

IS THE CHINESE STOCK MARKET OVERVALUED?

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**Abstract of a thesis submitted in partial fulfilment of the requirements for
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Abstract

The Chinese stock market has experienced tremendous growth and development over the past years. It is now the second largest stock market in Asia (after Japan). The increasing numbers of stock investors and the generally upward trend of the local stock indexes transform the Chinese stock market into one of the most actively traded stock market.

This study examined the “pricing errors” of the Chinese stock market. The intrinsic values of equities, which can be compared to actual index prices, were estimated using the dividend discount model. Using a database of daily dividend based index prices of Shanghai composite index 180 and Shenzhen composite index 100 from July 2002 to June 2005, our study shows the stocks were undervalued during the sample period, on average, by approximately 0.09% and 1% for Shanghai and Shenzhen composite indexes respectively. The result reveals during July 2002- June 2005, the Chinese stock markets were close to the real value. Another objective of this study is to examine the impact of the economic conditions on the “pricing errors” of Chinese stock market. We find that the Chinese stock markets are much price momentum driven. The relationships of the economic factors and the deviation between the estimated cost of equity (based on CAPM) and the implied cost of equity (based on the actual index prices) showed similar results. We conclude that the Chinese stock markets do not sufficiently reveal local economic conditions.

Keywords: stock markets, capitalisation, stock valuation, risks

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The Chinese stock market has experienced tremendous growth and development over the past years. The recent Chinese stock market development has been recognised as one of the greatest achievement in China's financial market since the Chinese economic reform in 1978. It is now the second largest stock market in Asia (after Japan). The increasing numbers of stock investors and the generally upward trend of the local stock indexes transform the Chinese stock market into one of the most actively traded stock market domestically. Since China's entry into WTO in 2001, there is a huge growth opportunities in China. The prosperous Chinese stock market has attracted global investors and interests. Thus it is important for both domestic and foreign investors to understand the pricing of stocks in China's stock markets (Wang and Chin, 2004).

1.2 Background

Since there is stock market, investors, policy makers and economists are trying to find the basic law of stock price changes. Most investors need some guidance before their buying/selling decision-making processes and they depend on the valuation of stock to judge whether stock prices are too high, too low, or just right. The process of valuing and revaluing common stocks is repeated by investors who expect future cash flows to change. Stock valuation is a subjective art much more than it is a mathematically precise objective science. There is no definite rule in valuation of stock, but investors are supposed to be rational and will value a stock using the best estimates according to the risks and returns from investing in the stock (Yardeni, 2003).

1.2.1 Role of Stock valuation

The market value of a stock is determined by the ability of a firm to earn a return on its investments above the opportunity cost of capital. There is mounting evidence that certain stock-valuation methods can profitably differentiate among stocks (Chen and

Dong, 2001). For example, Basu (1977), Jaffe, Keim, and Westerfield, (1989), Chan, Hamao, and Lakonishok, (1991), and Fama and French (1992) found that stocks with high earnings/price ratios have higher returns. Furthermore, Chan et al., (1991) showed that a high cash flow/price ratio also forecasts higher returns. Fama and French (1992) found value strategies are fundamentally riskier, that is, investors tend to bear some kind of higher fundamental risk in value stocks such as those with high book-to-market ratios, and the average higher returns compensate for taking this risk (Lakonishok, Shleifer, and Vishny, 1994).

The simple theory of mean reversion indicates that stock prices are unlikely to deviate too far from their normal levels relative to any indicator of fundamental value. That is, the ratio between the stock price and the fundamental value of the market has a tendency to be brought back to more normal historical levels- its “mean”. Thus it is generally accepted that stock returns are difficult to forecast in the short run. The fact that one can obtain a stock-valuation measure to realize better returns presents challenges to the theory of unforecastable stock returns (Campbell and Shiller, 2001).

A valuation measure allows one to achieve better returns may be indicative of investor overconfidence and market inefficiency. Certain types of value strategies seemed to have beaten the market because these strategies take advantage of the suboptimal behaviour of the typical investors. This means contrarian investors bet against naive investors, who, for example, overreact to stocks that have performed very poorly, oversell them, and then make these out-of favour “value” stocks to become underpriced (Lakonishok et al., 1994). However, contrarian strategies outperform the market by investing disproportionately in underpriced stocks and under-investing in overpriced stocks (see De Bondt and Thaler, 1985; Haugen, 1994; Lakonishok et al., 1994).

1.2.2 Stock Valuation Methods

There are several stock valuation models. The most popular and simplest technique for stock valuation is comparing the market’s P/E (price earning ratio) to historical averages.

However, in many cases P/E ratios usually give wrong valuations. For example, growing companies expected to worth a lot more in the future may have high ratios, while undervalued companies with stable earnings growth are expected to have lower ratios. It is difficult to distinguish whether a high or low P/E ratio is good or bad valuation without taking into consideration the expectations for future earnings growth (Acubby). As valuation of stock markets can regularly be expressed by means of a ratio of the stock price to a fundamental, P/E ratio can be used to predict future profitability. Mis-valuation of the stock index is shown by the deviations of the valuation indicators from their historical averages (Bisciari, Durr, and Nyssens, 2003). Professor Robert Shiller provided a “cyclically adjusted” P/E ratio by averaging profits on an inflation-adjusted basis and then comparing this figure with the current price level. Investors can estimate how much the stock market is mis-valued by comparing the cyclically adjusted P/E ratio and its long-term average, which indicates long-term stable discount rate (Shiller, 2000).

Another primary valuation technique is to look at discounted value of all of its future cash flows it can generate (Gordon and Shapiro, 1956). Consequently, the theoretical value of a stock must reflect the discounted sum of the future cash flows in relation to the investment. This means in the long run, the current stock prices are associated with the expected discounted dividend (Bisciari et al., 2003).

According to Gordon (1962), a company’s objective is to maximize its value which is a function of its expected future income. The author presented a classical theory of the investment and valuation of a company supposing that the future is certain and funds are freely offered at a given rate of interest. The objective of the model is to find the investment that maximizes the value of the company. However, there are restrictive assumptions about the financing policies of the company and the form of the return on the investment function. Gordon provided a framework for valuation of stocks and indeed almost all stock valuation models are an extension of the Gordon’s (1962) dividend discount model.

The **Gordon growth model** is given as follows:

$$P_0 = D_0 * (1+g)/(k-g)$$

It assumes that a company has a current dividend (D_0) which grows at a constant rate g . The letter k is the constant required rate of return for the stock which equals the cost of equity for that company and P_0 is the current stock price (Gordon, 1962).

Valuation models in general help measure value in the complicated, random, and volatile stock market. Using valuation models, stocks are discounted or valued compared to other investment and spending alternatives for investors to assess whether it is a good or bad time to buy stocks. Although models in general are useful to assess stock values, any model is just an attempt to make reality simple and easy to understand. Valuation models are constructed to explain what happened in the past and there exists outliers that valuation models cannot provide an appropriate explanation. Nevertheless, models are still useful, especially with the help of technical indicators and the best approach for investing in the stock market is to use a number of disciplines (Yardeni, 2003). For example, Chen and Dong (2001) indicate that the best investment strategy is to combine the stock valuation model mis-pricing with momentum rankings such as holding a portfolio of stocks that are the most underpriced and that have top momentum. By investigating the stock valuation model developed by Bakshi and Chen (1997) and extended by Dong (1998), Chen and Dong (2001) concluded that even with a little more general framework than the Gordon model, investors can develop a stock valuation measure that improves investment performance considerably.

1.2.3 The Over or Under Valuation of the Stock Market

1.2.3.1 The Stock Market's Over or Under valuation

The generally accepted random-walk theory of the stock market is the unpredictability of stock price changes (Campbell and Shiller, 2001). According to the Efficient Markets Hypothesis (EMH), the market is efficient when prices fully reflect available information in the market (Fama, 1970). The market price should always equal to the objective fair value so that the market is correctly valued (Bisciari et al., 2003). The stock market is

considered to be efficient when both counterparties have access to exactly the same information and buyers and sellers are completely free to react to the information. Thus the market efficiently reflects the anticipations of thousands of informed investors. However, bubbles appear in efficient markets when investors act irrationally upon unrealistically bullish prospects of stocks (Yardeni, 2003). It is impossible to outperform the market because the stocks will generally be priced “efficiently” by means of arbitrage.

Mis-pricing of individual stocks as well as the aggregate market can be measured by means of stock valuation models (Dong and Hirshleifer, 2004). Fama and French (1993) explained the mispricing premium as the compensation for risk factors. Lo and MacKinlay (1990) suggested that the probable reason for mis-pricing was sample selection biases. De Bondt and Thaler (1985, 1987), and Lakonishok et al., (1994) argued that investor overconfidence and market inefficiency enable valuation methods to effectively achieve superior returns. More often than not, a valuation of stock market is expressed in a ratio of the stock price to fundamental values. Positive deviations of the valuation indicators from their historical averages illustrate over-valuation of the stock market and vice versa (Bisciari et al., 2003). When the stock market’s price index goes above the fair market value obtained in valuation process, it is time to buy stocks in the undervalued market. On the other hand, selling stocks always occur during the overvalued period when the price index is lower than that fair market value. In general, the degree of stock market’s overvaluation or undervaluation is represented by the ratio of the actual price index to the fair-value price (Yardeni, 2003).

Mis-pricing of stock has mean reverting characteristics. This means undervalued stocks are likely to become less undervalued as time goes by, and overvalued stocks are likely to become less overvalued (Dong and Hirshleifer, 2004). The stock market tends to undergo over- and under-valuation cycles. The mis-pricing cycle turns round approximately once every 1.5 years on average. The most undervalued group is the most overvalued group some years later and some years before. This systematic turnaround of stock values from hot to cold and then from cold to hot is linked to the winner-loser reversal hypothesis

(Chen and Dong, 2001). When the valuation ratios such as P/E are at their historical extreme relative to some fundamental indicators such as dividends or earnings, it is safe to assume that prices will not deviate too far away from their original levels. It is important to pay attention to this simple mean-reversion theory. Since stock prices are especially high relative to some fundamental indicators, prices will drop sooner or later to bring those stock market valuation ratios back to more standard historical levels (Campbell and Shiller, 2001).

1.2.3.2 The Judgement of Individual Stock's Misevaluation

High security prices should reflect strong growth opportunities under efficient stock markets. When the firm's new investment opportunities are overvalued by the stock market, the firm could make additional investment in an attempt to achieve a high price for newly issued equity. Thus companies regularly react to overvaluation by investing more. According to this argument, mis-valuation can function by the raising the equity capital. Specifically, firms are gradually more motivated to issue equity to raise funds when the firm's equity becomes more and more highly valued. In a similar way, a fund manager may obtain the high short-run stock price by investing heavily at the cost of long-term value so as to satisfy optimistic market expectations (Dong et al., 2007). Conversely, it is difficult to predict if a stock is undervalued without predicting the future profits of a firm and future interest rates (Buffett, 2008).

A stock may be worth more or less than the current market value. An overvalued stock typically has a higher price to earnings ratio than other stocks in its industry or the entire market. Stocks that are overvalued by such conventional measures are expected to drop in prices. However, a stock with a current low price relative to its P/E ratio and earnings outlook is judged as being undervalued. Another way to determine the over or under valuation of a specific stock is to look at its PEG ratio (Price/Earnings to Growth) compared to the P/E expected growth rate. The PEG ratio is defined as the P/E ratio divided by the annual earnings-per-share growth. The distance of the PEG ratio from 1 (when P/E ratio equals the estimated earnings growth which generally indicates that a

stock is considered to be fairly valued) shows the degree of over or under valuation of the stock. The deviations of the valuation P/E or PEG ratios from their historical averages demonstrate mis-valuation level of the stock. For example, if a stock's current PEG ratio is below its historical average, the distance from the normal average value shows how much it is undervalued (Bisciari et al., 2003).

Popular stock market analysts often give reason for high valuation ratios in hope of future productivity growth regardless of whether the stock market expects variations in productivity growth historically (Campbell and Shiller, 2001). Therefore, investors may feel like paying more for stocks that have greater growth potential, but they are not willing to overpay for a stock with growth prospects that does not match with its current market price. Momentum investors often purchase overvalued stocks because they think the price will go even higher, especially when such stocks are increasing in large volume. On the other hand, low momentum stocks are more likely to be underpriced particularly with small firms, which have high book to market ratios (Chen and Dong, 2001).

There is no positive correlation among different stock mispricing levels. Some stocks are undervalued by the market even when other stocks are overvalued. Even with high correlation of mispricing exists among stocks, factors of under- or over-valuation of the total market would likely to take place at different times. Thus some individual stocks tend to be a bargain than other over-priced stocks in an overvalued stock market (Dong and Hirshleifer, 2004).

1.2.3.3 Problems of Stock Market Overvaluation

The experience of Japan in the 1990s gives rise to the general concern about overvalued stock market. The Japanese economy became stagnant as a result of 60 percent decline of its total value of corporate equity in 1990 (McGrattan and Prescott, 2000). When the market is constantly overoptimistic, investors will make adjustment and invest accordingly. As stock prices rocket, investors are confident on the outlook of investments. This trend of over optimistic then will affect both investors and speculators. The analysts

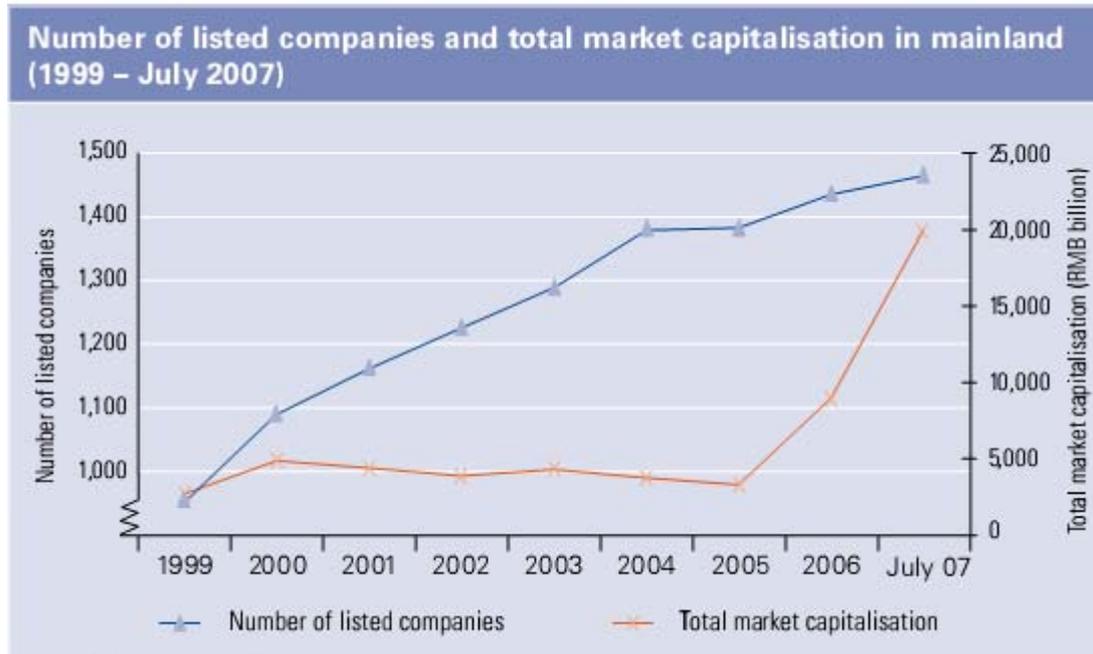
continue to raise their estimates for the long-run potential earnings growth rates of their companies and the investors keep their “over- exuberance” about high stock prices. Consequently, the stock market is significantly overvalued and is in danger of a drastic fall (Yardeni, 2003).

In the short-run, overvalued stock market can grow to be even more overvalued because of investors’ over confidence and market inefficiency. Most security analysts like to be optimistic in their long-term outlook of the stock market. They do not have much interest on firms and industries that are expected to be underperformed in the upcoming period. This is because the financial service industry is much more profitable when the markets go up than when they fall. However, this overvaluation would not last for a long time because profits will not outgrow GDP. Overvaluation may also result from irrational buying or weakening of a company's financial strength, both of which inflates the security's market price. However, overvaluation can be corrected by falling interest rates, rising earnings expectations, and of course, decreasing stock prices. In the same way, undervaluation can be corrected when interest yields increases, earnings expectations decreases, and stock prices rises (Yardeni, 2003).

1.2.4 The Chinese Stock Market

China’s stock markets have experienced extraordinary expansion and development since the establishment of the Shanghai Stock Exchange in November 1990 and the Shenzhen Stock Exchange in December 1990. The number of listed firms reached 1,463 in July 2007, an increase from only 10 firms in the early 1990s with a total market capitalization of more than RMB19,919 billion with 110 million investor accounts (see Figure 1) (KPMG Survey, 2007).

Figure 1. Number of Listed Companies and Total Market Capitalisation in China Stock Market (1999 – July 2007)



Source: China Securities Regulatory Commission

(Source: KPMG Survey, 2007)

The Chinese stock markets are segmented into two classes of shares - A shares for Chinese and B shares for foreign investors from 1992. A further segmentation took place when H shares were issued by Mainland firms, which have the capability of dual-listing on the Stock Exchange of Hong Kong (Li, Greco, and Chavis, 2001).

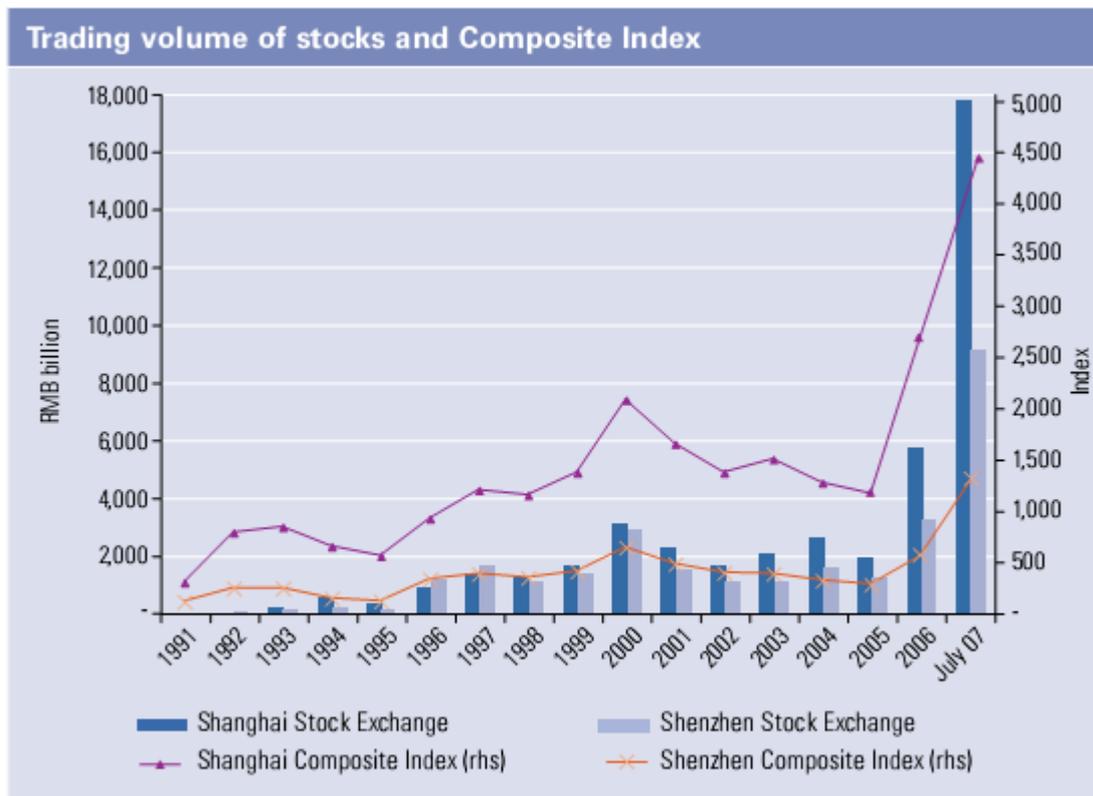
In China, the A shares are limited to domestic investors. They are listed on both the Shanghai and Shenzhen stock exchanges and are denominated in RMBs. The non-convertible RMB acts as a constraint that separates China from overseas markets. For example, Chinese investors are not allowed to buy shares listed in Hong Kong and overseas while foreign investors can not trade for A shares. Since spring 2001, local Chinese investors are able to trade the B shares that were once created particularly for foreign investors where domestically listed shares are denominated in US dollars in Shanghai and Hong Kong dollars in Shenzhen stock exchange. However, the size, total

market value, and the long term performance of the B share market lags behind that of the A share market. In 1993, companies from China were permitted to cross-list on the Hong Kong Stock Exchange. However, the prices of A shares still lead that of H shares. China protects its economy and markets by market segregation and the “currency shield” acts as a barrier between China’s capital markets and global investors (Gao, 2002). The A share market was finally opened up to qualified foreign institutional investors in 2003 (KPMG Survey, 2007)

A major landmark of China’s economic reform is the opening up of the Chinese stock exchanges to attract capital inflows and improve operating performance in state-owned enterprises (SOEs). This includes listing of SOEs on the stock market and setting a new governance structure through shareholders monitoring. In less than 12 years, China’s stock markets have developed into the world eighth largest with market capitalization of greater than US\$500 billion. Chinese firms, especially SOEs, have benefited greatly from the rapid increase in issuance and general public enthusiasm on the security market (Bai, Liu, Lu, Song, and Zhang, 2004).

The Chinese stock markets have brought rapid growth and impressive returns. The surging numbers of stock investors and the generally upward trend of the local stock indexes further fuel investors’ appetite for more stocks, which shape the country’s stock market (see Figure 2). However, China has certain exclusive characteristics of market regulation and ownership structure such as strict issuance approval, incomplete corporate-governance structure, significantly liberalized pricing and placement systems, inadequate regulatory capacity, and continuous market manipulators (Zhang and Zhao, 2004). The Chinese stock markets are still tightly controlled by the government in contrast to other Asian stock markets, such as Singapore and Japan (Bai et al., 2004). Although the Chinese stock markets are still in its early stages of development, it is important that the government impose proper investment infrastructure to sustain the long-term growth of China’s financial market (Gao, 2002).

Figure 2. Trading Volume of Stocks and Composite Index (1991 – July 2007)



Source: Shanghai Stock Exchange and Shenzhen Stock Exchange

(Source: KPMG Survey, 2007)

1.3 Problem Statement

In spite of the credible development of the Chinese stock market, not much is known about China's stock price behaviour. Most of the existing empirical work on the Chinese stock market has emphasized either on modeling day-of-the-week effects (see Tsui and Yu, 1999; Chen et al., 2001) or on explaining the obvious puzzle of much higher prices in the A share than in the B-share segment of the market (see Chakravarty et al., 1998; Fernald and Rogers, 2002; Gordon and Li, 1999; Mei et al., 2005; Su, 2000; Zhang and Zhao, 2004).

Debates have been developing on the Chinese stock market valuation over the past years. Previous empirical works reveal the overvaluation of stock prices and describe some speculative characteristics of the Chinese stock market. Some argue that abnormal high

P/E ratios, low profits, and price deviations of the Chinese A shares indicate that Chinese A share markets have already been systematically overvalued (see Du, 2004; Gao, 2002; Fernald and Rogers, 2002). Others believe that the stock market valuation in China deviates significantly from underlying fundamentals with obvious speculative characteristics (see Mei et al., 2005; Girardin and Liu, 2003; Feng, 2003). There have also been large amount of arguments on the Chinese stock market “bubble” written in Chinese (see Guo, 2004; Zhang, 2004; He, 2007; Li, 2007). Discussions about the bullish Chinese stock markets has become more heated when the Shanghai and Shenzhen stock exchanges experienced extraordinary bull market since mid 2005(KPMG Survey, 2007).

1.4 Research Questions

Question 1: Have the Chinese A share markets been overvalued?

Question 2: How much is the estimated discount rate (based on CAPM) deviates from the implied discount rate (based on historical stock prices)?

Question 3: How much have the economic and price based factors, term structure, inflation, and price momentum affected the Chinese stock market pricing errors?

1.5 Outline of the thesis

The rest of this thesis is organized as follows. Chapter 2 presents relevant literature review. Chapter 3 discusses the data and research methodology followed by empirical results in Chapter 4. Chapter 5 provides the conclusions of the research findings, limitations, and recommendations for future research.

CHAPTER 2

LITERATURE RIVIEW

2.1 Introduction

The United States experienced the Nasdaq bubble in the late 1990s. The prices of technology stocks exceeded their fundamental values and experienced unusually high return volatility (Pastor and Veronesi, 2004). Mei et al. (2005) found that the high price and heavy share turnover of the Chinese A share market echo observations of the U.S. stock market from 1996-2000. The fluctuations in heterogeneous beliefs generated by overconfidence among Chinese investors led to larger speculative component in stock prices, and the technical bubble of the U.S. stock market was identified as the result of “irrational exuberance” (see Shiller, 2000; Scheinkman and Xiong, 2003; Miller, 1977; Chen, Hong, and Stein, 2002). Given that markets in the advanced economies seemed to be more susceptible to speculative bubbles and crashes, and many emerging stock markets also display similar evidence, it seems reasonable that no one should look forward to these phenomena disappearing from the Chinese markets (Ahmed et al., 2006).

This chapter reviews the stock market valuation in both the United States and China. In order to understand the stock price behaviour in China’s stock market, we review the general performance of the Chinese stock markets over the past years. Since China’s stock market is a very special market, we introduce the features of the stock market and describe the movement of stock prices under government intervention. The discussion of the effects of the economic conditions on the Chinese stock market fluctuations provides the basis for next chapter in which we will test the relationship between the economic factors and the pricing errors of the Chinese stock market.

2.2. Stock Market Valuation

2.2.1 The General Trend of Stock Market Valuation

There are many literature investigating stock market valuations. Traditionally, stock valuation literature in accounting focuses on the fundamental value measures that address simultaneous prices and returns. Prior researches in the accounting literature such as Ohlson (1995), Abarbanell and Bernard (1995), Penman and Sougiannis (1997), and Dechow, Hutton, and Sloan (1997) investigated the empirical properties of the residual-income formula to explain cross-sectional prices. Empirical studies by Frankel and Lee (1998) and Lee, Myers, and Swaminathan (1999) show that better pricing fit than the traditional dividend discount model as well as better predictive power than financial ratios analysis can be realized by the multi-stage residual income model. For example, Dong, Hirshleifer, and Teoh (2007) measured misevaluation as the deviation of market price from the fundamental value, which is obtained by the residual income model from Ohlson's (1995) study. They believe intrinsic value reveals a discounted value of analyst forecasts of future earnings that reflects growth prospects and opportunities. Thus, normalizing market price by intrinsic value which sorts out the extraneous effects of the firm's growth provides a purified measure of misevaluation. Their measure of stock market misevaluation minimizes the confounding of misevaluation effects and growth opportunities existing in many stock market and investment studies. Their findings indicate that firms respond to overvaluation by investing more. Overall, the authors applied a forward-looking fundamental measure and obtained a general measure of market misevaluation which sorts out growth effects.

The stock valuation literature in finance focuses on the ability of the fundamental measures to forecast future returns. For example, Rozeff (1984), Fama and French (1988, 1989), Campbell and Shiller (1988), MacBeth and Emanuel (1993), and Kothari and Shanken (1997) examined the relationship between market multiples, such as book-to-market ratio or dividend yield (dividend/price) and subsequent market returns. The authors emphasized on forecasting returns by simple valuation measures predictability of market returns.

2.2.2 Stock Market Valuation in the United States

The performance of the U.S. stock markets in the late 1990s has been mixed. Some believed that the bursting of the stock market bubble was unavoidable, while others argued that factors such as globalization, greater monetary and fiscal discipline, faster productivity growth, and widespread use of high-tech equipment provided some rational for, at least partly, the higher valuation in the post-“irrational exuberance” period.

Glassman and Hassett (1999) questioned the reason why the stock prices kept increasing when the stock market was thought to be fully valued or on the verge of a crash. The authors believed the incredible returns that stocks produced came from recognizing that stocks had been far riskier than bonds and as a result generates more returns. Glassman and Hassett think that stocks are terrific investments and investors are gradually shrinking the risk premium toward where it should be. They believed that investors are bidding up the prices of stocks because they are catching on to the true riskiness of stocks and hoping to have a higher return to compensate for that risk. Their anticipation of the Dow Jones Industrial Average to end up at 36,000 was considered extremely dangerous because people would get irrationally exuberant when they see the news and jump into the stock market without proper preparation.

Shiller (2000) claimed that there was a bubble in the U.S. stock market, mostly because of psychological factors or “irrational exuberances” which are frequently used to illustrate a heightened state of speculative fervour. Shiller summarized the evidence against rationality of the stock market. Most of the evidence engages in the predictability of returns. For instance, subsequent ten-year returns are likely to be lower when stock prices are high relative to earnings. Shiller also argued that there are obvious pricing errors due to noise in stock prices since actual stock prices are more volatile than the present discounted value of actual dividends.

In line with Shiller (2000), other researchers also discussed how price movements are led by social processes in a non-stationary environment or irrational market and that

individuals value other person's opinion in assessing probabilities. For example, Miller (1977) and Chen, Hong, and Stein (2002) analysed the overvaluation generated by heterogeneous beliefs. The authors concluded that the stock market overvaluation was caused by the investors' overconfidence. Scheinkman and Xiong (2003) presented a continuous-time equilibrium model in which overconfidence generates divergence of opinions among agents in regard to asset fundamentals. The authors emphasized that the disagreements generated by the overestimation of informativeness of the distinct signals lead to the stock market bubble.

Campbell and Shiller (2001) showed that stock prices are probably overvalued based on the dividend-price and price-smoothed-earnings ratios. According to the authors, the extreme valuation ratios outside their historical range over the late 1990s poses a challenge to the traditional opinion that equity prices resemble a sign of rational expectations and that they are substantially motivated by mean reversion. However, Campbell and Shiller disagreed the traditional valuation levels and argued that their findings showed a poor long-term stock market outlook.

Some researchers considered the high values of the U.S. stocks could be explained with a market risk premium well below its long-run historical level. For example, Cecchetti et al. (2000) estimated the unconditional risk premium and their calculations evidently identified significant overvaluation in the U.S. stock market. Miller, Weller, and Zhang (2001) used Cecchetti et al. (2000) available figures as a benchmark case in their numerical calculations. In order to observe the market correction that is required to restore risk premier to their ex ante (unconditional) levels, they begin with computing the warranted dividend yield (i.e., the dividend yield consistent with a risk premium of Cecchetti et al.'s calculation). A warranted market price was defined as a proportion of current market price is obtained by dividing the warranted dividend yield into the current yield. The authors concluded that in the medium growth scenario, the warranted market price is approximately 40 percent of the market price. In the high growth situation, the

warranted price turns out to be about 50 percent, which means the market was about 2 times of its fundamental value.

Dupuis and Tessier (2003) and Cole et al., (1996) studied the relationship between traditional market indicators and the stock performance. The authors concluded that even when other factors such as share repurchases are adjusted, the current level of market valuation indicators is significantly higher and point to an overheated market. Dupuis and Tessier (2003) calculated an equilibrium measure of stock market value derived from the permanent components of the time series by identifying the fundamentals behind the dynamics of the U.S. stock market over a 30 years time period. The fundamental value is defined as the component of stock prices caused by the cumulative effects of permanent shocks to discount rates and dividends which are identified by means of a structural vector-error-correction model. The transitory component is a residual to the fundamental component presents a general assessment of the degree of over- or undervaluation. Based on this measure, their model illustrates that the Wilshire 5000 was overvalued by roughly 8 per cent at its peak early in 2000. By the end of 2002, accompanied by corporate governance scandals and heightened geopolitical tensions, the entire stock market was undervalued by approximately 14 per cent.

According to Sornette (2003), accelerating overvaluations of financial markets arose from an imitative process between investors and their crowd behaviours. The author pointed out that the predication of a 5 to 10 years consolidation of the global stock markets starting around 1999 allows a purge after the over-aggressive enthusiasm of the preceding has been borne out in 2000. The average investors are driven by the expectation of future earnings instead of present economic reality.

There are many examples of bubbles driven by unrealistic expectations of future earnings in the history. For example, Sornette (2003) believed that stock markets experience a series of stages, beginning with a successful market or sector with strong fundamentals in which credit expands and money flows more easily. Stock prices will rise when more

money is available. The bubble expands and then bursts when more investors expecting for quick profits are drawn into it. That is to say, stimulated by initially well-established economic fundamentals, investors build up a self-fulfilling enthusiasm by imitation or herding behaviour that causes the overvaluation of stock market.

Some literatures disagreed that stock prices are irrationally far from fundamentals, and this supported the view that the stock market is overvalued only if the extreme valuation ratios imply unrealistic growth rates in fundamentals. In this regard, the stock prices are not exuberant if the out-of-sample predicted growth rates of fundamentals are in accordance with observed historic growth rates (see Hall, 2001, Reschreiter, 2004; Lettau and Ludvigson, 2005).

Hall (2001) believed that the stock market operates on the rule of recording the appropriately discounted value of the future cash shareholders are supposed to receive regardless of its substantial movements. The author concluded that the stock market values the property owned by companies appears to stand up reasonably well for the past 50 years in the U.S. The volatility of the aggregate stock market with regard to other broad measures such as GDP is extensive, but not out of line with the movements of cash flows accumulating to companies when all their costs are paid and all non-shareholders' claimants including governments are satisfied. Hall felt it is simple to understand extraordinary heights that the stock market reached in 2000: high expected cash-flow growth together with low discount rates demand for extreme levels of the capitalization factor. Furthermore, when cash-flow growth truly exists, the high capitalization factor multiplies a high level of the cash flow leading to astronomical levels of the stock market. His study indicated that it is not logical to criticize the high price/earnings ratios as evidence of irrational stock market without examining the prospects for growth in future earnings.

According to Reschreiter's (2004) findings, extreme valuation ratios may due to fundamentals that are expected to grow in extraordinary rates and stock prices are

expected to grow at normal rates. The author argued that the extreme valuation indicators do not imply that stock prices will fall to fundamental values; instead, such high ratios imply the expectation of fundamentals catching up with prices. The question is whether the overvalued stock market should be based on an investigation of the expected growth rates of fundamentals inherent in the valuation ratios. The author concluded that stock prices are not exuberant because the predicted fundamental growth rates do not seem to be unrealistic compared to historical growth rates. The results imply that increases in dividends and earnings rather than falling stock prices will bring the high valuation ratios back to equilibrium levels. Since expected growth rates in dividends and earnings are rational and the expected fundamental growth rates inherent in the valuation ratios are at the historical level, stock investment is rational in spite of the high valuation ratios.

Lettau and Ludvigson (2005) argued the rational justification for the high valuation ratios may be high growth rates in fundamentals that explain the record high valuation ratios. The valuation ratios become high as prices are expected to grow less than fundamentals. The authors concluded that the high valuation ratios may be a sign of anticipation of above average future growth rates in the fundamentals and below the average future returns. However, this does not mean that prices and fundamentals grow at expected rates above or below their long run averages that resulted in the high valuation ratios. In other words, prices and fundamentals are expected to grow at different rates.

2.3 Chinese Stock Market

2.3.1 A Review of Chinese Stock Market Performance

Since 1992 to 2002, the Chinese stock market showed remarkable booms and busts. The initial four years (1992-1996) were quite erratic. Initiated in 1991, the Shanghai A share index went from 100 to 250 within a year and subsequently got to 1,200 by the first quarter of 1992. Following June 1992, the Shanghai index lost over 60 percent in a span of five months. Then the bull market came back after a few days of hitting the bottom (Feng, 2003). The overall market index mounted from 400 to a new height of 1,600 in just three months. The index fell back to 400 by the middle of 1994, but in the second

half (1996-2001) of the decade, the stock market in general trended up. From the beginning of 1996 to mid 2001, China's stock market experienced an unprecedented bull market. The Composite Indexes for the two stock exchanges in China went up by 270% in Shanghai and 460% in Shenzhen (Feng, 2003). Overall, the Chinese stock market displayed great volatility during its first ten years. And there were many periods in which the index lost several hundred points in a short period of time. For example, there were 20 "mini-crashes" when the Shanghai A share market index dropped more than 10% within a month from 1993 to 2001 (Mei et al., 2005)

The bear market started in late spring 2001. In the following four years (2002 -2005), the Chinese stock markets were assumed to be dormant and have lost the function in generating funds. After the stock price crash in July 2001, the stock market remained stagnant more or less over the next fifteen months. From November to December 2003, the stock prices rose. The Shanghai index closed the year up some 10% (Green and Ming, 2004). Since February 2004, the bull market reappeared and the peak appeared in April 9 when the Shanghai composite index closed at 1,778.22. However, the bull market went bearish and the Shanghai composite index remained at a low level. On the last trading day of 2004, the Shanghai composite index ended the year at 16.52% (1,266.5) losing some 250.69 points. Similarly, the Shenzhen composite index ended the year at 12.4% (3,067.57) losing some 434.3 points (Zhang, 2004). The following year 2005, the market was unstable and violent. The index bottomed out at 998.23 on June 6, and is the first time it fell below 1,000 since 1997. The Chinese stock market fell from the 2001 historical high of 2,245 to a historical low (Zhang, 2004). During this period, the annualized return for the Shanghai composite index was -9.68% a year and -14.73% for Shenzhen composite index (Harriss, 2007).

Overall, the Chinese stock market appeared rather erratic with the bull and bear markets alternating between each other over the past years. This erratic movement in the stock markets lead to very unsettled stock market conditions (Giradin and Liu, 2003).

2.3.2. Chinese Stock Markets and Economic Conditions

The impact of the Chinese stock market is still considered as quite insignificant relative to the national economy. The Chinese stock market opened in the early 1990s under special institutional environment. Households hold a very low percentage of assets in the form of stock in their total financial portfolios. No apparent correlation was ever found between the stock market price fluctuations and the general economic situation in China. For example, during the economic boom from 1992-1994, China experienced a stock market crash. The Chinese stock markets experienced dramatically falls since mid 1992 and ended up at 400 by mid 1994 (Feng, 2003).

The Chinese economy experienced deflation from 1998-2002. Contrary to the deflation experience in other countries, the Chinese economy grew strongly with an average annual GDP growth rate of 7.8% and the stock prices appreciated considerably during that time. The 1929 U.S. great crash and the resulting deflation lasting throughout the depression were a consequence of the bursting of bubbles in the stock market and the collapse of financial system. The Japanese deflation from 1991 was a result of the stock market bubble burst. The deflation in these cases is generally caused by the burst of bubbles, which will lead to large reduction in households' wealth and consequently a sharp decline in consumption. China's GDP growth rates were 7.8% in 1998, 7.1% in 1999, 8.0% in 2000, 7.5% in 2001, and 8.0% in 2002, and these rates were lower than the average annual growth of 9.8% from 1978 to 1997 (Lin, 2004). With deflation in 2002-2003, inflation creeps in but remains moderate. However, the Chinese stock market experienced bear market from 2002 to 2005 (He, 2007). This bearish market is caused by the influences of the Chinese government investment policies.

The government regularly manipulates the monetary policy to reduce interest rates so as to stimulate the declining investment and current consumption demand. The central bank of China lowered the interest rates three times in 1998. When the interest rate was reduced again in June 1999, the one-year benchmark deposit rate was 2.25% which was just one-fourth of the 1996 rate (Lin, 2004). The central bank of China raised the reserve

ratio in September 2003 and October 2004. In addition, the one year fixed term deposit rate was increased from 1.98% to 2.25% in 2004. The interest rate was raised again in March 2005. Such sudden changes of the policy precipitated the decline of the stock market and bond market (He, 2007).

In 1998, the Chinese government started to apply expansionary fiscal policies and issued 100 billion RMB long term infrastructure construction bonds. A total of 660 billion RMB bonds were issued to support infrastructure construction in 2002 (Lin, 2004). The rush in the accumulation of international reserves since 2001 was a result of the relaxation of investment and credit control (Prasad, 2007). The investment rush led to inflation as a result of the expansion of credits and money supply (He, 2007). Since 2004, inflation has begun to creep in and the government has strengthened the macro-control by raising the rate of reserve accumulation and the one-year benchmark deposit rate. As a result, the rate of reserve accumulation doubled relative to the rate during 2001-2004 (Prasad, 2007).

2.3.3 Chinese Stock Market and Government Policy

The Shanghai composite index reached 1,500 in February 1993 on a basis of 100 in December 1990. When the Company Act went into operation on 1 July 1994, the composite index bottomed out almost immediately at 340 in July 1994. The Company Act was aimed to regulate the disclosure of information by listed firms which resulted in stable improvement in information disclosure from 1995. Consequently, both financial and non-financial information must be provided by listed firms to investors and the public in the form of prospectuses, listing reports, and periodic reports. False disclosure became a criminal offence since then (Chen et al., 2001).

‘From April to October 1996, the Chinese’s stock markets recovered from the two years of sluggishness, going towards a new rally. After October however, over-speculation started to prevail and became more and more rampant’ (PBOC, Annual Report, 1997, p. 71). The period from April though December 1996 was described by strong speculative

pressure. Thus the government began to take steps to ease the overheating of the stock market. News about warning individual investors of the great risk by their speculation activities appeared on official newspapers. The Shanghai stock market acted quickly: there were 10%, 8%, and 10% falls in price on 16, 17 and 18 December, 1996 respectively. Following this, the stock market calmed down for some time, and the Shanghai index lodged in about 1,000 points (Giradin and Liu, 2003).

The government took approaches to cool the stock market when the market rose again from February 1997 with a record high in April 1997. The 1997 Asian Financial Crisis did not impact the development of the A-segment of China's stock market. This further proves that the stock market is insulated from international influences. The government intervention in preventing state-owned enterprises (SOEs) from listing in the stock market in mid-1998 led to the falling of stock prices in the subsequent year. On 19 May 1999, the government permits state-owned enterprises to buy their own shares in the market. As a result, the sharp rise in the index continued for the following two months. Following this, the government conducted a phase of market adjustment to stop such hasty rise. However, the upward trend lasted for another four months up to late 1999. The authorities speeded up the new listing of firms in order to put further downward pressure on stock prices. However, the price increase lasted for one and a half year from early 2000 (Giradin and Liu, 2003).

In 2001, the government decided to make general adjustments to the Chinese stock market which lasted for more than a year. The authorities' decision to strengthen their monitoring of the stock market operations is by implementing a crackdown on illegal trading and checking the source of the funds invested by firms on the stock market led to the price collapse in early summer 2001. Frequent scandals and poor company results kept retail investors away. A survey by Sina Inc. and Securities Market Weekly in September 2003 found that 90% of 10,000 retail investors say that they had lost money since July 2001. Half of those surveyed say that they sold their shares and would never buy shares again (Green and Ming, 2004).

In 2002, the government focused their reform energies on the retail-banking sector leaving the stock market alone. With a very weak demand for shares, the rate of share offerings slowed down from 2002 to 2003 compared to the boom period of 1999 - 2001. During November - December 2003, reports arose that the authorities were ready to boost prices with new policies. Annual financial results of securities firms are expected to be much healthier than feared (Green and Ming, 2004).

In February 2004, the State Council issued a statement on the government's intention to keep developing the stock market. A fragile recovery lasted until the index reached the highest 1,783 in the past three years as of April 2004 (Green and Ming, 2004). When the government announced a new round of macro-control, a five month stock price decreased with the lowest at 1,259 for the past five years. Until November 19, 2004, the Shanghai and Shenzhen stock market has fell 8.89% and 7.88% respectively. The average market price to earning ratio fell from 28.91% to 26.63%. The average stock price and price to earnings ratio of the Chinese A share market in 2004 were the lowest over the last ten year. However, the operating performance of listed firms was at the historical best. The deviation between fundamentals and shares prices exposed the negative side of the Chinese stock market. However, the average P/E ratio in 2004 was much more close to those of the S&P and HIS P/E ratios, which means that the Chinese stock market might be more close to its real value (Guo, 2004).

On April 29, 2005, a statement to reform the listed firms was issued by the authority. On May 9, 2005, with the release of the new policy, the Shanghai composite index ended at the lowest of the past six years. The day is known as the 'Black Monday' in China's stock market. Until the middle of May, the Shanghai composite index reached below 1,100. The news release conference of the State Council brought cheers the investors and the stock markets started to rebound. However, the rebound did not last long and the index fell below 1,100 and to 1,000 until June 2005 (Zhang, 2004).

2.3.4. The Special Feature of the Chinese Stock Market

The Chinese stock market is different from other stock markets, particularly in terms of investors' composition and the extent of government regulations. Share tradability restriction means considerable shares are held by the government and institutions are government controlled so that the shares are not exposed to the market. As the turnover ratios of stock transactions are incredibly high, there should be rather short investment horizons of investors and very high share price volatility (Nam et al., 1999). The market lacks of institutional investors and is driven by numerous small individual investors (Girardin and Liu, 2003). A high volume of the market implies that stock pricing is governed by irrational investors, and as a consequence, there would be quite low expected returns. Together with the strictly prohibited short-sales, these are some of the special features in China's stock market which impact corporate valuation and asset price behaviour (Wang and Chin, 2004).

Successful stock market development is defined to be strongly related to low inflation, a legal structure that protects minority shareholders' rights, and the existence of substantial institutional investors. On the contrary, the Chinese stock market has to deal with intensive government control, two short periods of double-digit inflation during 1988-1989 and 1992-1993, a small number of institutional investors, and poor governance (Green, 2003). Accordingly, many investors believe that the share prices in China's stock markets have nothing to do with the fundamentals of the firms but are merely driven by speculative behaviours (Bai et al., 2004). Before a stock market can efficiently allocate capital, several conditions have to be met. For example, companies must be able to compete freely for the capital existing in the market. Information about the companies in the market must be provided by a soft infrastructure of dependable underwriters, accountants, lawyers, journalists, including equity analysts. It is also vital that the financial system as a whole is running efficiently. Banks and bond markets should be able to compete with the stock market for household savings. Unfortunately, similar to other emerging markets, very few of these conditions are present in China.

However, some economists' support the idea of postponing building a stock market in China until the above qualifications are fulfilled (Green, 2003).

2.3.4.1 Special Investor Compositions

The Chinese stock markets are narrow markets in terms of market participants. The A share market limits its access to Chinese residents only. Foreign investors are permitted into the domestic B share market but on highly restrictive conditions. Local residents are not permitted to invest outside of China except on highly restrictive terms. The one year benchmark fixed deposit rate is under 2.5% including the current yield of a ten-year government bond which is less than 2.65%. Such investment options do appear quite attractive to the local investors who prefer to invest in more volatile stock markets (Harriss, 2007).

As a result, the Chinese A share market is dominated by a large number of unsophisticated individual investors. For example, up to the end of 2000, there were a total of 57.79 million A share accounts in the Shanghai and Shenzhen stock exchanges, and only 1.35 million accounts were held by institution investors. In the absence of the required experiences and skills, together with the lack of qualified security analysts, the majority of individual investors behave like noise traders (Wang and Chin, 2004). The investors make investment decisions according to technical analysis such as price patterns, and choosing stocks mainly on past price trends and news flow (Harriss, 2007). However, stock valuations such as the relationship between share prices and fundamentals are often neglected (Girardin and Liu, 2003). Chinese investors are quasi-rational investors who struggle to make good investment decisions but commit knowable mistakes (Drew et al., 2003).

In general, investors are expected to act upon and arbitrage away the pattern of mispricing. If all investors act upon the uncommon return patterns, mispricing ought to be arbitrated. However, Chinese investors are dependent on herd behavior. Most of them have no choice but to follow other investors because of the limited disclosures by listed

firms, which hides away fundamentals from individual investors (Girardin and Liu, 2003). These individual investors also depend heavily on rumours for information for significant momentum profits. The market is indeed heavily momentum driven (Drew et al., 2003). More trading and larger speculative component in prices is resulted from more fluctuation in heterogeneous beliefs among investors by the fundamental uncertainty (Mei et al., 2005). Such a market cannot be information efficient when so many investors regularly ignore publicly available information (Girardin and Liu, 2003). Thus the Chinese stock markets do not sufficiently reveal local economic conditions (Green and Ming, 2004).

2.3.4.2 Strict Government Regulations

In general, when stock prices exceed their fundamental values, listed firms will increase the supply of shares to arbitrage the difference. More often than not, firms are likely to issue equity when their market value becomes high. This is defined as an automatic market correction mechanism. However, it is not the case in China. The Chinese government put restrictive governmental control over initial public offerings and seasoned equity offerings. The Chinese companies can not sell their equity without government approval. The process is greatly political and would last for years. Many qualifying companies also can not take advantage of favourable market conditions to sell their shares due to the strict quotas. Similarly, when stock prices fall below their fundamental values, companies are stopped from share buy-backs because of restrictive Chinese corporate law (Mei et al., 2005).

Except for the share tradability restriction and high price volatility, the strictly prohibited short-sales is another characteristic in China's stock market. The short-sales prohibition efficiently limits the supply of a firm's tradable shares. Investors are prevented from sending a negative signal by trading and making arbitrage strategies even when there is price bubbles. More significantly, when short-selling is prohibited, the irrational investors are more likely to use the trading volume or turnover as a sentiment indicator combined with expected returns. China's stock market is characterized by these features, such as the

dominance of unsophisticated individual investors and short-sales prohibition. Consequently, China's stock market is more inclined to behavioral concerns, to a great extent influencing the return–volume dynamics (Wang and Chin, 2004).

2.3.4.3 Chinese Investors Treat the Stock Market like a “Casino”

The bear market which began in late spring 2001 is remarkably contrary to the observation of the Chinese stock market. The Chinese stock markets were bullish market from 1996 to 2001 and this led to overconfidence among the participants in the stock markets. Such common expectations of the bullish phenomena led to the dominance of ‘bull’ market since 1996. Even in the bull market, it was very difficult for investors to make capital gains in spite of a medium rise in the value of the index when the price is highly volatile. Investors do not take granted for the volatility of the index and they could not make any money although the index is rising. After 1997, an investor with a weekly horizon made capital losses most of the time. The investor could make capital gains which are substantial enough to make up for the losses only during very short lucky times. These are consistent with the assessment in an Asian Development Bank study on the Chinese stock market, when discussing the behaviours of domestic Chinese investors, that ‘many of them treat the stock market like a casino’ (Nam et al., 1999, p. 78; Girardin and Liu, 2003).

In general, the ‘Casino’ feature is the major feature of the Chinese stock market. It is a risky business to invest in the Chinese stock market. The authorities have already put in place some monitoring mechanism to monitor speculation in the Chinese stock market. Furthermore, investors have been puzzled because they are unable to distinguish between the bull and the bear markets. Although a bull market exists and is accompanied by high capital gains, it is still difficult to make good profits. Measured by the variance of capital gains, risk is defined as skyrocketing in such speculative market (Girardin and Liu, 2003).

2.3.5 Valuation of the Chinese Stock Markets

There are continuous debates on the Chinese stock market valuation over the last few years. Some economists such as Wu Jing Lian argued that the stock market in China appears to be a ‘casino’, whereas others disagree with this. Most of the existing empirical work on the Chinese stock market has emphasized either on modeling day-of-the-week effects (see Tsui and Yu, 1999; Chen et al., 2001) or explaining the obvious puzzle of much higher prices in the A share than in the B-share segment of the market (see Chakravarty et al., 1998; Fernald and Rogers, 2002; Gordon and Li, 1999; Mei et al., 2005; Su, 2000; Zhang and Zhao, 2004).

2.3.5.1 Valuation Issues and Methods in Chinese Stock Markets

In China, valuation of stock is very important in directing investor’s specific investing issues. This involves comparing the stock prices with real market stock prices using different valuation methods. However, the valuation methods have restrictions in terms of their application. Some of these valuation methods have been misused or even abused. The most commonly used valuation methods in China is ratio comparison such as PE (Price/Earning) and PB (Price/Book Value) or PEG (PE/Expected Growth Rate in Earnings). The Dividend Discount Model is another popular valuation method in valuing the Chinese stock market. There are also cases that discounted cash flow is used in place of discount dividend. These two methods are applicable to different industries and firms with distinct financial characteristics and features. Combining two or more ratios with discounted dividend is consistently used in valuing Chinese stocks (Feng, 2007).

The two valuation methods commonly used in the Chinese stock markets are the yield ratios and the dividend discount model. The simple ratio analysis is more widely used because it is easy to understand and convenient to calculate. For example, if we assume that all firms within a particular sector have similar growth rates and risk, a strategy of picking the lowest P/E ratio stock in each sector will yield undervalued stocks. Portfolio managers and analysts sometimes compare P/E ratios to the expected growth rate to identify under and overvalued stocks. In the simplest form, this approach assumes that

firms with P/E ratios less than their expected growth rate are viewed as undervalued (Feng, 2007). On the other hand, some believe that the fundamental discount model as perfect theory but poor practicability in China. In fact, unconvincing and bias results can be led by the lack of basic data on Chinese listed firms making it difficult to obtain model parameters (Feng, 2007).

The stock valuation standard in China is quite indefinite in valuing and setting stock prices. For example, the Chinese A share is priced differently relative to the universe standard. Foreign investors considered Chinese firms to be unreasonably overvalued due to heavy government intervention and influence. Unlike some countries which need global funds to increase their market liquidity, China does not rely on international capital market to raise its valuation level. Some institutional investors think that it is most suitable to adopt the U.S. stock valuation measures because both countries are major economies in the world. Both China and the U.S. have industries covering extensive fields and the main businesses of listed firms are in their respective country and most stocks are traded in their domestic stock exchanges. However, China focuses on heavy manufacturing industry development such as steel and traditional chemical engineering which is known as high growth industries but is considered sunset-industries in America. Thus the China's stock market has neither its own stock valuation rules nor the exact referential experience from other stock markets (Ping, 2004).

2.3.5.2 Debates about Overvaluation of the Chinese Stock Market

The argument whether the Chinese stock markets are overvalued or undervalued is still debatable and inevitable among academicians, financial analysts, and investors. Some argued that the Chinese A share markets have already been systematically overvalued. For example, according to the 1994 data, the average P/E ratio of Chinese A share markets is twice the average of the P/E of 10 Asian new rising markets. The number exceeded the P/E of Hong Kong by 88% and Taiwan by 39%. In addition, some blue-chips stocks succeeded in lowering the average P/E ratio depleting their prices (Du, 2004). This means the overall P/Es of Chinese A shares are very high according to

international pricing structure. The serious overvaluation of the A share markets indicates that the Chinese stock markets experienced some “bubbles” but some industries and enterprises followed the international valuation standards to fend off the bubbles phenomena. Thus the Chinese stock markets tend to experience falling stock prices if it is truly overvalued (Du, 2004). He (2007) contend that among the many problems China's financial sector faced, the market “bubble” burst prematurely especially in the higher risk industry stocks. In addition, there has been severe over-speculations in the Chinese stock market, which poses a big challenge for the country to quicken its pace in moving towards a more normal financial market system and a more broadly market reform .

China’s stock markets are still a long way from reaching the international standards of regulation and transparency of developed nations’ markets. The fact that the Chinese stock markets are rife with insider trading and market manipulation requires a long process to correct the problems. Naughton (2002) believed that the Chinese stock markets have been artificially inflated and are ready for a correction. With increasing regulatory inspection, there should be a major market downturn. This broader market decline may be the inevitable deflation of an artificial stock market bubble (Naughton, 2002).

China’s financial sector is only semi-reformed, and this sets obstacle for equity investment. In addition, interest rates are set low enough to allow the SOEs to borrow more cheaply. For example, in the terms of the bond market, the number of currently listed bonds is less than 20. Households, private companies and government organizations became “enthusiastic stock market speculators” when there are few alternatives available. The consequence of these features is that the shares are valued at artificially high levels (Green, 2003)

Chinese investors have been pouring money into the stock market while lacking of a well-developed financial system and other viable alternatives to bank deposits. Prasad (2007) maintained that it is difficult to answer whether the stock market valuations in China are completely out of whack and disposed to a steep fall based on traditional

metrics, for example, price-earnings ratios. Since about two-thirds of the shares are held by institutional investors (mostly state-owned) and are not actively traded, individual investors' aggregate stock market wealth amounts to at most 30 percent of GDP. Prasad (2007) believed that the market is in danger of sharp falls in prices in order to generate broader concerns about the domestic financial system with the massive run-up in stock prices within a very short period of time and the increasingly wide participation in the stock market by uninformed investors.

Similarly, there are some investors who think the Chinese stock markets are neither overvalued nor undervalued and there is no untied valuation standard in world stock market. They believe the P/Es are totally different under various economic conditions, not to mention the huge growth rate of the Chinese economy over the last 10 years. Thus it makes no sense to value the Chinese stock markets under the standard mature stock markets. Therefore, the overvaluation of Chinese stock markets is a misleading argument (Li, 2007).

2.3.5.3 Chinese Stock Markets' Over-valuation in the 1990s

Fernald and Rogers (2002) studied the A and H share stock markets from 1993 to 1997. They indicated that the generally high level of the Chinese A share prices are attributed to low expected returns as a result of limited alternative investments available in China. The authors concluded that the two to four times higher prices of the A shares over B shares are due to the different risk premium demanded by domestic and foreign investors even though they are legally identical with the same dividends and voting rights. They also found that firms in Shenzhen or Hong Kong H shares have higher earnings/price ratios for both domestic and foreign investors relative to Shanghai's A shares. However, the insignificant difference of H shares is not consistent with the proposition that H shares should have lower earnings/price ratios because they list in larger, better regulated, and more transparent and liquid market, which shows high probability of A shares' overvaluation. Li et al., (2006) thought the price differentials in the Chinese cross-listed A and H shares are mainly due to the systemic risk premiums deviation of the local

markets. The authors concluded that the H shares excess returns represent risk premiums from both the Hong Kong and China markets. However, the A share excess returns are only affected by the market risk premium from China markets. They proved that discounts on H shares relative to A shares are very much related to the contemporary discounts of H share local market index (HSI) relative to A share local market index (SHI).

Although opinion varies significantly on the size of the overvaluation in China's stock markets, Gao (2002) investigated the Chinese stock market from 1994 to 2001, and the result shows little doubt that the low earnings posted by most companies resulted in high valuations. In Gao's analysis, before arguing China's high valuation or labelling it an 'overvalued market,' it may be more appropriate to talk about low company earnings or call them low-profit companies. It is indeed "low earnings rather than high prices" that cause the high P/E in China and China's stock markets bubble.

According to Gao (2002), China stock markets appeared to be dominated by industrial and manufacturing companies and require a steady core of blue-chip companies but many of China's blue-chip companies are listed overseas exchanges that are not available to local investors. The fact that China has P/E and P/B ratios are much higher than those in Japan respectively showed that China's stock markets have already been overvalued and overvaluation became worse when including the market poor corporate profitability.

Girardin and Liu (2003) investigated the Shanghai stock market from April to December 1996 and found the market was characterized by strong speculative pressure. The composite index amounted 120% at the end of 1996. The daily turnover in the Shanghai stock market was one and a half times the highest daily turnover in the Hong Kong stock market, which has increased threefold, reaching 19.6 billion RMB. However, the Hong Kong stock market has a 20 times bigger capitalization than that of Shanghai stock market. According to the 1997 Annual Report of PBOC (April through October 1996), "China's securities market stepped out of two-year sluggishness heading towards a new

rally. After October however, over-speculation started to prevail and became more and more rampant.”

Green’s (2003) study of the Chinese stock market until year-end 2001 shows the P/Es are still very high. The author argued that the Chinese stock prices will remain high until competition intensifies. China’s stock markets are independent and protected from global market competition. Such protection has led to a huge variation between the P/E ratios of China’s companies listed in domestic and overseas markets. As a general rule, the P/Es in Western markets are likely to float between 10 and 20. Most of the firms that operate in China but listed somewhere else have normal P/Es. For example, the P/Es for CNOON, China Mobile, China Unicom, and Legend that are listed in the Hong Kong stock market have P/Es between 11 and 29. However, much of the 1990s P/Es were above 40. There are also other examples such as the extreme valuation in June 2001 when the index’s valuation dropped to 40 from its historical high of 70. This also signifies the possibility of a stock market overvaluation (Gao, 2002).

According to Green (2003), the total values in China’s official market capitalization is ambiguous because they include non-tradable legal person and state shares which occupy two-thirds of the total shares. Only one third of the shares that is known as individual person shares are publicly issued and can be freely traded by private individuals and institutional investors on the exchanges. The difficulty in computing the total market value of the Chinese listed firms is that the non-tradable shares do not have market prices. In addition, the state-owned shares and legal-person shares are traded on informal markets in China with a 70%-80% illiquidity discount on average (see Chen and Xiong, 2002; Bai et al., 2004). Using the market price of tradeable shares to represent the price of those non-tradable shares, Bai et al. (2004) discovered that the Chinese publicly listed firms are highly valued by shareholders on the whole during the year of 2000. Nevertheless, when non-tradable shares are discounted, the authors obtained a more comparable result of Tobin’s q ratio and the market/book ratio with those in other major stock markets.

Feng (2003) defined the years from 1996 to 2001 as the “exuberant” years since the stock prices in China had appreciated significantly and correspondingly market valuation ratios had arrived at record high within this period. During those “exuberant” years when market values were exceptionally high, the market surge might be driven by speculative elements to a large extent. The author evaluated the efficiency of stock market valuation in terms of reflecting underlying fundamentals based on the present-value model. The key findings of the study showed that stock market valuation in China deviates significantly from underlying fundamentals. For example, earnings growth and stock market valuations are strongly negative related. More strikingly, valuation ratios in China behave in a manner against the efficient markets theory that is founded on standard notions of investor rationality. The P/E ratios are discovered to be significantly and negatively associated with earnings growth, even during the ‘exuberant’ stock expansion years. The result suggests that the worse the firms perform, the higher their market values. This implies persistent investor deviations from the economic axioms of rationality and they support the notion of systematic human irrational behaviour. Feng (2003) concluded that market valuation in China overall appears to reflect a high level of systemic investor idiosyncrasy in the way of speculative motives and psychological factors.

Mei et al., (2005) used data from the Chinese stock markets from 1993 to 2000 to show that the A shares traded on average for more than 4.2 times than the corresponding B shares with a much higher turnover rate of 500% versus 100% per year for B shares. The A shares and B shares are entitled to the same claim to dividends and legal rights, but the existence of such a large domestic share premium which was 421.8% over the B shares is different from the emerging and developed markets where the domestic shares generally sell at a discount. They believed that these results are in line with the presence of a speculative component in the prices of domestic shares and such high price and heavy share turnover in the A shares suggest the stock market bubble in China. They also found that the price dynamics of the newly emerged Chinese market and the technology bubble in the U.S are quite similar in many respects.

Mei et al. (2005) showed that the Chinese market has extraordinary booms and busts, which is similar to the pattern of U.S. technology stocks in late 1990s. They hypothesized that Chinese investors would engage in serious speculative trading because they always disagree about stock valuation due to their lack of experience. The upwardly biased stock prices reflect the valuations of the optimists who pay prices that go above their own valuation of future dividends since they expect a buyer who is willing to pay even more in the future. Heterogeneous beliefs are generated conveniently by overconfidence, which is thought to be a widely observed behavioural bias in psychological studies. Thus, the stock price exceeds its fundamental value in similar fashion.

Ahmed et al. (2006) tested on the market interest rates data during the decade of the 1990s on the Shanghai stock market. The authors' tests are in line with the probable presence of speculative bubbles with complex nonlinear components. Their conclusion is that even though what they observed are not essentially speculative bubbles, considerable volatility exhibits quite distinctively on the Shanghai stock market.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Long horizon historical researches on equity prices examined how firm and investor performances have changed over time and across economic conditions in an attempt to better understand what factors drive value. In order to understand how investors value financial assets, Foerster and Sapp (2006) examined stock valuation using fundamental valuation methods and compared it to the actual price for equity over a long period of time. In the process of evaluating the level of pricing errors which is defined as the differences between the actual price levels for the index and the expected prices, they find that the mispricing level is normally connected with changes in economic and price-related factors. The relationship between these factors and the short-term fluctuations in actual prices around the expected price indicates that investors' expectations indeed play a significant role in asset pricing.

In this study, we used the technique that is similar to Foerster and Sapp (2006) in defining the stock market "pricing errors". This chapter discusses the research methodology used in the study. First we describe the sample collection and data sources. The following section, we discuss the research methodology and empirical models for determining the "pricing errors" and the effect of certain economic factors on such pricing deviations. Finally, we present the associated research hypotheses to be tested according to our research questions.

3.2 Sample Selection and Data Collection

3.2.1 The Data Source

Data for this study is mainly from the China Stock Market & Accounting Research Database (CSMAR), compiled according to the format of *CRSP* and *Compustat* by Hong Kong Polytech University and GTA Information Technology Company Limited in Shenzhen.

The data consists of daily index prices including dividends of Shanghai composite index 180 and Shenzhen composite index 100 (from CSMAR). To estimate the term structure, the difference between the bond yields with low risk but different times to maturity is considered. The long term government ten years bond issued at 2002 listing on both Shanghai and Shenzhen markets are used (from CSMAR). As for the short-term bond rates, the central bank of China started to issue short-term bonds from late 2003. In China, the one-year fixed term deposit rate is always used to represent the risk-free rate. So for the short-term low risk bonds, the one year deposit rates obtained from the historical data of National Development bank of China for 2002 and 2003 are used. In addition, a one year bond issued at 2004 and another similar one year bond issued at 2005 are used (from CSMAR). The Consumer Price Index (CPI) is obtained from China Statistics Yearbook. The time period of the data is from July 2002 to June 2005.

3.2.2 Shanghai “180” and Shenzhen “100”

The data series of this study includes the daily data on the Shanghai 180 composite index (July 2002–June 2005) and Shenzhen 100 composite index (January 2003-June 2005). The Shanghai 180 A Share Stock Price Index is a market-value weighted index that tracks the daily performance of 180 A Shares listed on the Shanghai Stock Exchange. The Shanghai 180 index was formed on July 1, 2002, which is designed to provide a benchmark for Shanghai A shares stock market performance. Similarly, the Shenzhen 100 A Share Stock Price Index is a market value-weighted index that tracks the daily performance of 100 A Shares listed on the Shenzhen Stock Exchange. The Shenzhen 100 index was formed on January 2, 2003 designed to provide a benchmark for Shenzhen A shares stock market performance. This study uses the Shanghai 180 composite index and Shenzhen 100 composite index data because they are the most commonly used benchmark portfolio of Chinese stock market that provide information on the daily price level of the index including the corresponding dividend payments. The Shanghai A share and the Shenzhen A share stock price indexes are excluded from this study because they are capitalization-weighted indexes including all A shares listed on Shanghai and Shenzhen Stock Exchanges. These two composite indexes have relatively high P/E ratios

because they include stocks of firms with inferior performance but high prices. However, the Shanghai 180 composite index and Shenzhen 100 composite index is much easier to understand and evaluate the Chinese stock market movements. Our study excludes non-tradable shares.

3.3 Methodology

3.3.1 The Dividend Discount Model

The dividend discount model is considered to be poor practicability in China because of the lack of relevant data on Chinese listed firms, which makes it difficult to obtain the model parameters. Fan and Hu (1999) investigated whether the Shanghai stock prices can be determined by the present-value model. Their results showed the model did a good job in explaining the prices of 47 stocks traded on the Shanghai Stock Exchange at the beginning of 1996 to 1998. The estimated parameters are found to be similar to those reported for stocks traded on the Hong Kong and the New York Stock Exchanges. These results are identified as encouraging for the relatively new Shanghai Stock Exchange and inexperienced Chinese investors who have been permitted to buy stocks only since the early 1990s. Their findings proved that the present-value model explains prices of stocks traded in mature stock markets and is also applicable to prices of stocks traded in developing economy. Our study investigates the valuation of Chinese stock market to include both the Shanghai and Shenzhen composite indexes using the dividend discount model.

3.3.1.1 Empirical Models

To formally investigate the probability of the over-valuation of China's A share market, the Dividend Discount Model which is based on the standard relationship in financial economics is adopted as follows:

$$P_0 = D_1/(1+r_t) + D_2/(1+r_t)^2 + D_3/(1+r_t)^3 + \dots + D_T/(1+r_t)^T + P_T/(1+r_t)^T \quad (1)$$

where

P_0 = the expected intrinsic value or price that one would expect to pay for the asset in year t

D_T = the nominal annual dividend paid on the stock in year T

P_T = the terminal price in year T

r_t = the constant discount rate or the rate of return required by investors at time t

Equation (1) is adjusted to the price P'_T which is dividend based:

$$P_0 = P'_T / (1+r_t)^T \quad (2)$$

$$T = t+7$$

where

P_0 = the expected intrinsic value or price that one would expect to pay for the asset in a given day t

P'_T = the terminal price in day T which is dividend adjusted

r_t = the constant discount rate or the rate of return required by investors at time t

$T = t$ plus 7 since P'_T is discounted on a 7 days basis.

Following the CAPM model, the discount rate is defined as follows:

$$r_t = r_{ft} + \beta (MRP_t) \quad (3)$$

where

r_{ft} = the one-year deposit rate at time t

β is assumed to be 1.0 because the stock market not individual stock that is valued here

MRP_t = the approximate market risk premium at time t computed as the market return less the yield on the long-term Chinese government bond.

Thus a pricing error can be obtained by calculating prices from equations (2) and (3) to the actual price at each time t :

$$UP_t = (P_0 - P_t) / P_t \quad (4)$$

where

UP_t = the unexpected portion of the price in period t

P_t = the actual price

P_0 = the expected valuation based on the terminal index price

UP which represents the proportional variation between the expected value of shares using dividends discounted at the estimated cost of equity r_{ft} shows the degree of mis-valuation of the cost of equity. UP should be zero if the market is efficient and correctly valued. The periods of continuous over- and under-valuation in the market are anticipated. If the actual price, P_t is larger than the expected price, P_0 , there should be negative UP and vice versa (Foerster and Sapp, 2006).

3.3.1.2 *The Cost of Equity*

The Dividend Discount Model has certain assumptions to estimate equity value, and it is necessary to investigate the quality of the estimate for the crucial input-discount rate.

To determine how well the method performs at predicting the discount rate, the observed prices are used to back out the implied discount rate.

$$r_{it} = (P'_{T+1} / P'_T) - 1 \quad (5)$$

where

r_{it} = the implied discount rate at time t

P'_{T+1} = the terminal price in day $T+1$ which is dividend adjusted

P'_T = the terminal price in day T which is dividend adjusted

Then the estimated discount rate at each period, r_t , which is calculated by equation (3), is compared with the implied discount rate, r_{it} obtained by the historical data. The unexpected part of the current discount rate is defined as follows:

$$UR_t = (r_t - r_{it}) / r_{it} \quad (6)$$

where

UR_t = the unexpected part of the current discount rate

r_t = the constant discount rate or the rate of return required by investors at time t

r_{it} = the implied discount rate at time t

3.3.2 The Role of the Economic Factors

The final part of this study investigates how the pricing errors are impacted by changing economic conditions:

3.3.2.1 Empirical Models

This includes studying how the observed pricing errors are impacted by key economic and price-related factors:

$$UP_{t= a+ \sum b_j *F_{jt} +e_t} \tag{7}$$

where

UP_t = the unexpected portion of the price in period t

F_{jt} = the value of economic factor j in period t

b_j = the sensitivity of the pricing errors to factor j

a = the intercept term

e_t = the error term

Three key economic and price-related factors are studied here. The first is term structure which is defined as the yield on long term government bonds - the yield on short-term government bonds. The second is inflation. Changes in inflation (DCPI) are measured by the differences in the Consumer Price Index (CPI) adjusted on daily basis. The last is price momentum (MOM) which is measured using the one month cumulative change in equity prices.

As with the pricing errors, how these economic factors are able to capture the differences between the estimated and implied discount rate is also investigated as follows:

$$UR_{t= a+ \sum b_j *F_{jt} +e_t} \tag{8}$$

where

UR_t = the unexpected part of the current discount rate

F_{jt} = the value of economic factor j in period t

b_j = the sensitivity of the pricing errors to factor j

a = the intercept term

e_t = the error term

3.3.2.2 The Expected Signs of the Economic factors

In spite of increasingly important role of the stock market in the Chinese economy, no systematic studies on the economic consequences of stock market development in China have been developed (Feng, 2003). There are many occasions when the stock market does not respond to the business cycle, but it has quite strong reaction to changes in economic activity. For example, stocks almost always increased rapidly before a boom and fall as the downturn arrives (Foerster and Sapp, 2006).

In order to capture the relationship between stock market return and economic conditions in China, some of the most commonly used economic and price-related factors are considered in this study. These factors have been used to argue how investors are currently valuing equity investments given different economic conditions (Foerster and Sapp, 2006). For example, the term structure of interest rates (TERM) is used to examine the impact of expected changes in economic conditions. The change in the level of the consumer price index (DCPI) is included in the study to compensate for price differences, which may take place as a result of changes in inflation over time. Finally, a momentum factor (MOM) measure is also included to capture the trends in market valuation. These factors are assumed to impact the changes in stock prices as a result of their relationship to the business cycle.

Term Structure Measure

The term structure is defined as the yield on long-term government bonds less the yield on short-term government bonds. This variable measures how the economy is developing over time. It is also intended to capture business cycle effects. The slope of the yield

curve is commonly viewed as a leading economic indicator. If the yield curve is upward-sloping or the term structure is positive, economic expansion is generally taking place. On the contrary, an inverted yield curve or negative term structure always indicates that the business climate is deteriorating. This is because of the indication of a future recession by the associated tightening of monetary policy which increases short-term rates (Lin, 2004). The economy condition is expected to improve as the term structure increases especially when the slope of the yield curve goes from being negative to positive. When the economy is improving, investors would more optimistically anticipate for future dividend payments by firms as it would not require as large a return on their equity (Foerster and Sapp, 2006). For this reason, the actual stock price is expected to increase as the term structure increases, which improves the economic condition. Thus a negative relationship between term structure and the pricing errors (the difference between the expected price and actual price) is expected.

The DCPI Measure

Changes in inflation can have potential impact on stock prices thus a measure of the year-over-year changes in consumer prices will be considered. Our study based on a daily basis data, and the changes in inflation, DCPI, are measured using differences in the yearly Consumer Price Index (CPI) adjusted on daily basis. The stocks are viewed as a way of compensating for or providing a long-term hedge against inflation. Furthermore, stock price changes are regularly observed to have a negative relationship with the changes in inflation in the short-run. The measure offers a means to investigate the changes in investors' expectations regarding inflation. Inflation is commonly viewed as a lagging economic indicator, which means that inflation is viewed to be rising when the economy goes into a recession. Thus, the changes in inflation and DCPI are supposed to be negatively related to the economic conditions. In addition, the pricing errors would be positively related to the rate of inflation. That is, when inflation is decreasing, the actual stock price is expected to increase more than the expected stock price. With the improving economic conditions, there would be more optimistic expectation about the

future decreasing actual cost of equity for the market and increasing dividends (Foerster and Sapp, 2006).

Price Momentum Measure

Price momentum (MOM) factor is measured by the cumulative changes in equity prices over the past 30 days. Momentum is supposed to be a leading indicator, which means that there would be a decrease in the cost of equity or an increase in the expected level of future dividends as the actual stock prices rises. Thus the economic condition improves with increasing MOM. As a result, momentum is positively related to the economic conditions and the pricing errors are supposed to have a negative relationship with momentum (Foerster and Sapp, 2006).

The hypotheses in this study focus on how the changes in the economic factors are related to the changes in the actual price and consequently on the unexplained portion of the actual prices or the pricing error. The unexplained portion (UP) of the actual prices or the pricing error should be zero in an efficient market. The relationship between the unexplained pricing error and the economic factors are assumed to depend on the information of these economic measures with regard to the required return on equity and future dividend growth (Foerster and Sapp, 2006). Given a period of continuous over- and under-valuation in the stock market is anticipated in this study, we assumed that there are periods when investors are under-estimating (over-estimating) the required return on equity or systematically over-estimating (or under-estimating) the future dividend growth rate. This will lead to a negative unexplained pricing error, UP, because the actual price, P , would be greater than the expected price, $E[P]$. The unexplained pricing error, UP, would be positive when the contrary is the case (Foerster and Sapp, 2006).

The possible relationships between the economic factors and the unexplained deviations and between the implied and the estimated costs of equity, UR, are also investigated in this study. The implied cost of equity is supposed to be greater than the estimated cost of equity when the economic factors show an improvement in future economic performance.

The forward looking implied cost of equity will capture the investors' perception that future conditions are improving and thus equity prices should be improving in the future (Foerster and Sapp, 2006). Thus UR is hypothesised to have a negative relationship with the leading indicators, TERM and MOM have positive relationships with the lagging indicator, DCPI.

3.4 Research Hypotheses

Hypothesis 1: China's A share stock market is over-valued based on the Dividend Discount Model (DDM).

Hypothesis 2: There is no difference in the implied discount rate based on historical equity prices and the estimated discount rates based on CAPM.

Hypothesis 3: The term structure factor has negative relationship with the differences between the expected and actual values of the Chinese stock market.

Hypothesis 4: The rate of inflation: DCPI factor has positive relationship with the differences between the expected and actual values of the Chinese stock market.

Hypothesis 5: The price momentum factor has negative relationship with the differences between the expected and actual values of the Chinese stock market.

CHAPTER 4

DISCUSSION OF EMPIRICAL FINDINGS AND RESULTS

4.1 Introduction

This chapter discusses and analyzes the empirical results and findings. Section 4.2 discusses the economic factors that are investigated. Section 4.3 analyzes the empirical results from the Dividend Discount Model. Section 4.4 discusses the findings for the estimated and implied discount rates.

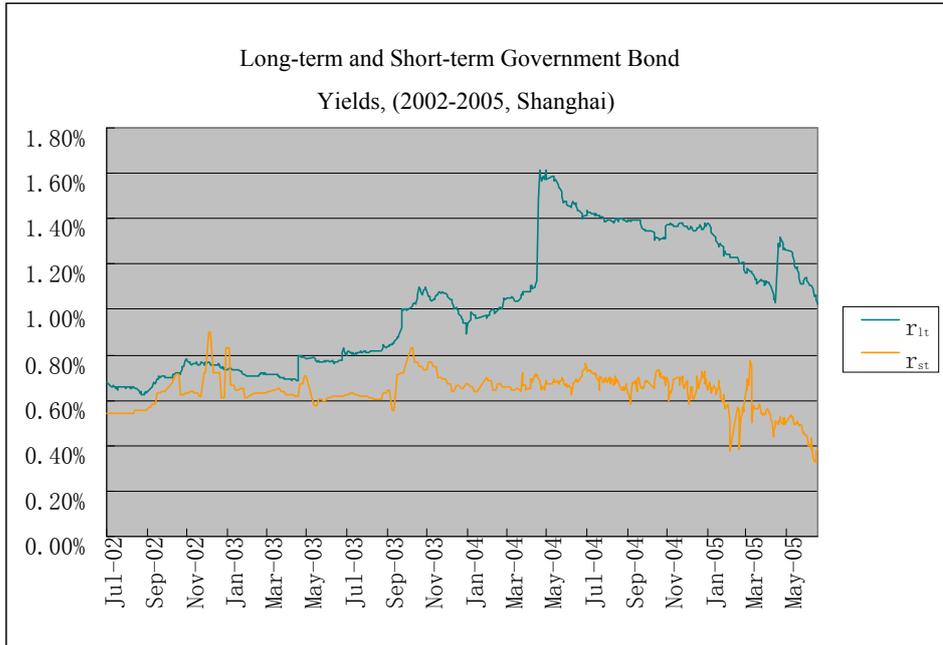
4.2 Descriptive Statistics and Sample Selection Results

4.2.1 Description of the Economic Factors

4.2.1.1 *Term Structure*

The study assumes investors take the economic conditions in consideration in their stock valuation process. First, the economic factors over the sample period are shown in Figures 3 to Figure 6. Looking at the long-term and short-term government bond rates in Figures 3a and 3b respectively, the long-term rates are more stable than the short-term rates over the entire sample. For the same bond but listed in different stock market, the long term and short term bond performed in similar pattern but with quite different values in the Shanghai and Shenzhen stock markets. In Figure 3a, we see that the long term rates fluctuate narrowly until early 2004. The long term rates increased rapidly from April 2004 and peaked in May. In October 2004 and March 2005, the central bank of China increased the deposit rate and reserve ratio. The short term rate did not exceed the long term rate in the Shanghai stock market. However, the short term bond rates fluctuated wildly from January to May 2005. In Figure 3b, we see that in the Shenzhen stock market, the short term interest rates experienced dramatic swings, with the very low negative value and much higher rates than the long-term bond during the period.

Figure 3a. Long-Term and Short-Term Government Bond Yields, (2002-2005, Shanghai Stock Market)



Note: r_{lt} is the long term government bond yield and r_{st} is the short-term government bond yield.

Figure 3b. Long-Term and Short-Term Government Bond Yields, (2003-2005, Shenzhen Stock Market)



Note: r_{lt} is the long term government bond yield and r_{st} is the short-term government bond yield.

In general, the long and short-term interest rates followed similar patterns but the differences in yield widens after April 2004. In Figures 4a and 4b, the term structure is measured by the difference between the yields on the long and short term bonds. We can see how the spread between them has changed over this time period. In Figure 4a, we see that in the Shanghai stock market, the term structure started to decrease since July 2002 with its value very close to zero until October. Given how we have defined the term structure, we see frequent inversions of the yield curve in the period during November 2002 to January 2003. The periods of inversion are frequently observed before or during periods when the economy is in a recession (Foerster and Sapp, 2006). The inverted yield curve of term structure signified the recession in the late 2002. This is consistent with the true conditions as shown in Figure 5. The term structure rapidly trended up from April 2004. In Figure 4b, we see that during January to May 2005, the term structure started to decrease when big inversion displayed on Shenzhen stock market.

Figure 4a. Term Structure Measure, (2002-2005, Shanghai Stock Market)

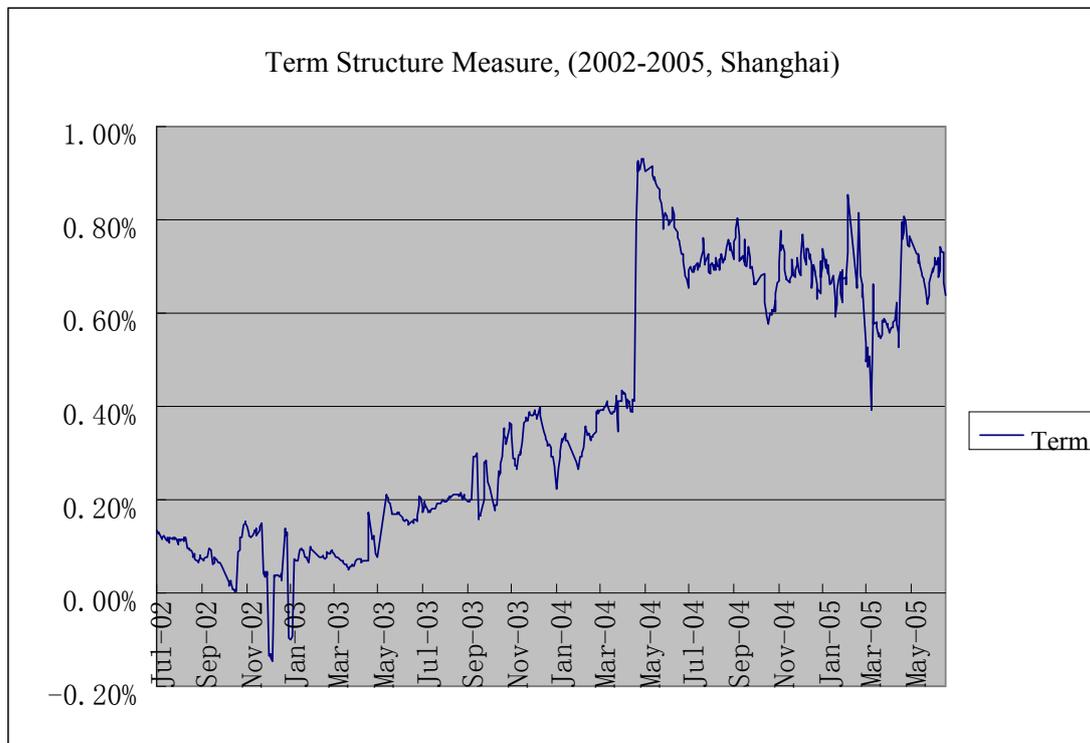
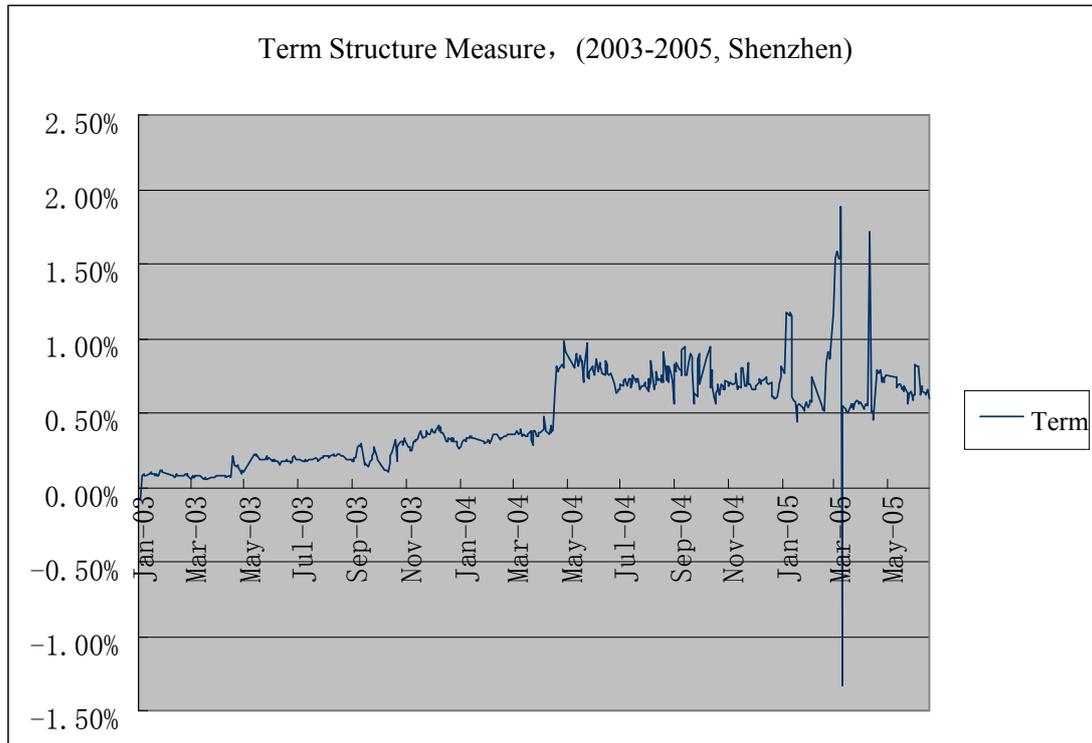


Figure 4b. Term Structure Measure, (2003-2005, Shenzhen Stock Market)



4.2.1.2 The Consumer Price Index

For the yearly CPI in Figure 5a, we see that deflation dominated in 2002 and began to creep in until 2004. This provided some evidence that increasing inflation paved the way for the economic downturns, when inflation increased a lot in 2004 and decreased again in 2005. Then in Figure 5b, we can find the rate of inflation adjusted on daily basis, DCPI, was negative in 2002 and 2005, and positive in 2003 and 2004.

Figure 5a. The Consumer Price Index (1990-2007)

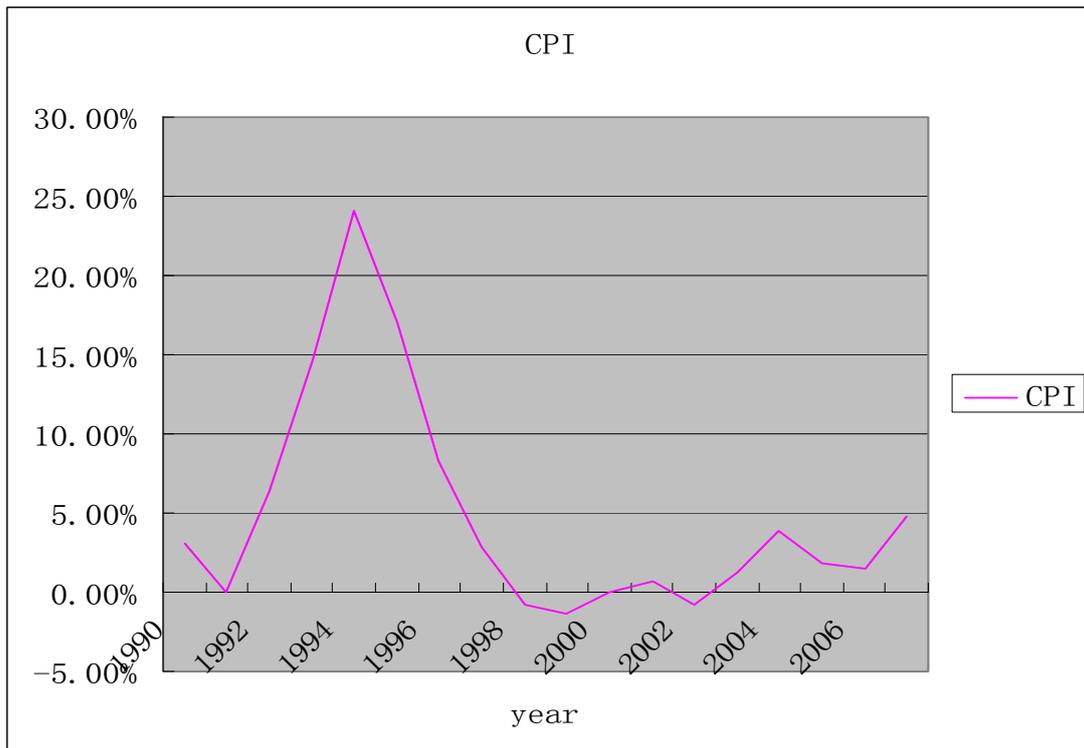
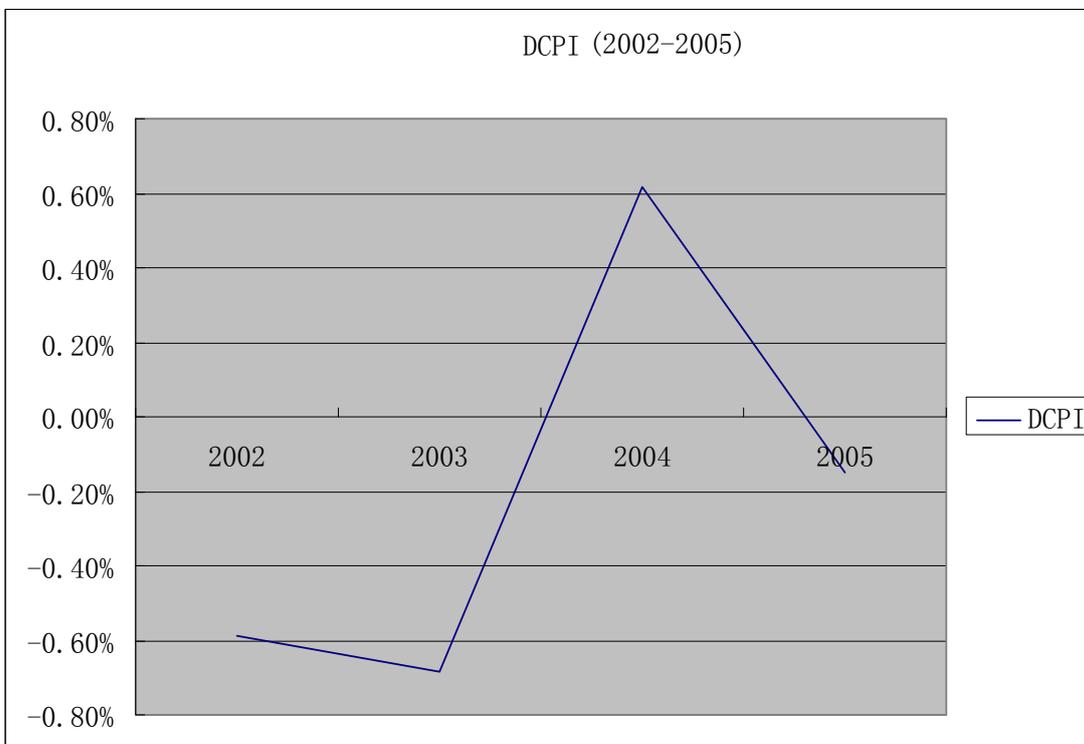


Figure 5b. Change in Consumer Price Index (2002-2005)



4.2.1.3 The Price Momentum

To further see how investors' valuation of equities has changed over time, Figures 6a and 6b present the one month price momentum factor. This clearly demonstrates how equity prices rise and fall during the sample period.

Figure 6a. One Month Price Momentum Factor, (2002-2005, Shanghai Stock Market)

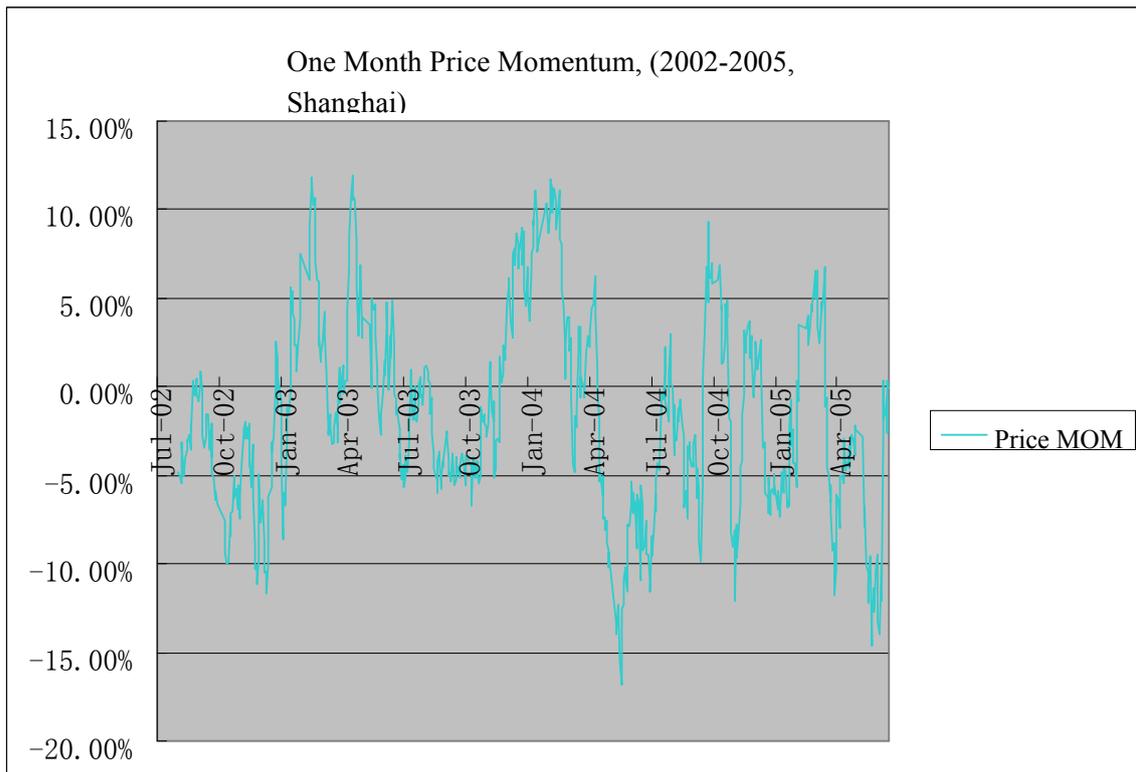
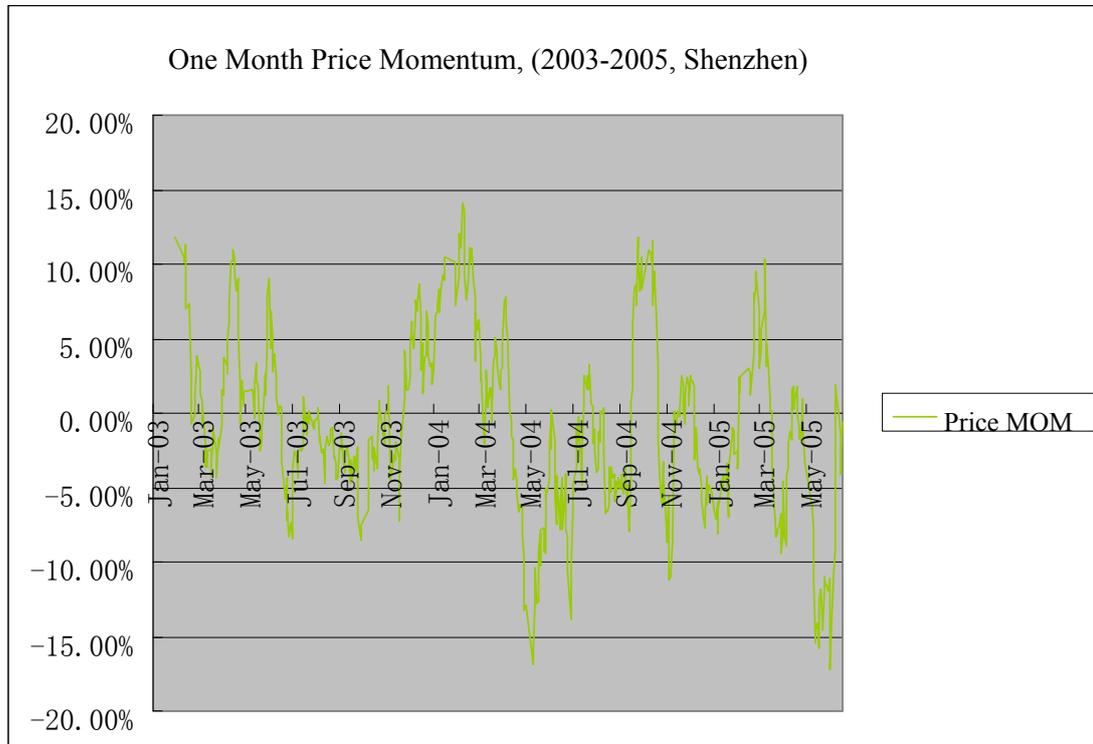


Figure 6b. One Month Price Momentum Factor, (2003-2005, Shenzhen Stock Market)



4.2.2 Descriptive Statistics and Correlation Analysis

Table 1 and Table 2 present a summary statistics of the economic and price-based factors used in the study. Table 1a and 1b illustrate the large variation within each of the economic factors (such as term structure, inflation, and momentum) over the sample period. The statistics are consistent with the patterns observed in Figures 3 to 6.

Table 1a. Summary Statistics for Economic Factors (Shanghai Stock Market, 2002-2005)

Variable	Mean	Std Dev	Min	Max
TERM	0.0038693	0.0027544	-0.00146	0.00931
DCPI	-0.001466	0.0057383	-0.00685	0.00616
MOM	0.01653	0.0556587	-0.16813	0.11954

Table 1b. Summary Statistics for Economic Factors (Shenzhen Stock Market, 2003-2005)

Variable	Mean	Std Dev	Min	Max
TERM	0.0046398	0.003085	-0.0133	0.01888
DCPI	-0.000527	0.0059106	-0.00685	0.00616
MOM	-0.008698	0.0587838	-0.17278	0.14156

Notes: The economic factors are the term structure of interest rates (TERM), measured as the difference between long-term government bond yields and short-term government bond yields, year-over-year changes in consumer prices adjusted on daily basis and a price momentum factor as measured by the cumulative changes in equity prices over the past 30 days. The summary statistics include the mean, standard deviation, and minimum and maximum daily values, July 2002-June 2005 for Shanghai and January 2003-June 2005 for Shenzhen.

Table 2a and Table 2b present the correlations between the economic factors. The momentum (MOM) factor is negatively correlated with the changes in inflation and term structure. This is consistent with current wisdom that stocks provide a long-term hedge against inflation so that inflation is frequently negatively related to stock price changes. On the other hand, there is a positive relationship between the change in inflation and term structure. Since deflation will generally result in the stagnation of the GDP growth, this is consistent with the government reducing short-term interest rates to control deflation and to stimulate economic growth.

Table 2a. Economic Factor Correlations (Shanghai Stock Market, 2002-2005)

	TERM	DCPI	MOM
TERM	1.000	0.622 (0)	-0.242 (0)
DCPI		1.000	-0.047 (0.262)
MOM			1.000

Table 2b. Economic Factor Correlations (Shenzhen Stock Market, 2003-2005)

	TERM	DCPI	MOM
TERM	1.000	0.774 (0)	-0.258 (0)
DCPI		1.000	-0.057 (0.132)
MOM			1.000

Notes: Correlation is significant at the 0.01 level (2-tailed) (with p-values of the test of the hypothesis that each correlation is not significantly different from zero in parentheses).

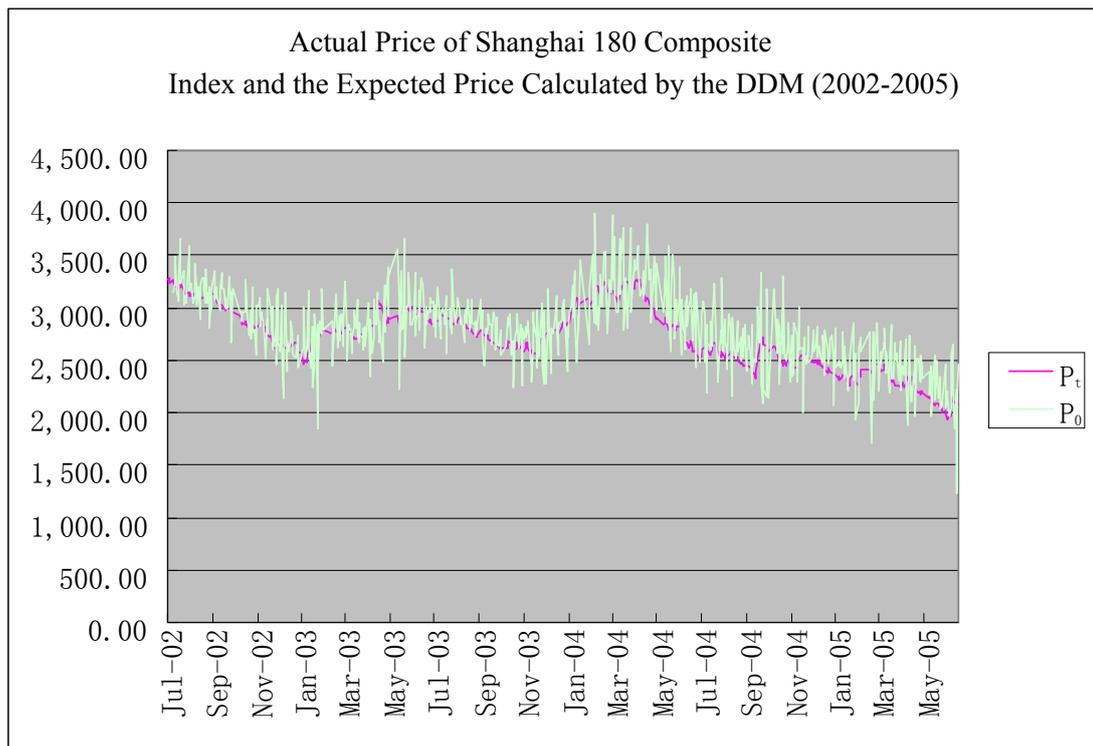
4.3 The Dividend Discount Model

This section examines the valuation techniques using expected future dividends to explain the actual value of the Shanghai 180 and Shenzhen 100 composite indexes. Since dividends played an important role in stock valuation, it is assumed that investors use the expected dividends and adopt CAPM in calculating the discounts rates to determine the current value of stocks.

4.3.1 The expected intrinsic values of the stock indexes

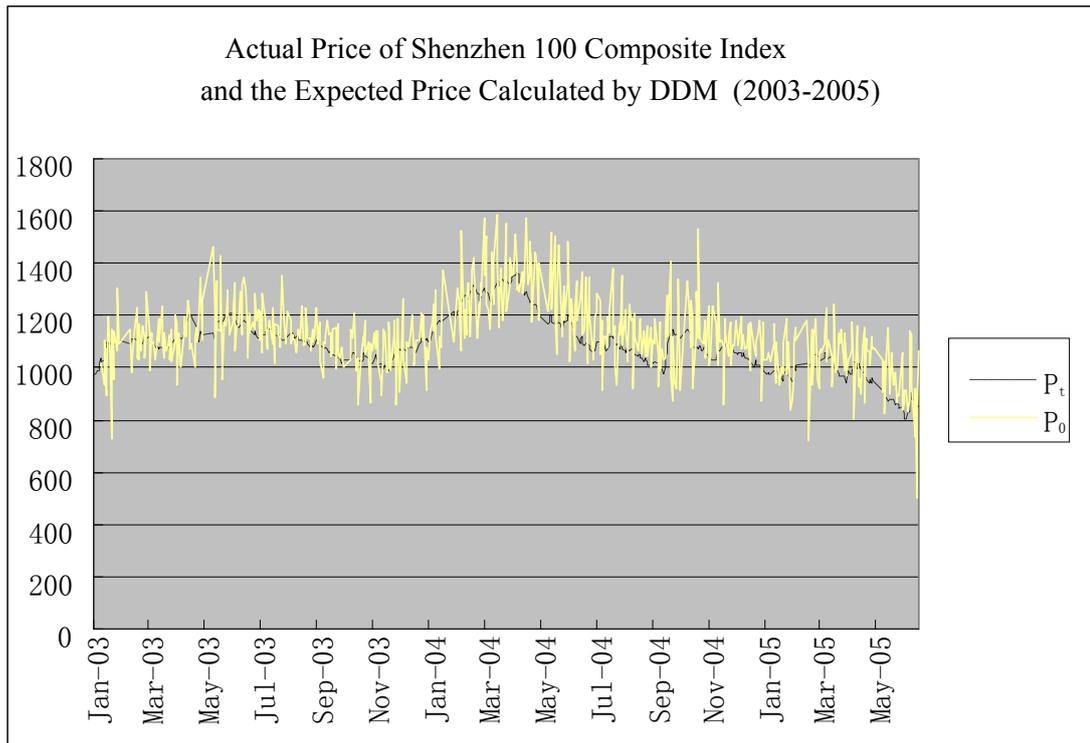
Figure 7 shows the performance of the expected prices obtained from the DDM (dividend discount model). The DDM seems to perform reasonably well in estimating the real prices over the sample. The deviations between the actual and expected prices appear in same pattern in the Shanghai and Shenzhen stock markets. The expected prices appear to be over-valuing stocks during the sample period as the pricing errors appear to be more distributed across the under-valuation over the sample. The differences between the actual and expected prices are the largest when there are large changes in the Chinese economy (for example, during 2004).

Figure 7a. Actual Price of Shanghai 180 Composite Index and the Expected Price Calculated by the Dividend Discount Model



Notes: P_t is the actual price and P_0 is the expected intrinsic value or price based on DDM.

Figure 7b. Actual Price of Shenzhen 100 Composite Index and the Expected Price Calculated by the Dividend Discount Model



Notes: P_t is the actual price and P_0 is the expected intrinsic value or price based on DDM.

4.3.2 Regression Analysis of the “Pricing Errors”

Table 3 shows the estimated results using Equation (7). The regression results show the relationships between the pricing errors and the economic and price based factors. The intercept term symbolizes the average pricing error over the corresponding sample period (Foerster and Sapp, 2006). The estimated intercept shows there is an average under-pricing of 0.9% of the Shanghai stock market and 1% of the Shenzhen stock market over the entire sample period. The intercept terms are not significantly different from zero, which proves the average pricing error is zero in both markets. As it is not possible for investors to predict the unprecedented growth in both dividends and stock prices over the full sample period, it is not unexpected that the expected price is larger than the actual price for much of the sample. This is shown in Figures 7a and 7b with majority of the underpricing from 2002 to 2005.

Table 3a. Pricing Errors Regression (Shanghai Stock Market, 2002-2005)

	Intercept	TERM	DCPI	MOM	Adj R-sq	F	N
Reg	0.009	5.336	0.56	-0.298	0.082	21.686	694
	(0.943)	(2.687)	(0.611)	(-4.735)			

Table 3b. Pricing Errors Regression (Shenzhen Stock Market, 2003-2005)

	<i>Intercept</i>	<i>TERM</i>	<i>DCPI</i>	<i>MOM</i>	<i>Adj R-sq</i>	<i>F</i>	<i>N</i>
Reg	0.01	5.078	0.473	-0.362	0.091	20.122	572
	(1.116)	(3.046)	(0.565)	(-5.253)			

Notes: The regressions are based on the dependent variable pricing errors presented in Equation (7): $UP_t = a + \sum b_j * F_{jt} + et$, where “ U_{pt} ” is defined as $(P_0 - P_t) / P_t$; P_t is the actual price of the index; and P_0 is the expected valuation based on the terminal index price (the cost of equity used to discount the dividends and terminal price is estimated using a rolling CAPM); F_{jt} is the value of economic factor j in period t ; b_j is the sensitivity of the pricing errors to factor j ; a is the intercept term; and et is the error term. The TERM, DCPI, and MOM factors are described in Table 1. T-statistics are presented in parentheses. Adj R-sq is the adjusted R-square. F is the F statistic. N is the number of observations.

The regression results in Table 3 show that the Shanghai and Shenzhen stock markets during 2002-2005 deviate from their intrinsic value for a very small distance. This is supported by the t value statistics for the intercept term revealing that the model does not provide strong evidence of market under-valuation. In other words, the Chinese stock markets are quite near to efficient when they were bear market from 2002 to mid 2005. The finding show that the Chinese stock market was more close to its real value after the market crash since late 2001. The Chinese stock markets was closed to efficient when the stock indexes experienced much loss of the market value and sharp fall of average P/E ratios during 2002 to mid 2005. (For example, Until November 19, 2004, the Shanghai and Shenzhen stock market fell 8.89% and 7.88%, respectively. The average market price to earning ratio fell from 28.91% to 26.63 % (Guo, 2004). This result supports the

existing literatures about overvaluation of the Chinese stock markets in the 1990s from a different viewpoint.

The sign of coefficients beta in Table 3 shows the relationship between the economic and price-based factors and the pricing error. Contrary to the previous hypothesised sign, there is a positive relationship between the term structure of interest rates and the pricing errors. This might be explained by the investors' expectation of riskier economy though the positive term structure normally indicates better economic conditions. This finding is consistent with the investors who view the government's actions as an attempt to revive the economy by reducing short-term interest rates. As hypothesized, there is a positive relationship between the changes in the inflation and the pricing errors. There is also a negative relationship between the pricing errors and price momentum which is consistent with our priori hypotheses.

The t-statistics in Table 3 shows the significance of each economic factor in explaining the pricing errors. The relationship between the pricing errors and price-based factor, price momentum, is much more significant compared to the two economic factors in the overall period. This result proves that the Chinese stock market is quite price momentum driven. The pricing errors are not quite affected by rate of inflation. The probable explanation is that we use the yearly Consumer Price Index data and adjust the CPI on daily basis. The year-over-year changes in consumer prices adjusted on daily basis, DCPI, doesn't fluctuate during a year. Overall, the results from the estimated models for the pricing errors provide evidence for positive and negative relationships between the economic factors and the pricing errors. It suggests that the value of these economic factors in the standard asset pricing model is somewhat related to their ability to forecast how investors are valuing assets. This is evidenced by matching the actual prices that investors are willing to pay for the expected prices based on fundamental valuation (Foerster and Sapp, 2006).

4.4 The Implied versus Estimated Cost of Equity

4.4.1 Discount Rate Measure

We use the CAPM to calculate the discount rate in the discount dividend model over the entire sample period. We estimate the cost of equity based on historical information. The differences between the estimated cost of equity and the implied cost of equity that associate with the actual and theoretical equity prices are investigated.

Figure 8a and 8b show the implied cost of equity is higher than the estimated cost of equity almost over the entire sample. This is consistent with the estimated results where the investors are undervaluing the stocks during the period. The difference is more obvious after April 2004. The results imply that investors are integrating an increasing equity premium into prices over this period due to their expectations that stock prices would be decreasing continuously. The relationship between the implied cost of equity and the business cycle provides some insights into the impact of various factors on how investors value equity. Particularly, we see the estimated cost of equity increasing just before and especially during a period of economic contraction (June 2005) (Foerster and Sapp, 2006).

Figure 8a. Implied Cost of Equity and Estimated Cost of Equity (Shanghai Stock Market, 2002-2005)

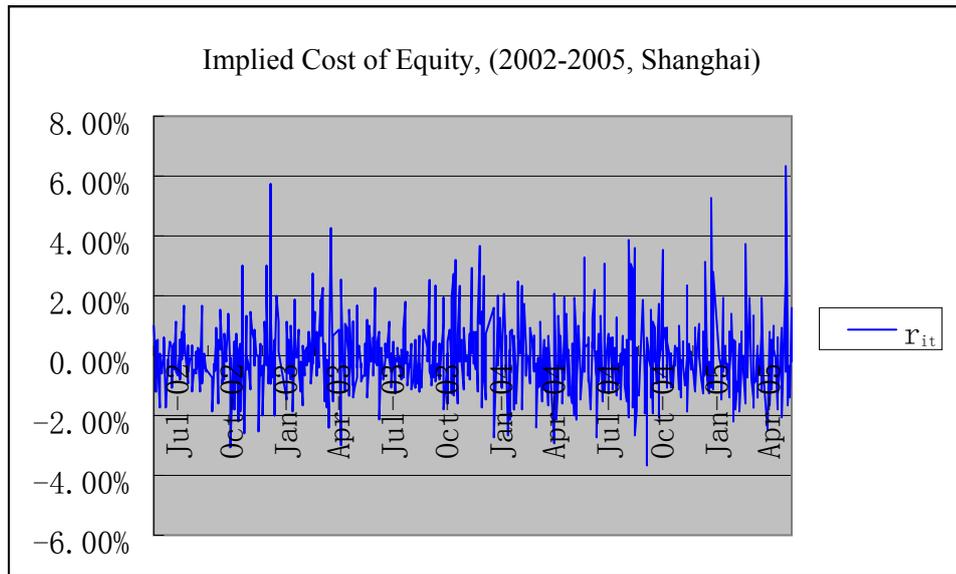
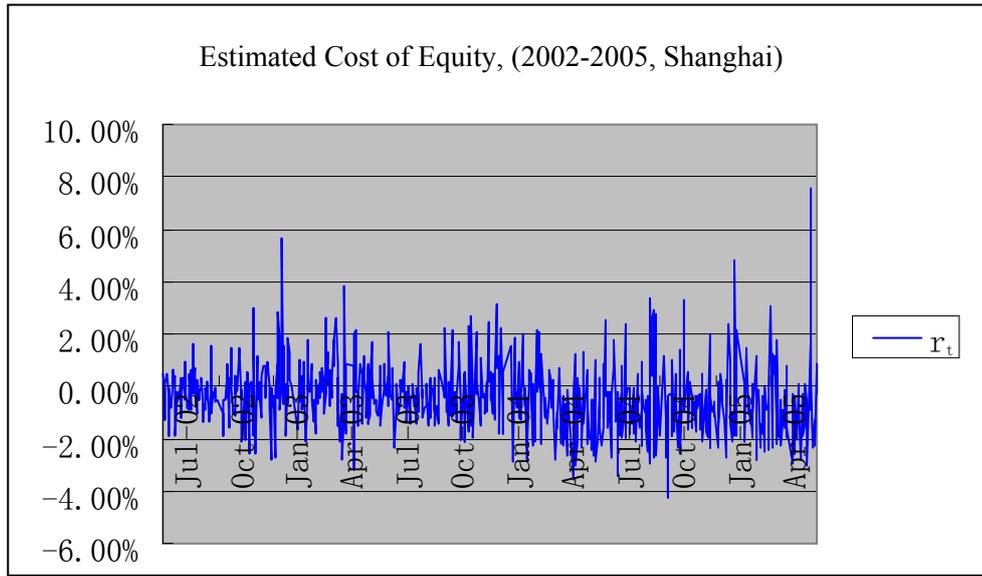
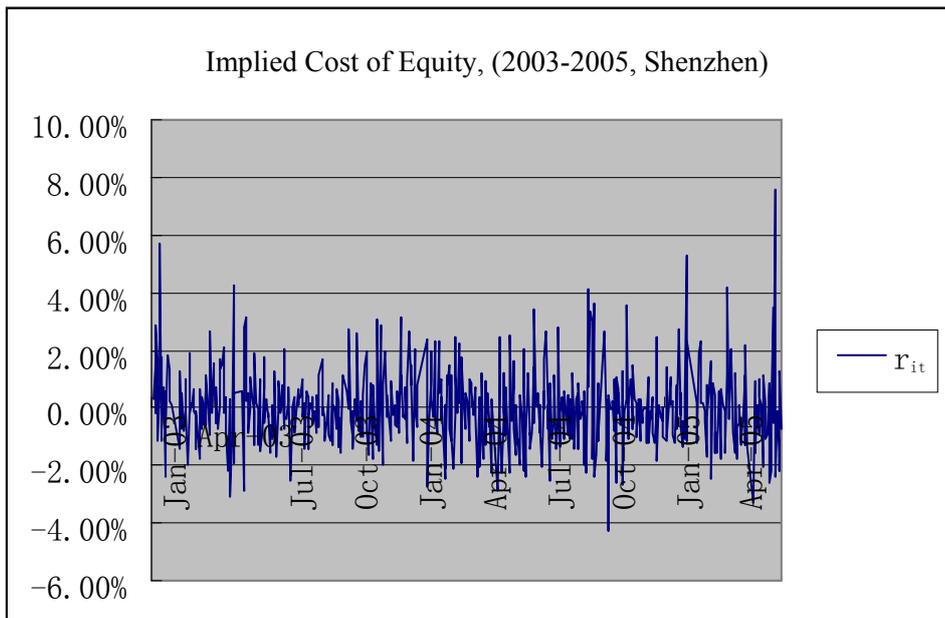
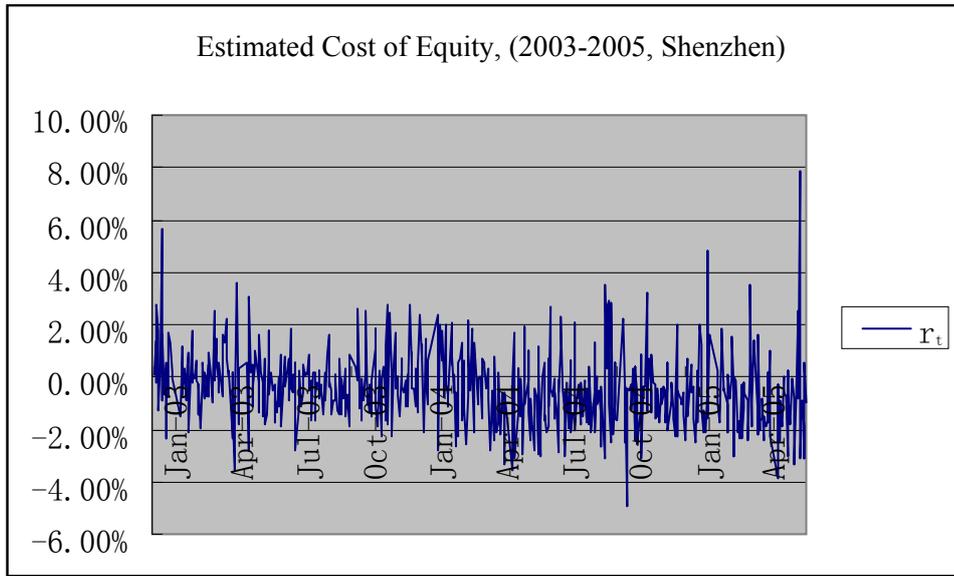


Figure 8b. Implied Cost of Equity and Estimated Cost of Equity (Shenzhen Stock Market, 2003-2005)



Notes: r_t is the estimated cost of equity based on CAPM and r_{it} is the implied discount rate based on real stock price.

4.4.2 Descriptive Statistics of Cost of Equity

To present a more formally investigation of the relationship between the estimated and implied costs of equity, summary statistics for each of the values as well as the difference between them are presented in Table 4. The estimated and implied costs of equity are very similar and are just below 8% over the whole sample in spite of the variability and lower values of the estimated cost of equity over time (see Table 4). The low standard deviation of the cost of equity indicates their stability over the entire sample period.

Table 4a. Summary Statistics for Cost of Equity (Shanghai Stock Market, 2002-2005)

Variable	Mean	Std Dev	Min	Max
Urt	-0.5159805	15.67961175	-401.09842	38.57076
rit	-0.000328	0.0119976	-0.03697	0.06348
rt	-0.004125	0.012765	-0.04242	0.07538

Table 4b. Summary Statistics for Cost of Equity (Shenzhen Stock Market, 2003-2005)

Variable	Mean	Std Dev	Min	Max
Urt	-0.444918	9.4849447	-176.221	45.45362
rit	0.0000328	0.0133049	-0.04297	0.07555
rt	-0.004272	0.0140174	-0.0496	0.07836

Notes: The variable include r_t , the estimated cost of equity (or discount rate) using the CAPM: $r_t = r_{ft} + \beta(MRP_t)$, where r_{ft} is the yield on a long-term Chinese government bond yield at time t ; β is assumed to be 1.0; and MRP_t is the estimated market risk premium at time t calculated as the Chinese market return (the Shanghai 180 composite index and Shenzhen 100 composite index) less the yield on a long-term Chinese government bond yield. r_{it} , the implied cost of equity, is calculated based on the historic index price using equation (5): $r_{it} = (P'_{T+1}/P'_T) - 1$. And the unexpected part of the current discount rate at time t : $UR_t = (r_t - r_{it}) / r_{it}$. The summary statistics include the mean, standard deviation, and minimum and maximum daily values, July 2002-June 2005 for Shanghai and January 2003-June 2005 for Shenzhen.

4.4.3 Regression Analysis of the Cost of Equity Deviations

Similarly, Table 5 presents the regression results of the level of the difference between the estimated and implied cost of equity (UR) and the economic factors using Equation 8. The overall regression results demonstrate the average under-estimation of the cost of equity by means of the moving average for the market premium in the CAPM compared to the implied cost of equity obtained by historical index prices. That is, the cost of equity is overvalued in the Shanghai stock market by 6.5% and 16.3% in the Shenzhen stock market. But they are not significantly different from zero.

Table 5a. Cost of Equity Deviations Regression (Shanghai Stock Market, 2002-2005)

	Intercept	TERM	DCPI	MOM	Adj R-sq	F	N
Reg	-0.065	-280.619	146.249	-21.322	0.003	3.07	693
	(-0.061)	(-0.845)	(1.141)	(-1.956)			

Table 5b. Cost of Equity Deviations Regression (Shenzhen Stock Market, 2003-2005)

	Intercept	TERM	DCPI	MOM	Adj R-sq	F	N
Reg	-0.163	-40.949	11.949	-10.727	-0.001	0.905	571
	(-0.178)	(-0.237)	(0.138)	(-1.505)			

Notes: The regressions are based on the dependent variable pricing errors presented in Equation (8): $UR_t = \alpha + \sum b_j F_{jt} + et$, where “ UR_t ” is defined as $(r_t - r_{it}) / r_{it}$. r_t is the estimated cost of equity (or discount rate) using the CAPM: $r_t = r_{ft} + \beta(MRP_t)$, where r_{ft} is the yield on a long-term Chinese government bond yield at time t ; β is assumed to be 1.0; and MRP_t is the estimated market risk premium at time t calculated as the Chinese market return (the Shanghai 180 composite index and Shenzhen 100 composite index) less the yield on a long-term Chinese government bond yield. r_{it} , the implied cost of equity, is calculated based on the historic index price using Equation (5): $r_{it} = (P'_{T+1}/P'_T) - 1$. F_{jt} is the value of economic factor j in period t ; b_j is the sensitivity of the pricing errors to factor j ; α is the intercept term; and et is the error term. The TERM, DCPI, and MOM factors are described in Table 1. T-statistics are presented in parentheses. Adj R-sq is the adjusted R-square. F is the F statistic. N is the number of observations.

Given that the estimated cost of equity is obtained from a moving average of past prices, the changes in investor sentiment are more rapidly integrated into the implied cost of equity than the estimated cost of equity. From the regression coefficients in Table 5, we can see the relationship between the economic factors and the deviation in the estimation of the cost of equity. The t statistics in Table 5 shows the significance of each economic factor in explaining the deviations of the discount rates. It is found again that the relationship between the deviations of cost of equities and price momentum is much more significant compared to the other two factors in the overall period.

However, the result shows negative relationship between the cost of equity deviation and term structure, but they are not significant. This result contradicts our priori hypothesis. Our results show that the implied price increases more than the estimated price as the term structure increase and investors would require a higher compensation for taking risk when short-term rate increases (Foerster and Sapp, 2006). Positive term structure is identified as a signal of improving economic condition. The possible explanation is that increasing the long-term rates to stimulate the economy leads to a necessary increase in the cost of equity offered to investors. This explanation is consistent with the findings shown in Figure 3. There is constant positive cost of equity since June 2005. This means the estimated cost of equity is higher than the implied cost of equity at that time. From the middle of 2005 the Chinese stock markets started to boom. This might be an indication of the investors starting to under-estimate the actual cost of equity or having unrealistically high expectations regarding the equity premium.

CHAPTER 5

CONCLUSIONS

5.1 Introduction

In this study we make several contributions to the understanding of how investors value financial assets in the Chinese stock market. While there is plenty of subjective evidence to support the robustness of Chinese stock market valuation, there remains a lack of clear empirical evidence in this regard. However, undertaking empirical study in stock returns in China remains a challenge. This study uses a comprehensive database of daily Chinese stock markets composite index prices to estimate the stock markets' "pricing errors" via the dividend discount model. Our work complements previous empirical work in asset pricing of the Chinese stock markets. The investigation of the relationship between asset returns and economic factors provides a new view in Chinese stock market valuation.

5.2 Results Discussion

This study investigates whether the Chinese A share markets are overvalued by examining the intrinsic value of the stock markets from 2002 to 2005. The objective of this study is to estimate the "pricing errors" of the Chinese stock markets. The intrinsic value of equity is estimated by fundamental valuation techniques, such as the dividend discount model. The pricing errors are obtained by comparing a series of intrinsic values to actual index prices. Since the fundamental valuation method (Dividend Discount Model) involve an estimate of the cost of equity at each point in time, how the cost of equity has changed over time and across several economic conditions has also been investigated as well. By judging the actual prices and dividend payments for the Shanghai 180 composite index (July 2002-June 2005) and Shenzhen 100 composite index (January 2003-June 2005), the dividend-based valuation method proved to perform relatively well in explaining the actual prices for the two composite index. We find that the stocks were undervalued during 2002-2005, on average, by approximately 0.9% and 1% for Shanghai and Shenzhen, respectively. The result is not significantly different from zero, which

concludes an average zero pricing error occurs in both markets. So the Chinese stock market was close to the real value during 2002-2005 when the bear market lost quite a lot of its value. Our results support Ahmed, Li, and Rosser (2006) and Green (2003) findings about the overvaluation of the Chinese stock markets in the 1990s. Therefore, this study provides a pursuant proof of the general public's enthusiasm and over-optimism of the security markets in China.

Three important economic and price-based factors were investigated for identifying their effects on the "pricing error". Firstly, the term structure which is identified as the difference between the long-term government bond yields and the short-term government bond yields; secondly, changes in inflation measured by differences in the Consumer Price Index (CPI) adjusted on daily basis; and thirdly, the price momentum measured by the cumulative changes in equity prices over past 30 days. The relationship between these factors and the short-term movements in actual prices around the expected price illustrate the significant role played by investors' expectations in asset pricing. When evaluating the level of pricing errors (differences between the actual price levels for the index and the expected prices), our results showed that changes in the economic and price-related factors have different effect on these differences. The results show that the inflation has very little influence on the deviation between the intrinsic value and real stock prices. This maybe caused by the year-over-year changes in consumer prices on daily basis, DCPI, doesn't fluctuate during a year as we use the yearly Consumer Price Index data. However, the price-based factor, price momentum, has much larger effect on the "pricing errors" compared to that of the economic factors, inflation and term structure. Similarly, the economic and price-based factors are also used to explain the differences between estimated costs of equity obtained by CAPM and implied costs of equity obtained by historical equity price. The relationship between the deviation and the estimated cost of equity (based on CAPM) and the implied cost of equity (based on the actual index prices) provides similar results.

Thus we can conclude that the Chinese stock markets do not sufficiently reveal local economic conditions. This conclusion is consistent with the view that there is no apparent correlation between stock market price fluctuations and the general economic situation in China and the Chinese investors depend heavily on anecdotal information for significant momentum profits (see He, 2007; Drew et al., 2003; Girardin and Liu, 2003). The characteristics of the Chinese's stock markets, such as the dominance of unsophisticated individual investors, imply that the market is more momentum driven and prone to behavioural concerns. Our findings suggest that the Chinese stock markets are quite similar to a "Casino" when it is generally valued by irrational investors who neglect fundamental information.

5.3 Policy Implications

However, within the transitional form between socialism and capitalism, the Chinese stock markets have special characteristics reflecting the culture of the Chinese economic system. When the Chinese stock markets do not adequately reflect local economic conditions, such market is also closed to international influences, which means it can not be used to predict global conditions (Green and Ming, 2004). Foreigners have been prohibited from investing in the markets and most of the listed firms are state owned. In fact, the Chinese stock markets are established at aiming to create a mechanism for promoting the restructuring of the state owned enterprises as they face market valuation. However, this turns out to be difficult due to high volatility in the market. It is widely believed that government interventions are concentrated on controlling speculation and stabilizing the markets. However, it is not clear whether or not the government has succeeded. Such active government intervention causes high stock price volatility and misevaluation of the Chinese stock markets (Ahmed, Rosser, and Eastern, 2006).

It is a serious policy issue for the Chinese government to decide how to cope with such emerging stock markets, which is closely and deeply associated with the broader policy issues related to its general reform efforts. The government is confronted with many problems about whether to intervene or not to intervene, whether and how to allow

foreign participation, and the problem of expanding the stock markets. Overall, the Chinese stock market is still a learning process similar to many other emerging markets have experienced. The Chinese stock markets will not exhibit so much volatility and have better valuation with time and development (Ahmed et al., 2006).

In short, the Chinese stock markets are underdeveloped and present lots of structural and institutional constraints for investment. With China's entry into WTO, foreign investors have started to look at the Chinese stock markets. Our study provides an insight to understand the behavior and valuation of stock prices in the Chinese markets (Lin, 2004).

5.4 Limitation of the Research

Some limitations are inherent in this study. The first is the time period examined. In our study, we choose the sample period for Shanghai A share market from July 2002 to June 2005, when the Shanghai 180 composite index begins. The Shenzhen 100 composite index starts from January 2003 to June 2005. In this regard, we cannot directly prove that the Chinese stock market was over-valued for the 1990s. During 2002 to 2005 when the Chinese A share market lost lots of its value and the average P/E ratio fell to the historical lowest, our results showed both the Shanghai and Shenzhen A share markets were very close to their real value in this time period. Our study data did not investigate the data for the 1990s' Chinese stock markets. This might make our findings and conclusions less robust than if we could directly prove the Chinese stock markets are over-valued.

In the study, we investigate three major economic and price-based factors, the term structure, inflation, and price momentum. However, there are many other important economic factors, such as default premium and earnings/price ratio that could make our results more detailed and findings and conclusions more conclusive.

Our research used the most fundamental stock valuation model, the Dividend Discount Model, to test the mis-valuation of the Chinese stock markets. In addition, the best approach for stock market valuation is to use a number of disciplines (Yardeni, 2003). Foerster and Sapp (2006) examined the valuation of the S&P Composite Index (1871-2005) by DDM. As well they considered the relationship of earnings and prices based on the Fed Model. The DDM model results could be more comprehensive when it is combined with other disciplines. Also we adopt the one-year deposit rate as the risk free rate in the CAPM. The benchmark for risk free rate is quite ambiguous in China. Although the one year deposit rate is most commonly used to represent the risk free rate, when China started to issue short-term bonds after late 2003, researches using data after 2003 can use the short-term bond yields as the standard risk free rates.

5.5 Recommendations for Future Research

Future researchers might consider an analysis in which the stock market is valued in the corresponding time period. While investigating the relationship between the Chinese stock market price behaviors and the economic factors, future research should focus on a broader scope of economic influences. Future studies should also combine other stock market valuation measures with the Dividend Discount Model.

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