonable model of stock price movements. From Ito's lemma, it follows that the process followed by a function G of S and t is t is

Note that both S and G are affected by the same underlying source of uncertainty, dz. This proves to be very important in the derivation of the Black-Scholes results.

2.1.3 The Lognormal Property

We now use Ito's lemma to derive the process followed by In S when S follows the process in equation. We define

$$G = \ln S \quad (29)$$

Since:

$$\frac{\partial G}{\partial S} = \frac{1}{S}, \frac{\partial^2 G}{\partial S^2} = -\frac{1}{S^2}, \frac{\partial G}{\partial t} = 0 \quad (30)$$

It follows from equation (12.14) that the process followed by G is

$$dG = \left(\mu - \frac{\sigma^2}{2}\right)dt + \sigma dz \quad (31)$$

Since μ and σ are constant, this equation indicates that $G = \ln S$ follows a generalized Wiener process. It has constant drift rate $\mu - \sigma^2 / 2$ and constant variance rate σ^2 . The change in $\ln S$ between time 0 and some future time T is therefore normally distributed, with mean $(\mu - \sigma^2 / 2)(T - t)$ and variance $\sigma^2(T - t)$. This means that

$$\ln S_T - \ln S \sim \phi\left[(\mu - \frac{\sigma^2}{2})(T - t), \sigma\sqrt{T - t}\right] \quad (32)$$

Or

$$\ln S_T \sim \phi\left[\ln S + (\mu - \frac{\sigma^2}{2})(T - t), \sigma\sqrt{T - t}\right] \quad (33)$$

Where S_T is the stock price at a future time T is the stock price at time 0, and as before $\phi(m, v)$ denotes a normal distribution with mean m and variance v Equation shows that $\ln S_T$ is normally distributed. A variable has a lognormal distribution if the natural logarithm of the variable is normally distributed. The model of stock price

behavior we have developed in this chapter therefore implies that a stock's price at time T , given its price today, is lognormal distributed. The standard deviation of the logarithm of the stock price is a \sqrt{T} . It is proportional to the square root of how far ahead we are looking.

2.1.4 Introduce the Black-Scholes-Merton Model

In the early 1970s, Fischer Black, Myron Scholes, and Robert Merton achieved a major breakthrough in the pricing of stock options.¹ This involved the development of what has become known as the Black-Scholes (or Black-Scholes-Merton) model. The model has had a huge influence on the way that trader's price and hedge options. It has also been pivotal to the growth and success of financial engineering in the last 30 years. In 1997, the importance of the model was recognized when Robert Merton and Myron Scholes were awarded the Nobel prize for economics. Sadly, Fischer Black died in 1995; otherwise he too would undoubtedly have been one of the recipients of this prize.

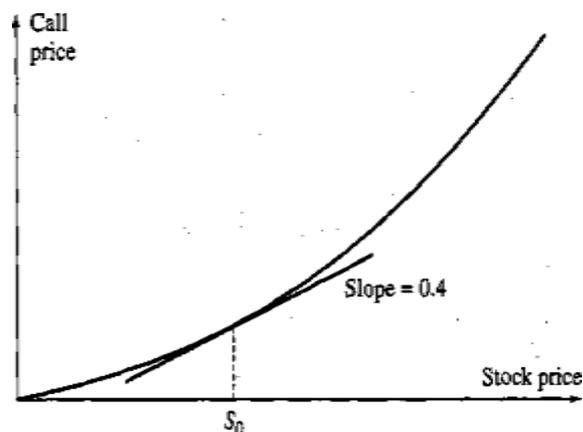
This chapter shows how the Black-Scholes model for valuing European call and put options on a non-dividend-paying stock is derived. It explains how volatility can be either estimated from historical data or implied from option prices using the model. It shows how the risk neutral valuation argument introduced i can be used. It also shows how the Black-Scholes model can be extended to deal with European call and put options on dividend-paying stocks and presents some results on the pricing of American call options on dividend-paying stocks. [20]

The Black-Scholes-Merton differential equation is an equation that must be satisfied by the price of any derivative dependent on a non-dividend-paying stock. The

equation is derived in the next section. Here we consider the nature of the arguments we will use.

These are similar to the no-arbitrage arguments we used to value stock options in Chapter 11 for the situation where stock price movements are binomial. They involve setting up a riskless portfolio consisting of a position in the derivative and ‘a position in the stock. In the absence of arbitrage opportunities, the return from the portfolio must be the risk-free interest rate, r . This leads to the Black-Scholes-Merton differential equation.

The reason a riskless portfolio can be set up is that the stock price and the derivative price are both affected by the same underlying source of uncertainty: stock price movements. In any short period of time, the price of the derivative is perfectly correlated with the price of the underlying stock. When an appropriate portfolio of the stock and the derivative is established, the gain or loss from the stock position always offsets the gain or loss from the derivative position so that the overall value of the portfolio at the end of the short period of time is known with certainty.



Picture1– Relationship between call price and stock price. Current stock price is S_0

Suppose, for example, that at a particular point in time the relationship between a small change ΔS in the stock price and the resultant small change Δc in the price of a European call option is given by

$$\Delta c = 0.4 \Delta S$$

This means that the slope of the line representing the relationship between c and S is 0.4, as indicated in Figure 1. The riskless portfolio would consist of:

1. A long position in 0.4 shares
2. A short position in one call option

Suppose, for example, that the stock price increases by 10 cents. The option price will increase by 4 cents and the $40 \times 0.10 = \$4$ gain on the shares is equal to the $100 \times 0.04 = \$4$ loss on the short option position.

There is one important difference between the Black-Scholes-Merton analysis and our analysis using a binomial model. In Black-Scholes-Merton, the position in the stock and the derivative is riskless for only a very short period of time. (Theoretically, it remains riskless only for an instantaneously short period of time.) To remain riskless, it must be adjusted, or rebalanced, frequently. For example, the relationship between Δc and ΔS in our example might change from $\Delta c = 0.4 \Delta S$ today to $\Delta c = 0.5 \Delta S$ in 2 weeks. This would mean that, in order to maintain the riskless position, an extra 0.1 share would have to be purchased for each call option sold. It is nevertheless true that the return from the riskless portfolio in any very short period of time must be the risk-free interest rate. This is the key element in the Black-Scholes analysis and leads to their pricing formulas[21].

Assumptions

The assumptions we use to derive the Black-Scholes-Merton differential equation are as follows:

1. The stock price follows the process developed with μ and σ constant.
2. The short selling of securities with full use of proceeds is permitted.
3. There are no transactions costs or taxes. All securities are perfectly divisible.
4. There are no dividends during the life of the derivative.
5. There are no riskless arbitrage opportunities.
6. Security trading is continuous.
7. The risk-free rate of interest, r , is constant and the same for all maturities.

As we discuss in later chapters, some of these assumptions can be relaxed. For example, A and R can be known functions of t . We can even allow interest rates to be stochastic provided that the stock price distribution at maturity of the option is still lognormal.

2.1.5 Derivation of the black-scholes-merton differential equation

The stock price process we are assuming is the one we developed.

$$dS = \mu S dt + \sigma S dz \quad (34)$$

Suppose that f is the price of a call option or other derivative contingent on S . The variable f must be some function of S and t .

$$df = \left(\frac{\partial f}{\partial S} \mu S + \frac{\partial f}{\partial t} + \frac{1}{2} \frac{\partial^2 f}{\partial S^2} \sigma^2 S^2 \right) dt + \frac{\partial f}{\partial S} \sigma S dz \quad (35)$$

The discrete versions of equations are:

$$\Delta S = \mu S \Delta t + \sigma S \Delta z \quad (36)$$

And

$$\Delta f = \left(\frac{\partial f}{\partial S} \mu S + \frac{\partial f}{\partial t} + \frac{1}{2} \frac{\partial^2 f}{\partial S^2} \sigma^2 S^2 \right) \Delta t + \frac{\partial f}{\partial S} \sigma S \Delta z \quad (37)$$

Where Δf and ΔS are the changes in f and S in a small time interval Δt . Recall from the discussion of Ito's lemma that the Wiener processes underlying f and S are the same. In other words, the $\Delta z (= \varepsilon \sqrt{\Delta t})$ in equations (36) and (37) are the same. It follows that a portfolio of the stock and the derivative can be constructed so that the Wiener process is eliminated[22]

The portfolio is

$-f$: derivative

$\frac{\partial f}{\partial S}$: shares

The holder of this portfolio is short one derivative and long an amount $\frac{\partial f}{\partial S}$ of shares.

Define Π as the value of the portfolio. By definition

$$\Pi = -f + \frac{\partial f}{\partial S} S \quad (38)$$

The change $\Delta \Pi$ in the value of the portfolio in the time interval Δt is given by

$$\Delta \Pi = -\Delta f + \frac{\partial f}{\partial S} \Delta S \quad (39)$$

Substituting equations (36) and (37) into equation (39) yields

$$\Delta \Pi = \left(-\frac{\partial f}{\partial t} - \frac{1}{2} \frac{\partial^2 f}{\partial S^2} \sigma^2 S^2 \right) \Delta t \quad (40)$$

Because this equation does not involve Δz , the portfolio must be riskless during time

At The assumptions listed in the preceding section imply that the portfolio must

instantaneously earn the same rate of return as other short-term risk-free securities. If it earned more than this return, arbitrageurs could make a riskless profit by borrowing money to buy the portfolio; if it earned less, they could make a riskless profit by shorting the portfolio and buying risk-free securities. It follows that

$$\Delta\Pi = r\Pi\Delta t \quad (41)$$

Where r is the risk-free interest rate. Substituting from equations (32) and (35) into (36), we obtain

$$\left(\frac{\partial f}{\partial t} + \frac{1}{2} \frac{\partial^2 f}{\partial S^2} \sigma^2 S^2\right)\Delta t = r\left(f - \frac{\partial f}{\partial S} S\right)\Delta t \quad (42)$$

$$\frac{\partial f}{\partial t} + rS \frac{\partial f}{\partial S} + \frac{1}{2} \sigma^2 S^2 \frac{\partial^2 f}{\partial S^2} = rf$$

Equation (37) is the Black-Scholes-Merton differential equation; It has many solutions, corresponding to all the different derivatives that can be defined with S as the underlying variable. The particular derivative that is obtained when the equation is solved depends on the boundary conditions that are used. These specify the values of the derivative at the boundaries of possible values of S and t . In the case of a European call option, the key boundary condition is

$$f = \max(S - K, 0) \text{ when } t = T \quad (43)$$

In the case of a European put option, it is

$$f = \max(K - S, 0) \text{ when } t = T \quad (43)$$

One point that should be emphasized about the portfolio used in the derivation of equation (36) is that it is not permanently riskless. It is riskless only for an infinitesimally short period of time. As S and t change, $\frac{\partial f}{\partial S}$ also changes. To keep the

portfolio riskless, it is therefore necessary to frequently change the relative proportions of the derivative and the stock in the portfolio.

2.1.6 Risk-Neutral Valuation

We introduced risk-neutral valuation in connection with the binomial model. It is without doubt the single most important tool for the analysis of derivatives. It arises from one key property of the Black-Scholes-Merton differential equation. This property is that the equation does not involve any variables that are affected by the risk preferences of investors. The variables that do appear in the equation are the current stock price, time, stock price volatility, and the risk-free rate of interest. All are independent of risk preferences.

The Black-Scholes-Merton differential equation would not be independent of risk preferences if it involved the expected return, μ , on the stock. This is because the value of μ does depend on risk preferences. The higher the level of risk aversion by investors, the higher μ will be for any given stock. It is fortunate that it happens to drop out in the derivation of the differential equation.

Because the Black-Scholes-Merton differential equation is independent of risk preferences, an ingenious argument can be used. If risk preferences do not enter the equation, they cannot affect its solution. Any set of; Risk preferences can, therefore, be used when evaluating f . In particular, the very-simple assumption that all investors are risk neutral can be made.

In a world where investors are risk neutral, the expected return on all investment assets is the risk-free rate of interest, r . The reason is that risk-neutral investors do not

require a premium to induce them to take risks. It is also true that the present value of any cash flow in a risk-neutral world can be obtained by discounting its expected value at the risk-free rate. The assumption that the world is risk neutral does, therefore, considerably simplify the analysis of derivatives.

Consider a derivative that provides a payoff at one particular time. It can be valued using risk-neutral valuation by using the following procedure:

1. Assume that the expected return from the underlying asset is the risk-free interest rate, r (i.e., assume $\mu = r$).
2. Calculate the expected payoff from the derivative.
3. Discount the expected payoff at the risk-free interest rate.

It is important to appreciate that risk-neutral valuation (or the assumption that all investors are risk neutral) is merely an artificial device for obtaining solutions to the Black-Scholes differential equation. The solutions that are obtained are valid in all worlds, not just those where investors are risk neutral. When we move from a risk-neutral world to a risk-averse world, two things happen. The expected growth rate in the stock price changes and the discount rate that must be used for any payoffs from the derivative changes. It happens that these two changes always offset each other exactly.

2.1.7 Black-Scholes Pricing Formulas

The Black-Scholes formulas for the prices at time 0 of a European call option on a non-dividend-paying stock and a European put option on a non-dividend-paying stock are:

$$c = SN(d_1) - Xe^{-r(T-t)}N(d_2) \quad (44)$$

And

$$p = Xe^{-r(T-t)}N(-d_2) - SN(-d_1) \quad (45)$$

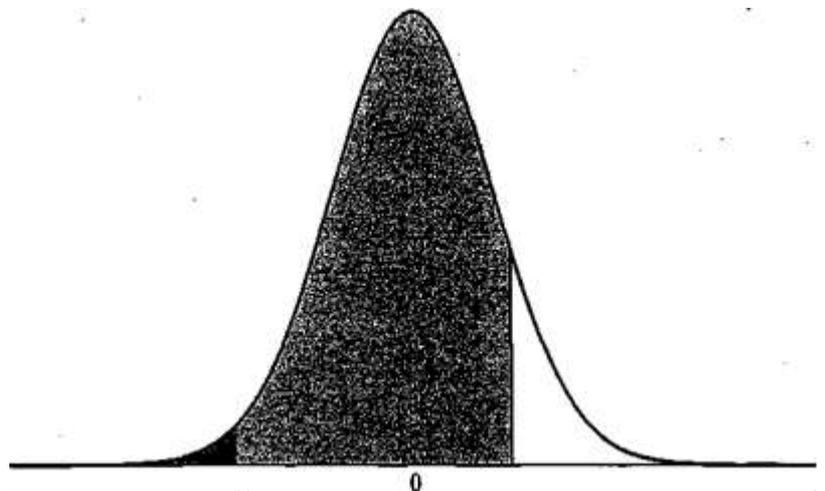
where

$$d_1 = \frac{\ln(F/X) + (\sigma^2/2)(T-t)}{\sigma\sqrt{T-t}} \quad (46)$$

$$d_2 = \frac{\ln(F/X) - (\sigma^2/2)(T-t)}{\sigma\sqrt{T-t}}$$

$$= d_1 - \sigma\sqrt{T-t}$$

The function $N(x)$ is the cumulative probability distribution function for a standardized normal distribution. In other words, it is the probability that a variable with a standard normal distribution, $\varphi(0, 1)$, will be less than x . It is illustrated in Figure 2. The remaining variables should be familiar. The variables c and p are the European call and European put price, S_0 is the stock price at time zero, K is the strike price, r is the continuously compounded risk-free rate, σ is the stock price volatility, and T is the time to maturity of the option.



Picture 2–Shaded area represents $N(x)$.

One way of deriving the Black-Scholes formulas is by solving the differential equation (36) subject to the boundary condition mentioned in Section. Another approach is to use risk-neutral valuation. Consider a European call option. The expected value of the option at maturity in a risk-neutral world is

$$\hat{E}[\max(S_T - X, 0)] \quad (47)$$

Where, as before, \hat{E} denotes the expected value in a risk-neutral world. From the risk-neutral valuation argument, the European call option price c is this expected value discounted at the risk-free rate of interest, that is,

$$c = e^{-rT} \hat{E}[\max(S_T - X, 0)] \quad (48)$$

The appendix at the end of this chapter shows that this equation leads to the result in equation (48).

To provide an interpretation of the terms in equation (48), we note that it can be written

$$c = e^{-rT} [S_0 N(d_1) - KN(d_2)] \quad (49)$$

The expression $N(d_2)$ is the probability that the option will be exercised in a risk-neutral world, so that $KN(d_2)$ is the strike price times the probability that the strike price will be paid. The expression $S_0 N(d_1)$ is the expected value in a risk-neutral world of a variable that is equal to S_T if $S_T > K$ and to zero otherwise.

Since it is never optimal to exercise early an American call option on a non-dividend-paying stock, equation (38) is the value of an American call option on a

non-dividend-paying stock. Unfortunately, no exact analytic formula for the value of an American put option on a non-dividend-paying stock has been produced. Numerical procedures for calculating American put values are discussed.

When the Black—Scholes formula is used in practice the interest rate r is set equal to the zero-coupon risk-free interest rate for a maturity T . As we show in later chapters, this is theoretically correct when r is a known function of time. It is also theoretically correct when the interest rate r is stochastic provided that the stock price at time T is lognormal and the volatility parameter is chosen appropriately. As mentioned earlier, time is normally measured as the number of trading days left in the life of the option divided by the number of trading days in 1 year.

2.2 Pricing Model of Stock pricing application (change the using of B-S model to adopt stock)

Research sample.

China Vanke Co., Ltd. has become a leading real-estate company in China since it stepped into the housing market over thirty years ago in 1988, with its main business being real-estate development and property service. Adopting the strategy of focusing on city clusters, Vanke has established its presence in 65 cities in mainland China by the end of 2014, mainly in the Pearl River Delta centered on cities of Guangzhou and Shenzhen, the Yangtze River Delta centered on Shanghai, the Bohai Rim Region centered on Beijing, and the Chengdu Region which covers major cities in Midwest China. Since 2013, Vanke made its attempts to invest overseas. It has now been

involved in six real-estate development projects in Hong Kong, Singapore, Los Angeles, and the New York City. Its sales volume in 2014 amounted to RMB215.13 billion for 18.064 million square meters, making it an industry leader globally in terms of sales performance. Vanke conducts its property service business mainly through Vanke Property Development Co., Ltd. (Vanke Property), which has the mission to provide first-class property service and building maintenance consistently. By the end of 2014, Vanke Property had 457 property service projects in 61 large- and medium-sized cities in mainland China, covering a contractual property management area of 100 million square meters[24].

Parameter estimation

In the fourth chapter, we discuss the applicability of the BS model, and analyze the specific issues to be considered in the selection of various parameters. Below under the constraint on the sources of information, that is limited to annual report and transaction data is publicly available, to Vanke Company for example, estimated Standard BS model input data for the current value of an asset s , option exercise price of X , the implementation of period T , the risk-free interest rate R , the volatility of the asset, and obtains the option value and calculate the price and market price. Pay attention to our in front of why choose the BS model pointed out that the BS model although the assumption of strict, but compared with many other expansion model more simple and beautiful, input variables to be estimated, practical applications can more reasonable results were obtained by the parameters appropriate estimation and adjustment, but also to avoid parameter estimation in arbitrary too big problem.

Stock price

As mentioned earlier, Mason and Merton (1985) believes that physical assets can be directly as they are in the market was traded to deal with, on the grounds that real assets is a market capitalization of listed company is the basis and source of the essence, so physical assets can be considered its own in the transaction. Copeland and antikarov (2001) proposed mad (Marketed asset disclaimer) method, and that the value of real assets are traded real assets under its market value unbiased estimation and perfectly correlated, so it can be directly to the value of real assets as the underlying assets. Accordingly, in the use of BS formula to make an evaluation of the value of equity, the underlying assets that the value of the company is a market value for the company's overall value market situation in the presence of unbiased estimation and perfectly correlated, so it can be directly to the value of the company as the underlying assets. Only financial and trading data and assuming that financial statements reflect the company's results, including free capital investment, loan capital, operating results that the provident fund investment, the company's total assets reflects the value of the company. Can, of course, evaluation method, the cash flow discount method and other methods on the value of the company to make further evaluation, but now the study use accounting statements in the ready availability of total assets as variables to represent the value of the company, the benefit is the standardization of data source, have a certain authority, is useful for comparative analysis of many companies and the whole market. The disadvantage is that the accounting data is, after all, reflect the historical

operating results and not the future operating conditions of the prediction, thus the distance value of the company's real value will have a certain bias.

In this case, the query the annual report of China Vanke Co., Ltd. in 2014, the consolidated balance sheet of the 2014 year end total assets 508408755415.65 yuan, the present value of assets will be as and BS model bid s estimation, i.e. $S = 508408755415.65$.

Option executive price X

Company of limited liability nature makes shareholders will have value to offset the liabilities of the company the remaining value left to their own choices, namely equity has option character, regardless of the option nature and execution period, the exercise price of the option is clear, namely the debts of the company value. Corporate debt value should be the market of the present value of the debts of the company, if the debts of the company from the issuance of bonds, the value of company debt should to the release of the face value of the bonds in accordance with the corresponding to the credit rating of the required rate of return for discounted value. But our company debt market is not developed, for the sake of simplicity; this study selected the total liabilities of the balance sheet as an option to implement the value of the price X.

In this case, the query the annual report of China Vanke Co., Ltd. in 2014, the consolidated balance sheet liabilities final 2004 grand total of \$392515138495.68, will as the middle of the BS model of power execution an estimate of the price of X, $X = 392515138495.68$.

Time to expiry

In the third chapter, the fourth quarter of the company continued to operate option analysis that without a fixed company liquidation date spot in maturity, but according to the nature of the limited liability company, shareholders will still enjoy according to the comparison between the firm value and debt decided to continue to operate or liquidation of the right to choose, because this can be the weighted duration of liabilities on the company's balance sheet as option expiration time. However, when the maturity of the debt, the company through renew or refunding the debt during prolonged. In fact, the company will maintain a daily balance ratio of assets and liabilities through active debt management. In theory, the company's life is infinite, until the company's life at the end of the moment that the company clear disk, the equity of this special option to be implemented. As a matter of fact, life there is always limited, although we advance difficult on the life of the company make accurate estimates, but in order to calculate the option value of during execution to make reasonable estimates have become necessary. [25]

Creditors as a whole to the shareholders of the sale of a call option based on the company's value, the new shareholders to buy from the old shareholders of the shares are willing to buy the price is the price of this call option price. The new shareholders are willing to pay a price is based on their own on the basis of the information to make judgments, such as national economic development, macroeconomic, industry conditions, the enterprise's own situation, which implies the enterprise itself by the expectation of camp, such as current project opportunities to see how long, the future of the company may also from is what kind of. Therefore, from the new entrants to the

shareholders of the company expected angle, during the execution of the call option is limited to people's cognitive ability and the social development and the change of industrial structure of business opportunities to see how far, people may see within a few years the company engaged in any business profitable, some people may see opportunities for decades between the change of industrial structure.

Another perspective of reality in the life, the life of a large number of small and medium-sized companies within a few years, very few companies life in more than a hundred years. As the main listed companies large and medium-sized company's life can be reasonable inference for between 10 years and decades.

When calculating the option value with the BS formula, in the case of other variables remain unchanged, with the increase of T during the period of execution, the calculated value of the options will converge to a constant. The trial calculation shows that the option value which is calculated during the execution of the service life of the public is one hundred years, which is very close to that of the constant. [26]

In summary, combined with the actual situation of Chinese companies, taking into account the more samples to satisfy than the need, the study of all calculated as the equity value of the option in the options during the execution of a unified hypothesis for 10 years, that is, $T=10$.

Risk-free rate r

If the underlying asset trading are consistent with the assumptions of the BS model, the underlying assets is the value of the company is a market value for the company's overall value market situation in the presence of unbiased estimation and perfectly

correlated, so it can be directly to the value of the company as the underlying assets, real option pricing discount rate also available without interest rate risk.

The BS model assumes that the interest rate is the risk-free rate corresponding to option duration, and false in duration within the option risk-free rate is fixed. It is generally accepted that the risk-free interest rate is the interest rate on government bonds, interest rates on government bonds is a term structure. Therefore, in the interest rates on government bonds are stable, selected and above, we selected the option exercise during 10 years the most close to a treasury rates as using BS model to assess the equity value of the input. [27]

In August 10, 2004 the Ministry of finance, the sixth issue of the Treasury bonds issued a variety of ten year period, the coupon rate of 4.86% (data source: China National Debt Association website in 2004, the issue of national debt table). We chose it as the estimated risk-free interest rate r in the BS model, namely $r=4.86\%$ 。

Volatility of underlying asset σ

Listed company's corporate value equal to its debt and the value of equity and, in the capital structure, the value of the debt is relatively stable, and the fluctuation rate approximately is equal to zero, so the value of the company's volatility is equal to the value of the equity volatility, is the stock volatility. That is to say, the value of the company's volatility of the company's value can be directly from its stock price volatility.

Chooses Vanke since January 2000 listing 3 to December 25, 2015 4225 trading day closing price data, calculation, the return rate of the standard deviation of daily volatility, then multiplied by the annual number of trading days of the square root of the tick 245, volatility of the annual value of 2.5%, namely, $\sigma = 2.5\%$.

Calculation

Has been in a reasonable estimate of the parameters, can be calculated by BS formula:

BS formulation:

$$c = SN(d_1) - Xe^{-r(T-t)}N(d_2) \quad (48)$$

$$d_1 = \frac{\ln(S/X) + (r + \sigma^2/2)(T - t)}{\sigma\sqrt{T - t}} \quad (49)$$

$$d_2 = \frac{\ln(S/X) + (r + \sigma^2/2)(T - t)}{\sigma\sqrt{T - t}} = d_1 - \sigma\sqrt{T - t} \quad (50)$$

Input parameters:

$$S=479205326848$$

$$X=373765898240$$

$$T=0.25$$

$$R=4.9\%$$

$$\sigma = 2.5\%$$

$$d_1 = \frac{\ln(S/X) + (r + \sigma^2/2)(T - t)}{\sigma\sqrt{T - t}}$$

$$d_1 = 1.231$$

$$d_2 = \frac{\ln(S/X) + (r + \sigma^2/2)(T - t)}{\sigma\sqrt{T - t}} = d_1 - \sigma\sqrt{T - t}$$

$$d_2 = -0.160$$

$$N(-d_1) = N(1.231) = 0.109$$

$$N(-d_2) = N(0.891) = 0.564$$

$$C = SN(d_1) - Xe^{-r(T-t)}N(d_2)$$

$$C = 1104971878000$$

Namely: vanke (000002) value of the company's total equity amounted to 347579119064.91 yuan.

The analysis of results.

Vanke the total value of the company's equity value of 524747909.62 yuan

What is it? Given such a figure is not intuitive, only the conversion of the stock price and the letter reached the market price of the company's stock can be more useful conclusion.

Under normal circumstances, the total value of the shares will be calculated by dividing the total number of shares issued in the total can get price per share. But China's stock market has its particularity is a non-tradable shares and tradable shares

two equity segmentation market, non-tradable shares on the basis of net assets pricing, tradable shares in the stock market according to the supply and demand for pricing. Therefore, we calculated the equity value of the total amount, after deducting the value of non-tradable shares, and then divided by the number of shares in circulation can be compared with the market price per share price. In combination with the actual situation of China's stock market, taking into account the need for more samples to meet the comparability, this study unified hypothesis that the value per share of non-tradable shares is equal to net assets per share.

Vanke in December 2004 31, said: the total share capital of 105439420416, which:

Tradable share capital = 9676190000

Total shareholders' equity = 105439420416

Net assets per share = shareholders' equity / total share capital

$$= 105439420416 / 1101497 = 19.17$$

In front of us with the BS model to calculate the total value of the equity value of 1104971878000 yuan.

Share price: $1104971878000 / 9676190000 = 11.41949339$

Conclusions section two

Option is a standardized contract, the option buyer has the right, but not the obligation to buy or sell a certain amount of the underlying asset at a certain price in the future. In order to get this right, the option buyer is payable to the seller for a certain amount, called the option price. In 1973, the option pricing model established by Black

Myron and Scholes Fischer opened up a new era of the theory of asymmetric return asset pricing theory. The extension and development of real option theory in the study of asset valuation and pricing of financial option theory.

Equity as a call option based on the total value of the firm, for equity valuation, whether can directly use the Black Scholes option pricing model to calculate there is a big dispute, because the BS formula is in a series of stringent assumptions are derived under the condition of, was used for the assessment of the value of company equity, middle of some theoretical and practical problems need to be addressed.

3. INTRODUCE THE BASIC SITUATION OF LISTED COMPANIES (VANKE)

3.1 Introduce the Vanke Co., Ltd

China Vanke Co., Ltd. has become a leading real-estate company in China since it stepped into the housing market over thirty years ago in 1988, with its main business being real-estate development and property service. Adopting the strategy of focusing on city clusters, Vanke has established its presence in 65 cities in mainland China by the end of 2014, mainly in the Pearl River Delta centered on cities of Guangzhou and Shenzhen, the Yangtze River Delta centered on Shanghai, the Bohai Rim Region centered on Beijing, and the Chengdu Region which covers major cities in Midwest China. Since 2013, Vanke made its attempts to invest overseas. It has now been involved in six real-estate development projects in Hong Kong, Singapore, Los Angeles, and the New York City. Its sales volume in 2014 amounted to RMB215.13 billion for 18.064 million square meters, making it an industry leader globally in terms of sales performance. Vanke conducts its property service business mainly through Vanke Property Development Co., Ltd. (Vanke Property), which has the mission to provide first-class property service and building maintenance consistently. By the end of 2014, Vanke Property had 457 property service projects in 61 large- and medium-sized cities in mainland China, covering a contractual property management area of 100 million square meters.

Vanke's shares in 2013 annual report shows that in 2013 Vanke sales area of over 50000 square meters, the amount of sales of \$10 million, an increase of 15% and 21%,

respectively, the annual sales amount to refresh the industry record. 2014 interim report results also show that the performance of Vanke A shares stable, the annual sales will continue to maintain growth levels. In recent years, China's real estate market entered a period of adjustment, is in the national macro-control and market changes more complex turbulent times, but Vanke Real Estate and not to be affected by it, still made good performance. "With the idea of the foundation, as a moral and ethical emphasis on commercial interests", is the biggest characteristic of vanke. Vanke has always been closely followed by the leader, adhering to the interests of investors benefit, market segments for the spirit of the benchmark, in order to be in the complex and volatile real estate market conducive to an invincible position.

Vanke A shares as the research object, mainly because of Vanke business philosophy leading, profitability, has been the development of more mature enterprises, the real estate industry leading enterprises. Vanke A shares of the valuation of investment funds in accordance with the value of the concept, there is a strong reference value. Need to be paid attention to in the research of this paper, the stock in circulation and whether divided into tradable shares and non tradable shares two classes, but the in order to facilitate accurate only research China Vanke Co., Ltd. of tradable shares a part of the stock, not involved in other situations.

The Group realized a revenue of RMB47.63 billion, representing a year-on-year increase of 23.7%. The Group realized a net profit for the period of RMB6.79billion, representing a year-on-year increase of 23.6%.In the past few years, the Company had intensified cooperation. Certain cooperative projects with a higher proportion of

interests held by cooperative partners were booked during the Reporting Period. Among the Group's booked projects during the Reporting Period, there were over 20 projects with cooperative partners holding over 35% equity interests. The net profit generated by these projects (including minority interests) accounted for 47% of the Group's total net profit during the Reporting Period. Affected by this factor, the proportion of net profit attributable to minority interests increased significantly in the first half of the year. After deducting the net profit attributable to minority interests, net profit attributable to equity shareholders of the Company rose by 0.8% year-on-year to RMB4.85 billion.

As at the end of the Reporting Period, the Company had a total area of 19,482,000 sq m sold but not yet booked stated in the consolidated statements, as construction had yet to be completed. These unbooked resources had a contract amount of approximately RMB230.33 billion. The area and contract amount were 16.7% and 18.4% higher than those at the end of last year respectively.

During the Reporting Period, the Group rationally replenished project resources in accordance with the market situation and its actual development needs. In the first half of the year, the Group acquired 26 development projects, with a gross floor area (GFA) of 6,881,000 sq m, of which the GFA attributable to Vanke's equity holding amounted to approximately 5,075,000 sq m, representing a 92.2% increase from that of the same period of 2014. As at the end of the Reporting Period, the aggregate GFA of the Group's projects under planning attributable to Vanke's equity holding amounted to approximately 36,783,000 sq m, which was sufficient to meet the Group's development needs for over two years. In addition, the Company was also involved in certain

city-redevelopment projects. According to the current planning, the aggregate GFA of these projects attributable to Vanke's equity holding at the end of the Reporting Period was approximately

As at the end of the Reporting Period, the Group's inventories included RMB23.11 billion of completed properties (properties ready for sale), accounting for 6.94% of total inventories. 2,708,000 sq m.

The Group maintained a sound financial and cash position. As at the end of the Reporting Period, the Group's cash and cash equivalents (including pledged and restricted deposits) amounted to RMB44.61 billion, which was much more than the sum of short-term borrowings and long-term borrowings due within one year of RMB23.77 billion. The Group's other liabilities (excluding receipts in advance that did not constitute any actual repayment obligation) accounted for 38.86% of total assets, representing a decrease of 2.59 percentage points from that at the end of 2014. The Group's net gearing ratio (interest-bearing borrowings less cash and cash equivalents, divided by net assets) was 15.76% and continued to stay at a relatively low level in the industry.

3.2 Analysis the financial position of Vanke Co., Ltd

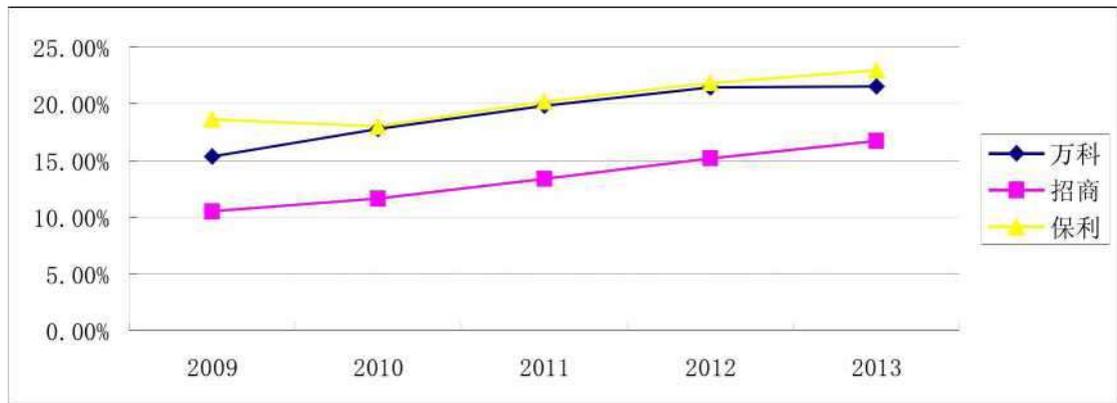
1. The analysis of profitability

Profitability is the enterprise profit ability, enterprise's profit ability is stronger, assigned to the investor's return is higher, the greater the value of enterprises. Analysis of indicators of profitability are the main sales gross margin and sales net profit rate, the

rate of return on total assets and net assets income rate. The gross margin reflects the initial profitability, is the enterprise net profit

Run the starting point, if there is no higher sales margin will not create greater profits. The annual financial statements published by Vanke A, from the 2009-2013 annual sales gross margin was 29.39%, 40.70%, 39.78%, 36.56% and 31.47%. Among them, the 2010 sales gross margin compared with 2009 growth of nearly 40 percentage points, after several year has decreased, but remained the same level of profit. Also in the leading level of the poly real estate from 2009-2013 year sales gross margin was 36.82%, 34.12%, 37.20%, 36.19% and 32.16%. By comparing the Vanke A shares has a higher gross margin, the company's profitability in the leading level of the industry. [28]

Another profitability index rate of return on net assets, is the most representative of the index, the higher the value that enterprise's profit ability is stronger. From Vanke annual report shows that its net assets yield nearly five years rate were 15.37%, 17.79%, 19.83%, 21.45% and 21.54%, the rate of return on net assets and Vanke A in the industry-leading level of investment, Poly Real estate net assets yield comparison, as shown in figure 4.1. As can be seen from figure three, the real estate company's net assets yield on the whole are increasing year by year, and the ratio of Vanke and poly is very close, significantly higher than the real estate investment rate of return on net assets. Although Vanke nearly two years of amplification has declined, but the return on investment of the base remained stable in the industry-leading level, which laid the foundation for the Vanke A good profit level.

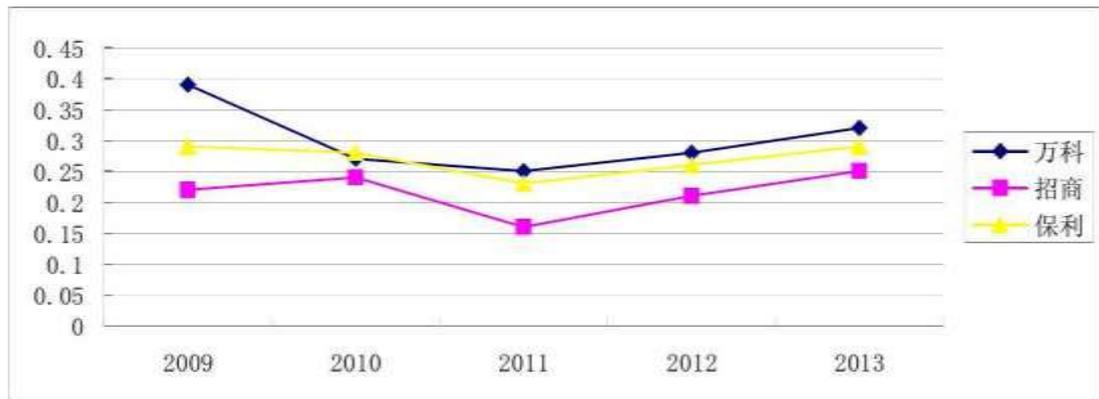


Picture.3—The comparison of return on net assets (2009-2013)

2. Operation ability analysis

Operation ability analysis of enterprise refers to the efficiency of the relevant indicators calculation of enterprise capital turnover to analyze enterprise asset utilization, in order to determine the efficiency of the company's management and capital operation ability. The commonly used operation ability analysis index of inventory turnover, accounts receivable turnover ratio, total asset turnover rate. Among them, the inventory turnover rate is a comprehensive index to measure and evaluate the enterprise purchase inventory, put into production, sales and other aspects of the recovery of funds management situation, which shows that the company

It's effective for inventory management. Is generally believed that the higher the inventory turnover rate of inventory management of the company is more effective, its operating ability is better. Vanke A will last five years of inventory turnover and investment real estate, Poly Real estate to be compared, as shown in figure 4.2.



Picture 4 – The comparison of inventory turnover (2009-2013)

We can see that Vanke A rate decreased obviously in 2010 inventory turnover, the other two companies although the decline but the magnitude is not large, these results may be attributed to the expansion caused by vanke. But Vanke A stock turnover rate in 2010 remained stable upward trend, were higher than that of investment and poly, at the advanced level, so the overall Vanke has good operation ability.

3. Debt paying ability analyses

The solvency of the enterprise is the enterprise using its assets to repay long-term and short-term debt, solvency is an important symbol to reflect the enterprise's financial position and operating ability. Analysis of short-term solvency indicators commonly reflect the current ratio and quick ratio; reflect the long-term solvency indicators of equity ratio etc.. Analysis of China Vanke A shares 2009-2013's annual report shows that the flow rate were 1.91, 1.59, 1.41, 1.40, 1.34; the quick ratio were 0.59, 0.56, 0.37, 0.41, 0.34. Therefore, Vanke's flow speed ratio has been maintained at a relatively low level, and showed a declining trend, we can see that the real estate Vanke face short-term financial risk. Equity ratio is the guarantee degree of the interests of the creditors to measure the enterprise bankruptcy liquidation, the larger the ratio of

property rights, the interests of creditors of the guarantee degree is low, the risk is bigger. The following will Vanke A, Poly Real estate, real estate investment in 2009-2013 equity ratio index comparison, as shown in figure 4.3. We can see that the real estate investment equity ratio is relatively low, long-term solvency is relatively strong, while China Vanke A and poly property ratio is relatively high, and very similar. But on the whole three

The company's equity ratio increased, indicating that the company's long-term solvency declined year by year, there is a certain debt risk, the company should strengthen solvency.

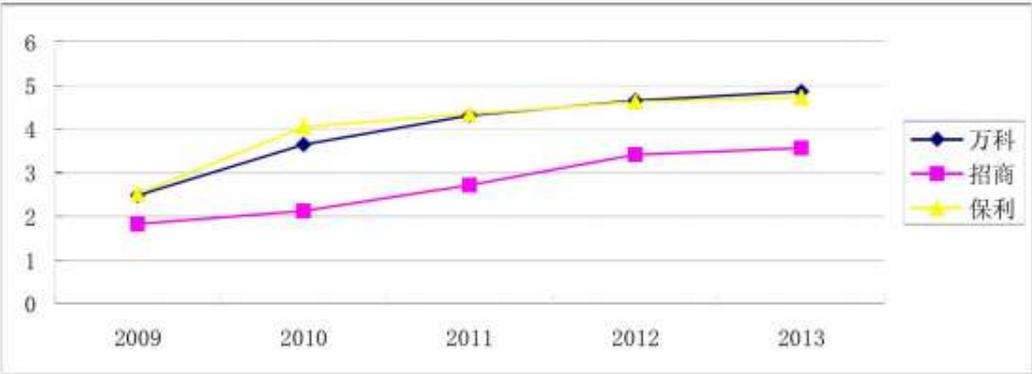


图 4.3 产权比率的比较 (2009-2013)
 Fig.4.3 The comparison of equity ratio (2009-2013)

Picture 5 – The comparison of equity ratio (2009-2013)

Through the above analysis, Vanke Group through continuous progress and development, has been in a leading position in the industry, with strong competitiveness, its operating capacity and profitability are in good condition, but the solvency has declined, debt risk, the company should strengthen the protection for the creditors. Therefore, a comprehensive analysis of the company's financial indicators is of great

value to the valuation of the stock market, provides a more strict and accurate financial basis for valuation.

4. Analysis on the valuation of China Vanke A shares, the discounted cash flow method

Using the method of discounted cash flow valuation of Vanke A shares, mainly estimates the intrinsic value determined by the characteristics of the enterprises. The free cash flow discount formula, the cost of capital and the expected value of future free cash flow decision of enterprises, and the free cash flow and cost of capital, and is expected by the enterprise itself the value of the assets, profitability and future development trends and growth characteristics of the decision. Therefore, the value of the stock company was estimated by the method of discounted cash flow, focus on the intrinsic value of the enterprise itself, the value of the investment is relatively accurate and authoritative analysis, not to estimate the share value with the change of the overall trend of the market changes. [29]

The long-term investment value of the investment focus on enterprises, and long-term investment is not ready within a year or longer than one year business cycle into cash investment [39]. Therefore the free cash flow of Vanke A stock valuation discount method, should also follow the concept of value investing. Short term investment, stock market volatility, the stock price cannot reflect the intrinsic value of the law, therefore based on the valuation of China Vanke A shares, will be used for long-term investment, the time zone at

Division, for a period of one year. The company decided to select the Vanke Group 2009-2013 annual economic data analysis, on the basis of the choice of the date of the main consideration to the previous year, China's stock market has not mature enough, the "money market", "speculation" to highlight the characteristics of these factors, the stock value estimation will have adverse effects. In 2005, China began to implement the reform of non-tradable shares in 2006, with the share reform of the basic and complete accounting system and constantly improve, make our securities market slowly on the right track, [4G] also has the value of the investment. But in late 2007 ushered in the financial crisis, which caused a lot of negative impact on the stock market of our country, once again due to the volatility of the stock market, is not conducive to the value of the investment analysis, the above factors and finally select the Vanke Group 2009-2013 annual data for the value of the investment analysis, in order to achieve an accurate analysis of the value of the shares of China Vanke A. [30]

5. Analysis of Vanke A shares valuation method of net rate of city

The valuation of Vanke A shares by city net rate method, first of all should choose appropriate comparable companies. In this paper, according to the securities times network announced in 2013 and 2014 China's Shanghai and Shenzhen listed real estate companies overall strength TOP10 list real estate company, and associated with wealth creation ability, financial stability and investment value of the ranking results obtained 10 comparable companies. Which removed some financial data is not complete, listed late real estate company, and select main business and Vanke consistent with or close to the company, so as to ensure the selected companies in asset scale, profit ability,

economic policy and competitiveness with China Vanke a quite, to city net rate method of valuation, but also the results of the valuation of the relatively more accurate. Table 4.11 lists each respectively 4.12 comparable companies in the 2009-2013 annual net assets per share and weighted average shares.

Table 1–Comparable companies’ per share net assets (unit: yuan) (2009-2013)

Year	2009	2010	2011	2012	2013
Poly Real Estate	7.13	6.49	5.93	5.95	7.25
ChinaMerchants	9.48	10.60	11.89	13.62	15.56
Gemdale	6.04	3.95	4.62	5.26	6.51
Financial Street	6.25	5.58	5.98	6.54	7.36
BCDH	8.12	9.11	8.05	8.74	6.22
BUCG	6.48	5.86	6.63	8.46	9.59
CFLD	1.88	1.89	4.74	4.89	5.03
chinaoct A	3.37	4.25	2.91	2.74	3.28

Continuation of Table 1 - Comparable companies’ per share net assets (unit: yuan) (2009-2013)

RSFZ	4.22	3.32	3.29	4.37	5.79
BJJT	2.52	3.18	3.63	4.44	5.38

Table2–Comparable companies, weighted average share price (unit: yuan) (2009-2013)

Year	2009	2010	2011	2012	2013
Gemdale	13.26	8.88	6.00	5.77	6.69
Financial	11.42	8.61	6.73	6.28	5.70
BCDH	18.08	16.91	12.57	10.99	7.61

BUCG	14.97	13.57	13.14	12.78	11.58
CFLD	8.13	11.96	12.68	20.03	27.83
chinaoct A	16.36	13.57	9.14	6.55	6.02
RSFZ	14.10	14.14	10.26	10.06	13.39
BJJT	13.67	11.48	10.20	8.27	8.71
Poly Real	23.32	14.86	11.34	11.38	11.03
China	24.66	19.35	17.53	21.95	25.25

Price to book ratio value method:

$$PB=P/B \quad (51)$$

To get comparable companies in 2009-2013 city net rate value, and then calculated the average net rate values, as shown in table 4.13。

Table3 – Comparable companies’ price-to-book value (2009-2013)

Year	2009	2010	2011	2012	2013
PolyReal	3.271	2.290	1.912	1.913	1.521
China	2.601	1.825	1.474	1.612	1.623

Continuation of Table3 – Comparable companies’ price-to-book value (2009-2013)

Gemdale	2.195	2.248	1.299	1.097	1.028
Financial	1.827	1.543	1.125	0.960	0.774
BCDH	2.227	1.856	1.561	1.257	1.223
BUCG	2.310	2.316	1.982	1.511	1.208
CFLD	4.324	6.328	2.675	4.096	5.533
chinaoct	4.855	3.193	3.141	2.391	1.835
RSFZ	3.341	4.259	3.119	2.302	2.313
BJJT	5.425	3.610	2.810	1.863	1.619
Averag	3.237	2.9468	2.1098	1.9002	1.8677

Through the query of Vanke A shares 2009-2013 annual net assets per share, then using the formula (3.13)

$$P=APB \times B \quad (52)$$

To get the relevant data of China Vanke A shares the stock valuation, as shown in table 4.14

Table4 – The stock estimate each year of Vanke A shares (unit: yuan)

Year	PE	PA	Estimate	Price
2009	3.2376	3.40	11.01	10.35
2010	2.9468	4.02	11.85	8.62
2011	2.1098	4.82	10.17	8.09
2012	1.9002	5.80	11.02	8.50
2013	1.8677	6.98	13.04	10.08

Through the comparison of free cash flow discounted method and city net rate method to estimate the value of the stock can be found, city net rate method to estimate the price closer to the true value of Vanke A shares, and the most important of is to than the option of the company is comparable companies choose the different estimates of a stock's value will also have the very big difference. Also the results from the two valuation methods to estimate the also can be seen that the estimated values are higher than the actual value, indicating that Vanke A shares in the market may be underestimated, the great appreciation of space, investors a good investment opportunity.

[31]

5.The price earnings ratio analysis of Vanke valuation of A shares

Use P / E ratio method Vanke A-share valuation process with the city net rate method are basically the same, the same should select appropriate than the company, this selection can be than the company has with the city net rate method in the selection of the same ratio is the company to the city net rate method and the P / E ratio method

of valuation results compared with comparable. 2009-2013 can be more than the company the weighted average price of the same as in table 4.12, and each period of basic earnings per share as shown in table 4.15:

Table5 –Comparable companies P/E value (2009-2013)

Year	2009	2010	2011	2012	2013
Poly Real	1.06	1.08	1.10	1.18	1.51
China	0.96	1.17	1.51	1.93	2.45
Gemdale	0.78	0.60	0.67	0.76	0.81
Financial	0.55	0.59	0.67	0.75	0.96
BCDH	0.95	1.17	1.26	1.08	0.57
BUCG	1.15	1.35	0.96	1.23	1.44
CFLD	0.05	0.02	3.28	2.02	2.05
chinaoct	0.55	0.98	0.57	0.53	0.61
RSFZ	0.73	0.71	0.82	1.15	1.55
BJJT	0.48	0.71	0.58	0.94	1.04

Table6–Comparable companies’ basic earnings of per share (unit: yuan)

Year	2009	2010	2011	2012	2013
PolyReal	22.00	13.76	10.31	9.64	7.30
China	25.69	16.54	11.61	11.37	10.31
Gemdale	17.00	14.80	8.96	7.59	8.26
Financial	20.76	14.59	10.04	8.37	5.94
BCDH	19.03	14.45	9.98	10.18	13.35
BUCG	13.02	10.05	13.69	10.39	8.04
CFLD	—	—	3.87	9.92	13.58
chinaoct	29.75	13.85	16.04	12.36	9.87
RSFZ	19.32	19.92	12.51	8.75	8.64
BJJT	28.48	16.17	17.59	8.80	8.38
Averag	21.67	14.90	11.46	9.74	9.37

Price earnings ratio method:

$$PE = \frac{P}{E} \quad (53)$$

Comparable company 2009-2013 year earnings value, then calculate the comparable companies in each period of the average price earnings ratio value, as shown in table 4.16:

By querying the 2009-2013 annual Vanke A shares the basic earnings per share, and then using the formula

$$P = APE \times E \quad (54)$$

To get the relevant data of China Vanke A shares the share of the estimated value, as shown in table7:

Table7 –The stock estimate each year of Vanke A shares (unit: yuan)

Year	PE	EPS	Estimate	Price
2009	21.67	0.48	10.40	10.35
2010	14.90	0.66	9.83	8.62
2011	11.46	0.88	10.08	8.09
2012	9.74	1.14	11.10	8.50
2013	9.37	1.37	12.84	10.08

By comparing the earnings per share method to estimate the real value and the weighted average share price, the difference is small in magnitude, which in 2009 the estimated value is consistent with the current weighted average share price. This can be seen by the price earnings ratio valuation of the stock market of China's real estate industry is more reasonable, for the comparable companies to choose the more appropriate, can reflect the state of the market Vanke A shares.

3.3 Compare result from B-S model with stock market

In order to verify the B-S model to guide the stock valuation, we make the following assumptions in line with the requirements of a linear regression model.

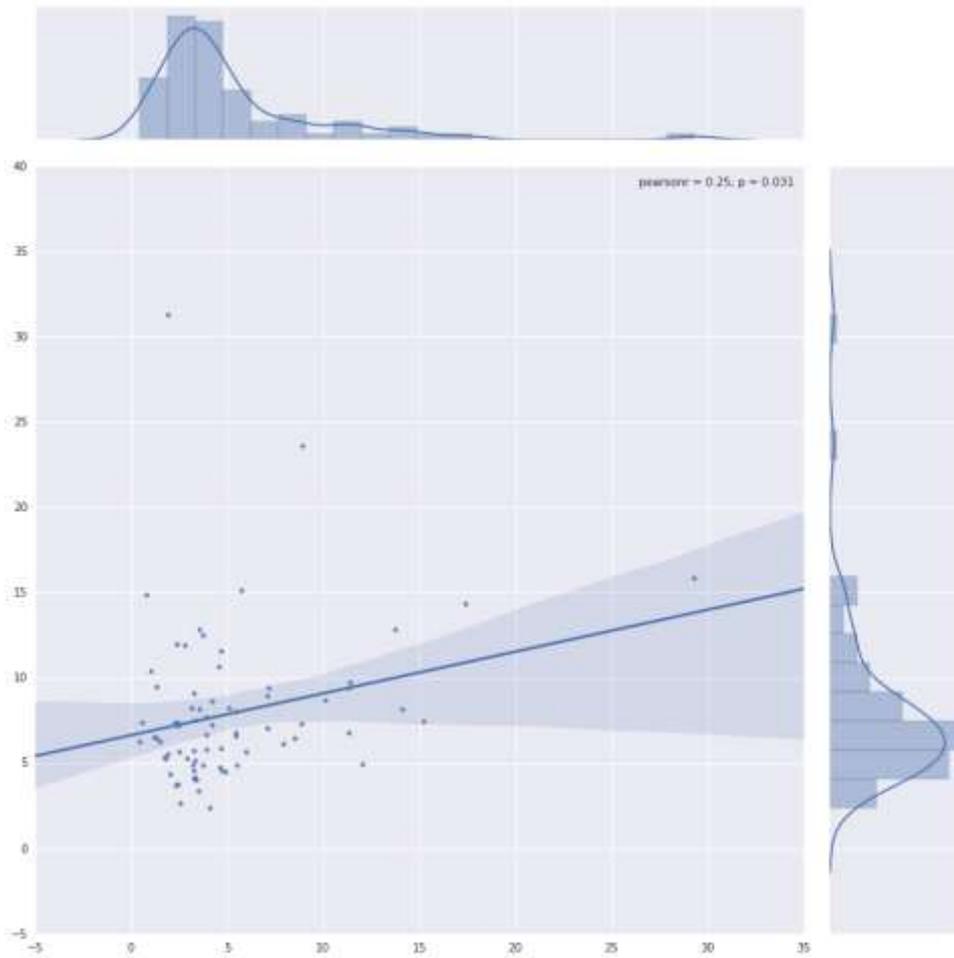
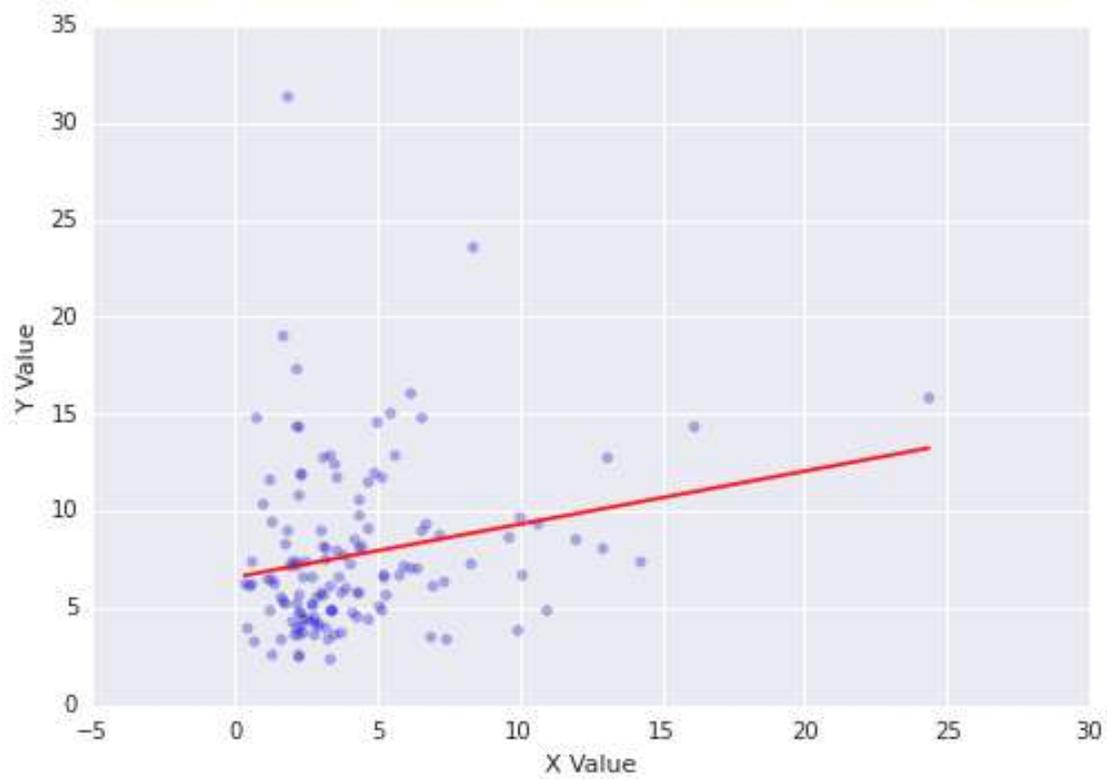
1. Through the B-S model to estimate the price of X as the independent variable, within one year of the stock average stock price Y as the dependent variable.
2. Sample selection of 74 companies listed real estate plate 。

3. Time range: 01/042014---01/04/2015

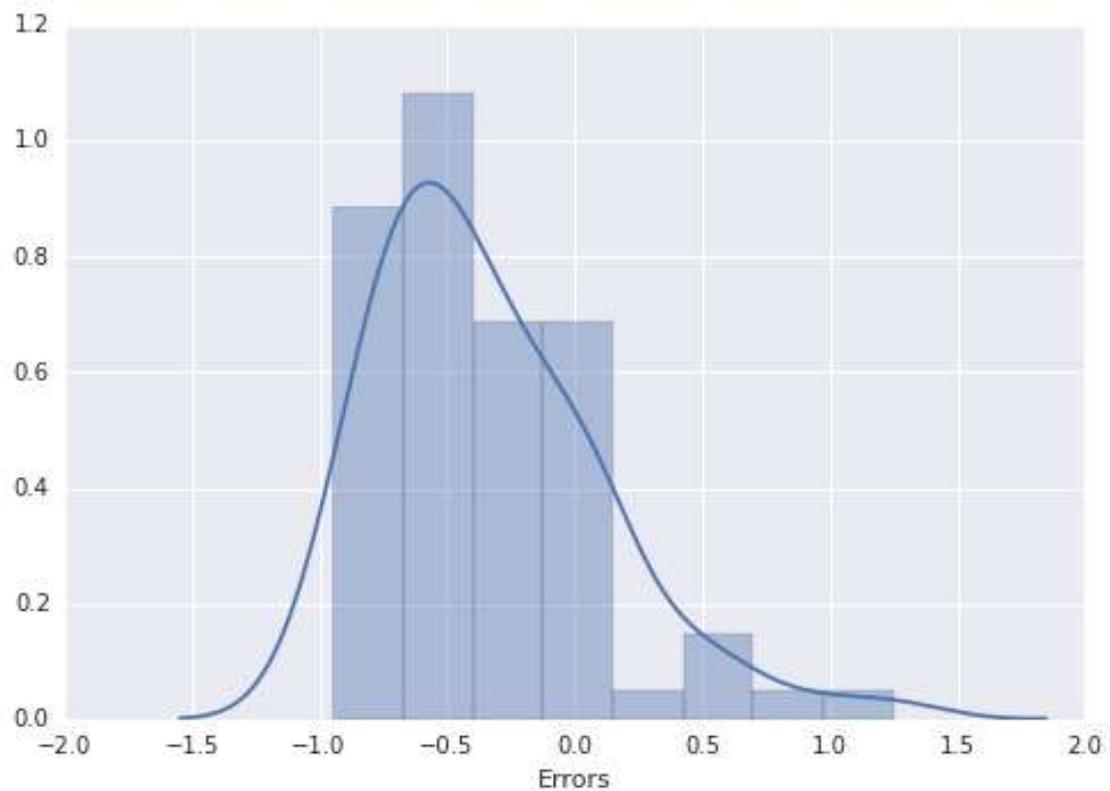
Table8 –The result of OLS

Dep. Variable:	y		R-squared:	0.063	
Model:	OLS		Adj. R-squared:	0.050	
Method:	Least Squares		F-statistic:	4.868	
Date:	Sat, 02 Apr 2016		Prob (F-statistic):	0.0305	
Time:	18:55:21		Log-Likelihood:	-213.25	
No. Observations:	74		AIC:	430.5	
Df Residuals:	72		BIC:	435.1	
Df Model:	1				
Covariance Type:	nonrobust				
	coef	std err	t	P> t 	[95.0% Conf. Int.]
const	6.6283	0.774	8.563	0.000	5.085 8.171
x1	0.2452	0.111	2.206	0.031	0.024 0.467
Omnibus:	74.075		Durbin-Watson:	1.907	
Prob(Omnibus):	0.000		Jarque-Bera (JB):	605.045	
Skew:	3.001		Prob(JB):	4.13e-132	
Kurtosis:	15.657		Cond. No.	10.7	

Picture 6-The result of OLS



Picture 7-The errors of estimate price with actually price analysis.



The results of this study show that the closing prices of listed call options contain information about equilibrium stock prices that is not contained in the closing prices of underlying stocks.

3.4 My suggestion about improve the model

Although we chose the BS model, but to is used to assess equity value, the BS formula itself strict assumptions and for equity valuation in the special problems still need to do a detailed analysis and careful treatment.

1. The underlying assets does not satisfy the trading conditions: Copeland and Antikarov proposed MAD (Marketed Asset Disclaimer) that real assets value is physical capital

An unbiased estimate of the market value of a property transaction and its complete correlation, so the value of physical assets can be directly used as the underlying asset. Accordingly, in the use of BS formula to make an evaluation of the value of equity, the underlying assets that the value of the company is a proxy for the company's overall market value field value estimation and perfectly correlated, so it can be directly to the value of the company as the underlying assets. Company value can be determined by a variety of other methods, such as assessment, cash flow discount method, the book value method, etc..

2. Equity is as European option: in front to continue business options analysis think, there is no a fixed company liquidation date spot in maturity, but according to the nature of the limited liability company, shareholders will still enjoy according to firm value and debt relationship between decided to continue to operate or clear debt option can be weighted duration of liabilities on the company's balance sheet as option expiration.

3. Do not pay dividends or underlying assets not value leakage: company value of any non normal business behavior such as the assets of the company as a gift or sale caused by leakage in value, and stock dividend on the option price sound similar. It is reasonable to assume that the non normal operating behavior of the company does not exist in the operation.

4. The underlying asset price follows geometric Brownian motion: Samuelson (1965) that, companies face numerous different characteristics and structure of uncertainty are attributed to a single uncertainty, namely firm value varies with time varying uncertainty. No matter how the company's future cash flow or other factors, changes in the company's value, the change in the value of the company to follow the fixed variance of the random walk. This argument for us in the use of BS model of equity pricing that the underlying asset price compliance from the geometric Brown movement provides a firm theoretical support.

5. Volatility is a known constant: listed companies corporate value is equal to the value of the debt and equity value and, in the capital structure and the value of the debt is relatively stable, and the fluctuation of rate can be approximately equal to zero, so the value of the company's volatility is equal to value of equity price volatility, is stocks of fluctuation rate. That is to say, the value of the volatility of the value of the listing Corporation data can be directly from its stock price volatility.

6 non risk interest rate is known as constant: the BS model assumes that the interest rate is no risk interest rate corresponding to the duration of the option, and it is assumed that the risk-free interest rate is fixed in the duration of the option. It is generally accepted that the risk free interest rate is the interest rate on government bonds, interest rates on government bonds is a certain period of time limit structure. Therefore, in the interest rates on government bonds are stable, selection and corporate debt weighted long period closest to the file Treasury rates as using BS model to assess the equity value of the input.

7. Frictionless market (no commissions and other transaction costs, no tax, subject matter can be infinite subdivision can be freely traded): BS model is used to calculate the theoretical price of an option, practitioners can be according to the theoretical price according to the market adjust their prices to get fit, so the market without friction assumption in the calculation of the theoretical value of equity is an acceptable assumption.

CONCLUSION

In this paper, we first review the research literature of company valuation and real options theory and methods. Value is defined for a certain period of time in the future (income expected cash flow) according to certain interest discount rate discounting the present value of the sum of rates, this idea leads to the currently widely accepted and applied longitudinal to the discount model, namely discounted cash flow valuation method (dcf method). Discounted cash flow valuation method that the present value of the sum of the value of a company is that the company expects all cash flow generated in the future. With cash flow valuation method is divided into two methods, namely only on the company's equity capital valuation method of valuation method and the company's overall. Two kinds of methods to discount the expected cash flow, but the cash flow and the discount flow is different. The equity value of the company usually through the use of the cost of equity capital of

The expected equity cash flow discount and. The company's overall value is usually obtained through the company capital weighted average cost of expected cash flow, and

then subtract the discounted value of the debts of the company can get the value of the company's share. By similar companies or assets should have similar transaction price, is the basic thought of law of one price, resulting in a method of the second largest category of corporate valuation theory that horizontal analogy model, also called the relative valuation method. The method of hypothesis other companies in the industry and corporate valuation has can be properly, and the market pricing of these companies is, in this premise, assessment of the value of the company is than the company's value to a variable, such as income, cash flow, account value or income ratios were calculated and obtained by reference. Third methods of corporate valuation theory is the contingent claim valuation method is the use of option pricing theory to assess the value of the company.

The option is a kind of option holders through pay a certain cost and have a on the expiry date or before the expiration date according to the specific circumstances to make specific choices. Is the essence of the option gives the holder a right but not the obligation. There are two types of options, one is buying options), also known as the call option, refers to the holder at a specified time to determine the price to buy assets such as stocks, interest rates and other rights). Another is to sell options or options, refers to the rights of the holder in the specified time to determine the price of assets. Because the option is to protect investors in the price to adverse movements from suffered losses and for investors to keep prices to the favorable direction of change can be obtained the interests of the asymmetric return characteristics, makes its valuation and pricing becomes very difficult and complex. In 1973, F. black and M. Scholes

published the option pricing model under seven strict assumptions, with no arbitrage equilibrium thought, by constructing a specific portfolio: hold a stock, sell a certain proportion of the call option, given the stock price fluctuation rate, the risk-free rate, exercise price, due day, the stock price of five variables calculated formula of European call option prices. BS model for financial derivative products market provides a solid theoretical foundation, since birth for many economists are concerned, and are rapidly being used widely in financial practice, financial derivative product market influence grows day and day. Later, many economists from the depth and breadth of option pricing is a more extensive research, option pricing theory has been further developed.

Third methods of corporate valuation theory contingent claim valuation method is to use the option pricing theory and method to evaluate the value of the company. Option pricing theory is used to the value of the company for assessment of a method is to identify the company has the option characteristics of assets and valuation, and the value of other assets and to get the company's value. In this study, from the characteristics of the limited liability of the Modern Corporation, the option characteristics of equity capital is set out, and the value of the equity capital of the company is calculated from the whole. Equity is a residual claim that equity holders have to meet their obligations, and stock holders interests remaining after all cash flow claim; company liquidation, all issued in debt, and other financial claim payment is completed after, the surplus of the company the full value of equity investors all; Co., Ltd. can play to in the value of the company below the issue the value of the debt to protect the role of equity investors, the maximum loss is in the company's contribution.

In this way, the stock right can be regarded as a call for the value of the company's value, the value of the underlying asset, the value of the underlying asset. If we can according to the call option pricing theory to determine the company's equity value and according to the total number of shares can get a share of stock prices. So using Scholes Black pricing model to give the company equity valuation and then to the stock price has become a viable option.

Starting from the modern company of limited liability feature in the equity capital has the option characteristics, first of shares and options relationship made detailed analysis, and then analyzes the Black Scholes model used on the applicability of equity pricing, especially made a detailed analysis on the assumptions and parameter estimation problem. Finally, it selects the Shanghai and Shenzhen two city 74 only BS model to calculate the values of their equity value and tradable stock theory. The results show that BS model is used to calculate the circulation stock theoretical value or the intrinsic value of market prices have a certain guiding significance.

The option pricing theory and corporate value assessment methods combined, specifically, the use of BS model for corporate equity value assessment and the stock price made beneficial exploration, to promote the utility of BS model.

• LIST OF REFERENCES

1. Menachem Brenner and Marti G. Subrahmanyam .A Simple Approach to Option Valuation and Hedging in the Black-Scholes Model [text] // Financial Analysts Journal. –1994 –Vol.50.–P. 25-28.
2. Bruce D. Fielitz and Frederick L. Muller. A Simplified Approach to Common Stock Valuation [text] // Financial Analysts Journal. –1985–Vol. 41. –P. 35-41.
3. Gilbert H. Palmer. An Approach to Stock Valuation [text] // The Analysts Journal. – 1956–Vol. 12.–P. 17-19.
4. Walter R. Good. Bias in Stock Market Valuation [text] // Financial Analysts Journal.–1989–Vol. 45. –P. 6-7.
5. Walter R. Good. Common Stock Valuation: Principles, Tables and Application [text] // Financial Analysts Journal. –1965–Vol. 21. –P. 104-123.
6. Gary P. Brinson. Dividends and Stock-Valuation Models [text] // Financial Analysts Journal. –1970–26. –P.125.
7. Philip Kotler. Elements in a Theory of Growth Stock Valuation [text] // Financial Analysts Journal. –1962–Vol. 18.–P.35-38.
8. Chin-Tsai Lin and Hsin-Yi Yeh. Empirical of the Taiwan stock inde [text] // Applied Economics. – 2009–Vol.41. –P. 1965–1972.
9. Alok Kumar. Hard-to-Value Stocks, Behavioral Biases, and Informed Trading [text] // Journal of Financial And Quantitative Analysis. –2009 – Vol. 44. – P.1375–1401.

10. Gary Smith. Investment and q in a Stock Valuation Model [text] // Southern Economic Journal, Vol. 47, No. 4 (Apr., 1981), –P. 1007-1020.
11. Raj Aggarwal. Multinationality and Stock Market Valuation: A Reply [text] // Management International Review, Vol. 20, No. 4 (1980), –P. 113-114.
12. Marvin May. An Investment Opportunities Stock Valuation Model Based on Growth Patterns of Equity [text] // The Journal of Finance. –1971–Vol. 26.–P. 993-994.
13. Steven Manaster, Richard J. Rendleman and Jr. Option Prices as Predictors of Equilibrium Stock Prices [text] // The Journal of Finance.–1982.–P. 1043-1057.
14. D. Blake. OPTION PRICING MODELS [text] // Journal of the Institute of Actuaries. –1989– Vol. 116. –P.537-558.
15. Richard C. Stapleto. Portfolio Analysis, Stock Valuation and Capital Budgeting Decision Rules for Risky Projects [text] // The Journal of Finance. –1971. –P. 95-117.
16. Beni Lauterbach and Paul Schultz.Pricing. Warrants: An Empirical Study of the Black-Scholes Model and Its Alternatives [text] // The Journal of Finance. –1990–Vol. 45. –P. 1181-1209.
17. Richard O. Michaud and PAUL L. DAVI. Valuation Model Bias and the Scale Structure of Dividend Discount Returns [text] // The Journal of Finance . 1982 – Vol. 90.–P. 54-59.
18. Bradford Cornell. Using the Option Pricing Model to Measure the Uncertainty Producing Effect of Major Announcements [text] // Financial Management. –1978–Vol. 7. –P. 54-59.

19. Wei Wei, Yuexin Mao , Bing Wang. Twitter volume spikes and stock options pricing [text] // Computer Communications . –2015–Vol. 14. –P. 14-18.
20. Joseph Aharony. Time Effects in Empirical Stock Valuation Models [text] // The Review of Economics and Statistics. –1979–Vol. 61.–P. 460-466.
21. James C. T. Mao. The Valuation of Growth Stocks: The Investment Opportunities Approach [text] // The Journal of Finance. –1966 –Vol. 21. –P. 95-102,
22. Lal C. Chugh and Joseph W. Meador. The Stock Valuation Process: The Analysts' View [text] // Financial Analysts Journal. –1984–Vol. 40.–P. 41-43.
23. Louis K. C. Chan, Josef Lakonishok and Theodore Sougiannis. The Stock Market Valuation of Research and Development Expenditures [text] // The Journal of Finance. –2001–Vol. 56. –P. 2431-2456.
24. Shmuel Hauser and Beni Lauterbach. The Relative Performance of Five Alternative Warrant Pricing Models [text] // Financial Analysts Journal. –1997–Vol. 53.–P. 55-61.
25. Haim Ben-Shahar and Abraham Ascher. The Integration of Capital Budgeting and Stock Valuation: Comment [text] // The American Economic Review. –1967–Vol. 57. –P. 209-214.
26. Dorothy H. Bower and Richard S. Bower. Test of a Stock Valuation Model [text] // The Journal of Finance. –1970–Vol. 25–P. 483-492.
27. Amaresh Bagchi. Stock Valuation Rule: Case for Revision [text] // Economic and Political Weekly. –1974–Vol. 9.–P. M65-M66.

28. Ľuboš Pástor and Pietro Veronesi. Stock Valuation and Learning about Profitability [text] // The Journal of Finance. –2003–Vol. 58–P. 1749-1789.

29. Kevin Cole, Jean Helwege and David Laster. Stock Market Valuation Indicators: Is This Time Different? [text] // Financial Analysts Journal. –1996–Vol. 52.–P. 56-64.

30. David K. Eiteman. A Computer Program for Common Stock Valuation [text] // Financial Analysts Journal. – 1968–Vol. 52– P. 107-111.

31. O. K. Burrell. A Mathematical Approach to Growth Stock Valuation [text] // Financial Analysts Journal. –1960–Vol. 16.–P. 69-72+75-76.

ATTACHMENT: THE RESULTS OF COMPARED ESTIMATE PRICE WITH ACTUAL PRICE

code	capital ization	circula ting_c ap	total_liabi lity	total_asset s	total_own er_equitie s	pubDate	Vola bilit y	Estime price	Price	Errors
002133.X SHE	59832	41771	55472056 32	80144404 48	24672345 60	2014/2/1 5	2.08 %	4.7586	4.5392	4.83%
000838.X SHE	18100	16290	16529171 20	20361635 84	38324646 4	2014/2/1 8	2.99 %	2.6026	2.6107	-0.31 %
600077.X SHG	10909 6	48663	85940971 52	1.1325E+ 10	27305743 36	2014/2/1 9	2.83 %	3.3474	5.1249	-34.68 %
000926.X SHE	71236	52896	1.821E+1 0	2.7111E+ 10	89014794 24	2014/2/2 2	1.90 %	14.141 9	8.1211	74.14 %
600807.X SHG	32115	30789	22850286 08	29147962 88	62976761 6	2014/2/2 2	2.50 %	2.3159	7.3682	-68.57 %
000537.X SHE	51272	51271	20848659 20	41514690 56	20666032 64	2014/2/2 5	2.20 %	4.2251	7.2369	-41.62 %
000616.X SHE	14302 3	14302 3	72342563 84	1.1748E+ 10	45136051 20	2014/2/2 5	1.59 %	3.3977	4.0002	-15.06 %
600773.X SHG	57571	53964	76223610 88	88742000 64	12518387 20	2014/2/2 5	2.65 %	2.8499	11.852 1	-75.95 %

600067.X SHG	11905 6	11905 6	96310149 12	1.5718E+ 10	60867502 08	2014/2/2 7	2.85 %	5.4993	6.5616	-16.19 %
000736.X SHE	29719	12825	18370113 28	46454231 04	28084119 04	2014/2/2 8	2.97 %	10.134 8	8.6268	17.48 %
600503.X SHG	11390 8	10994 8	11073329 92	30774978 56	19701647 36	2014/2/2 8	2.32 %	1.7778	5.3147	-66.55 %
000043.X SHE	66696	66696	1.3605E+ 10	1.7718E+ 10	41127610 88	2014/3/1	2.97 %	7.1419	6.9967	2.08%
000517.X SHE	10613 1	22228	49701140 48	82251125 76	32549982 72	2014/3/4	3.05 %	4.1362	2.3531	75.77 %
000514.X SHE	84377	84377	45061529 60	76172738 56	31111206 40	2014/3/5	2.71 %	3.9425	5.7797	-31.79 %
000965.X SHE	69234	69234	26863511 04	52913500 16	26049989 12	2014/3/5	3.26 %	3.9481	7.6958	-48.70 %
600663.X SHG	18676 8	13580 8	2.3352E+ 10	3.8538E+ 10	1.5186E+ 10	2014/3/5	2.72 %	8.9534	23.594 2	-62.05 %
000002.X SHE	11014 97	96761 9	3.74E+11	4.79E+11	1.05E+11	2014/3/7	2.59 %	11.419 5	9.6834	17.93 %
002077.X SHE	25200	25200	48006010 88	58561612 80	10555600 64	2014/3/8	2.52 %	5.0997	8.2006	-37.81 %
600094.X	15115	19938	1.0629E+	1.5086E+	44569989	2014/3/8	2.82	5.4979	8.0160	-31.41

SHG	6		10	10	12		%			%
002016.X SHE	64610	64609	15821021 44	35622924 80	19801903 36	2014/3/1 2	2.85 %	3.1819	8.2274	-61.33 %
600565.X SHG	72000	72000	98982758 40	1.1809E+ 10	19102634 24	2014/3/1 2	2.71 %	3.3105	4.4976	-26.39 %
600675.X SHG	15558 8	15558 8	2.8407E+ 10	3.6385E+ 10	79780925 44	2014/3/1 2	2.02 %	6.0008	5.6457	6.29%
600665.X SHG	86412	86412	91772200 96	1.1565E+ 10	23881850 88	2014/3/1 3	2.90 %	3.2716	4.0501	-19.22 %
601588.X SHG	33670 2	26600 0	2.1453E+ 10	3.2103E+ 10	1.065E+1 0	2014/3/1 3	2.77 %	3.5488	3.3443	6.11%
000608.X SHE	74991	74991	51022827 52	85612697 60	34589870 08	2014/3/1 4	1.70 %	4.9379	4.4356	11.32 %
000006.X SHE	13500 0	13382 4	57812510 72	99681597 44	41869089 28	2014/3/1 5	2.11 %	3.3080	5.6938	-41.90 %
000056.X SHE	22090	11921	43349739 52	78032834 56	34683097 60	2014/3/1 5	2.59 %	17.439 7	14.304 0	21.92 %
600238.X SHG	44820	44203	53388710 4	14236350 72	88974790 4	2014/3/1 5	2.58 %	2.0429	4.3395	-52.92 %
600246.X SHG	12168 0	12168 0	77196779 52	1.1926E+ 10	42062696 96	2014/3/1 5	3.56 %	3.7602	12.438 2	-69.77 %

600466.X SHG	43901	43901	81360624	66704998 4	58568934 4	2014/3/1 5	2.67 %	1.3430	6.4387	-79.14 %
600733.X SHG	19759	7560	14134459 2	51141696 0	37007238 4	2014/3/1 5	2.53 %	1.9623	31.293 4	-93.73 %
000024.X SHE	17173 0	68425	9.5123E+ 10	1.34E+11	3.8917E+ 10	2014/3/1 8	3.69 %	29.309 5	15.801 4	85.49 %
002146.X SHE	18915 7	16533 9	4.6921E+ 10	5.9405E+ 10	1.2484E+ 10	2014/3/1 8	2.80 %	7.9568	6.1193	30.03 %
600052.X SHG	87179	87179	83286691 84	1.0163E+ 10	18339914 24	2014/3/1 8	3.20 %	2.5605	5.6607	-54.77 %
600223.X SHG	10009 7	10009 7	2.5275E+ 10	2.7299E+ 10	20242958 08	2014/3/1 8	2.54 %	3.2298	4.8160	-32.94 %
600266.X SHG	88920	88920	2.682E+1 0	3.6257E+ 10	94371901 44	2014/3/1 8	2.55 %	12.055 4	4.8789	147.10 %
600767.X SHG	34101	34091	23669008 0	58125504 0	34456492 8	2014/3/1 8	3.50 %	1.0436	10.343 2	-89.91 %
600657.X SHG	15242 6	15242 6	1.68E+10	2.441E+1 0	76105108 48	2014/3/1 9	3.03 %	5.5200	4.8678	13.40 %
000402.X SHE	30270 8	30243 9	5.1615E+ 10	7.6071E+ 10	2.4456E+ 10	2014/3/2 0	2.95 %	8.8950	7.2848	22.10 %
600621.X	52408	52408	17037315	33766039	16728723	2014/3/2	2.04	3.3475	7.4749	-55.22

SHG			84	04	20	0	%			%
600639.X SHG	92883	65665	53231744 00	1.0307E+ 10	49834557 44	2014/3/2 0	2.96 %	5.7530	15.080 6	-61.85 %
600159.X SHG	83000	83000	13436424 96	33447905 28	20011480 32	2014/3/2 1	2.44 %	2.4884	3.7558	-33.74 %
600724.X SHG	14452 4	14449 4	1.515E+1 0	1.9912E+ 10	47623536 64	2014/3/2 1	2.05 %	3.7966	4.8419	-21.59 %
600791.X SHG	45288	45231	51480632 32	70454062 08	18973429 76	2014/3/2 1	2.46 %	4.7338	5.8027	-18.42 %
600823.X SHG	11706 0	11706 0	3.3862E+ 10	5.0088E+ 10	1.6226E+ 10	2014/3/2 1	2.57 %	15.244 2	7.4241	105.34 %
002113.X SHE	11840	11840	25565562	11893297 6	93367416	2014/3/2 2	2.54 %	0.7989	14.809 3	-94.61 %
600606.X SHG	51832	51832	39574179 84	61588797 44	22014615 04	2014/3/2 2	3.13 %	4.6124	10.609 2	-56.52 %
600716.X SHG	74060	74060	56611594 24	78205245 44	21593648 64	2014/3/2 2	2.73 %	3.2812	9.0375	-63.69 %
000502.X SHE	18482	18333	65171884	30970243 2	24453056 0	2014/3/2 5	2.00 %	1.3401	9.4752	-85.86 %
002285.X SHE	42432	42418	72454400 0	24976448 00	17731008 00	2014/3/2 5	4.18 %	4.2604	8.5835	-50.37 %

600177.X SHG	22266 1	21436 1	3.4126E+ 10	4.8346E+ 10	1.422E+1 0	2014/3/2 5	2.43 %	7.1478	8.9478	-20.12 %
600732.X SHG	44638	44638	43374732 8	95403494 4	52028764 8	2014/3/2 5	2.46 %	1.2120	6.5051	-81.37 %
600743.X SHG	18176 6	18176 6	1.3712E+ 10	1.738E+1 0	36686658 56	2014/3/2 5	3.06 %	2.3791	3.6305	-34.47 %
600890.X SHG	57919	57919	64025264	39477558 4	33075030 4	2014/3/2 5	2.80 %	0.5763	7.3458	-92.15 %
000631.X SHE	10455 1	10455 1	98757734 40	1.2883E+ 10	30070707 20	2014/3/2 6	3.02 %	3.3279	4.1523	-19.86 %
600393.X SHG	30000	28951	22735997 44	33452643 84	10716646 40	2014/3/2 6	2.20 %	3.9477	6.6448	-40.59 %
000897.X SHE	16172 7	16170 6	58946211 84	81340656 64	22394447 36	2014/3/2 7	2.74 %	1.5590	6.2476	-75.05 %
000042.X SHE	23946	23940	49312102 40	79981731 84	30669634 56	2014/3/2 8	2.59 %	13.792 8	12.780 1	7.92%
000046.X SHE	45573 1	45464 2	3.1087E+ 10	4.0738E+ 10	96510126 08	2014/3/2 8	3.53 %	2.4447	7.1538	-65.83 %
000505.X SHE	42675	36045	11097457 92	12377137 92	12796796 8	2014/3/2 8	3.58 %	0.4471	6.2041	-92.79 %
000558.X	63027	62975	52858634	62637977	97793408	2014/3/2	2.63	1.9530	5.5137	-64.58

SHE			24	60	0	8	%			%
600376.X SHG	22420 1	22420 1	7.6654E+ 10	9.2117E+ 10	1.5463E+ 10	2014/3/2 8	3.33 %	8.5319	6.4147	33.00 %
600748.X SHG	10833 7	10833 7	1.3434E+ 10	2.0557E+ 10	71227130 88	2014/3/2 8	2.50 %	7.1676	9.3595	-23.42 %
600862.X SHG	63793	63793	46334433 28	59743144 96	13408714 24	2014/3/2 8	3.54 %	2.4492	7.3353	-66.61 %
000029.X SHE	10116 6	89166	24800947 20	42150993 92	17350046 72	2014/3/2 9	2.98 %	1.8480	5.2710	-64.94 %
000040.X SHE	46959	46444	27080916 48	39605760 00	12524843 52	2014/3/2 9	2.22 %	2.9460	5.2117	-43.47 %
600064.X SHG	51622	51622	1.0175E+ 10	1.5562E+ 10	53874155 52	2014/3/2 9	2.20 %	11.378 8	9.3667	21.48 %
600604.X SHG	56645	33352	86162118 4	21635197 44	13018984 96	2014/3/2 9	2.67 %	2.4219	11.911 9	-79.67 %
600649.X SHG	29875 2	29875 2	1.901E+1 0	3.4398E+ 10	1.5388E+ 10	2014/3/2 9	1.11 %	5.4549	6.7275	-18.92 %
600658.X SHG	58010	58010	12541611 52	39402048 00	26860436 48	2014/3/2 9	2.17 %	4.7337	11.542 0	-58.99 %
600736.X SHG	10578 8	10578 8	1.5892E+ 10	2.0078E+ 10	41866173 44	2014/3/2 9	2.49 %	4.6759	4.7407	-1.37 %

000014.X SHE	20171	20171	12291760 64	18927159 04	66353977 6	2014/3/3 1	2.46 %	3.5810	12.816 2	-72.06 %
000011.X SHE	59598	17586	20696093 44	38732526 08	18036433 92	2014/4/1	2.20 %	3.5891	8.1114	-55.75 %
600048.X SHG	71379 9	71379 9	2.45E+11	3.14E+11	6.9153E+ 10	2014/4/1	3.21 %	11.327 9	6.7512	67.79 %