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The Effects of Fundamentals, Speculation, Government Policies, and International Capital Flows on China's Stock Market

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Abstract

This paper, based on the relationship between the economy, policy and the financial

market seeks to explore the leading force in China's stock market and identify how the

government policies affect the stock market, through an analysis of the performance of

the Shanghai Stock Exchange Index over the past 10 years. Comparing the stocks'

intrinsic value to their market price can present an aerial view of China's stock market.

When the market prices deviated from fundamentals, we can find what government did

to respond to the market and lead market opinions.

Through our estimation, comparing the sample fundamental prices with the sample

market prices, the market prices are consistent with fundamentals, besides the boom and

bust in 2008 and 2015. Beyond fundamentals, we also looked at another three

determinants of stocks' prices: speculation, government intervention through policy or

open market trading, and the capital flows or international hot money. Our main finding

is that fundamentals are still a core determinant in China's Stock Market.

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Chapter 1:Introduction

China, the second largest economy in the world, has dramatically developed in the last few decades. During this development, China's stock market has gained significant attention. Now, investors and economists are concerned with the rising downward pressure on China's economy, which will hinder its development. Articles and journals, for instance the Wall Street Journal or BBC news, have reported the poor performance of China's industrial production or export, which barely improved in 2015 and 2016. China's average GDP annual growth rate[1] was nearly 10% in the past four decades, while China's 2015 GDP growth rate was the lowest in the past 25 years. This rate was expected to be further reduced in 2016 and 2017.

The GDP trend suggests that a growing number of firms will have less profit growth in the near future. Thus, according to the fundamental analysis which argues that stock prices reflect their fundamental values, profit growth would affect stocks' value and the GDP downward trend negatively affects on most Chinese stocks. However, the Shanghai Stock Exchange Index, which represents the Chinese stock market, was not much

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[1] Calculated based on the official data from National Bureau of Statistics of the People's Republic of China.

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affected by the GDP. Moreover, the Shanghai Stock Exchange Index usually appears abnormally stable. These points raise questions about whether fundamentals are determinants of China's stock market.

Economists have discussed theories on the stock market and stock investment, because the stock market can have an important impact on allocation of economic resources and wealth. In this thesis, we reviewed the literature on both theories and empirical analyses about what determines the fundamental values of stocks. We first introduce theories and ideas about what determines the fundamental values of stocks in general. Then, we present relevant empirical studies about the fundamentals, speculation, capital flow and government policy from international perspective. We also conduct our own empirical examination of Chinese stock markets to understand whether the stock values follow their fundamental values. In the context of the relationship between the economy, policy and the financial market, this study also seeks to explore how the government policies affect the stock market. We answer these questions by analyzing the performance of the Shanghai Stock Exchange Index over the past 10 years. Small-scale newly listed companies have higher development uncertainty and mismatching profitability valuations, so the Shanghai Stock Exchange Index was the target. This index contains most blue-chip stocks. Comparing stocks' intrinsic or fundamental values with their market price can present an aerial view of China's stock market. When the market

prices deviated from fundamentals, the government's response to the market and actions to lead market opinions can be determined.

Our analysis found that fundamentals remain a core determinant in China's Stock Market. By comparing the sample fundamental prices with the sample market prices, we determined the market prices are consistent with fundamentals, other than the boom and bust in 2008 and 2015. In addition to the fundamentals, speculation and government interventions against speculation are the vital force pricing stocks.

This study is organized as follows. Chapter 2 presents a literature review on theories about what affects stock prices through history. Chapter 3 provides a literature review of empirical studies about the fundamental analysis, speculation, capital flows and government policy from an international perspective. Chapter 4 explains Chinese financial system and stock markets as well as their characteristics. Chapter 5 contains an empirical examination of fundamentals in the Chinese stock market. Chapter 6 describes of the market's boom and bust in 2007-2008 and 2015. This thesis ends with some concluding remarks in Chapter 7.

Chapter 2: The Determinants of Stock Price

We identified nine major theoretical approaches to understanding what determines stock prices and how. What follows is a brief summary of each approach.

I.   Keynes and his theory of beauty contest

John Maynard Keynes suggested (Keynes, 1942) investment should be based on the marginal efficiency of capital, output level, demand, interest rate, and others which are not only existing state of expectation, but also existed past states of expectations, and future expectations. He believed there is no reason to frequently revalue an investment, and existing market valuation will only change in response of the facts which will influence the yield of the investment. Price is not the correct price since we cannot know exactly how incidents will affect the marginal efficiency of capital in the future, because our knowledge cannot provide certain mathematical expectations. However, it does not matter as long as investors continue to calculate expectations in the same way. Keynes used an example of a game of musical chairs to explain the risks of investing in the stock market, and used a newspaper contest choosing the most beautiful woman to explain the

mechanism of the stock investment. According to Keynes (1942), stock selection is like newspaper contest choosing the most beautiful woman where whoever chooses the same woman or the closest, win. As a result, investors should not look for what he or she believes is the prettiest face, but guess what others will vote. Thus, correct price is not necessary because business cannot remain unchanged or continue indefinitely, and no one can correctly forecast the future incidents. However, investors should make short-term investments in what the market believes in short-term and quite before the bubble bursts.

II. Louis Bachelier and normal distribution on stock price move

Louis Bachelier (Bachelier, Davis, & Etheridge, 2006) first suggested the stock prices move randomly and a stock price's move at a specific price level can be described by a normal distribution curve. He applied Brownian motion to stock markets and proposed using Brownian motion for modeling stock market time series. According to his theory, because stock price moves randomly, any advice or insider information on stock investment is superfluous, and the decision to invest in a stock should be determined by drawing lots or rolling the dice. In addition option futures have a balanced effect on the stock price change. The longer the time period, the smaller the stock price volatility.

III. Harry Markowitz and portfolio investment theory

Harry Markowitz was the first to suggest that risk is the primary focus of investment when others were focusing on returns. Applying the concepts of mean and variance to portfolio return, Markowitz (2010) mathematically defined investors' preferences, explained the principle of investment decentralization, and systematically expounded the problems of portfolio selection. He created a set of "mean-variance" analysis model, based on marginal utility hypothesis, which measured return with portfolio mean or expected return and risk with variance of return. Markowitz proved that an optimal portfolio with minimum variance at a given return level would be a mean variance efficient portfolio, and the problem of investor's asset selection would be transformed into a linear programming problem with given objective functions and constraints. The theory holds that portfolio investment can reduce non-systematic risk. A portfolio investment is determined by the composition of securities and their weights. Portfolio risk depends on not only the variance of different assets, but also the covariance of assets. Thus, the complex multi-dimensional problem of portfolio selection with a large number of different assets is reduced to a simple quadratic programming problem with clear concepts, and mean-variance analysis. Selecting unrelated securities should be the goal of portfolio construction.

IV. William Sharpe and the capital asset pricing model

The capital asset pricing model published by William Sharpe in 1964, describes the relationship between the risk premium of the asset and the risk premium of the market. Using market equilibrium, Sharpe's capital asset pricing model (Sharpe, 1964) indicated that the expected rate of return of any securities portfolio is the risk-free interest rate and the sum of the risk premium. Sharpe quantified the risk (represented by β) to analyze the sensitivity of the asset's return rate to market changes, thus measuring the undivided risk of the asset. Given β, we can determine the correct discount rate for the current value of an asset, which is the expected return on that asset or another risky asset. High returns correspond to high risks, the higher the risk of an individual security, the higher the obtained compensation. Although systematic risks cannot be eliminated, other risks can be mitigated or avoided by diversification in market investments. Non-systemic risk, also known as unique risk or unsystematic risk, is the individual stock risk. Investors can eliminate this risk by changing their stock portfolios. From a technical viewpoint, the return of non-systematic risk is an integral part of stock returns, but the risks do not change as the market changes. Modern portfolio theory states that special risks can be eliminated by diversification. Even if the portfolio contains all the stocks in the market, systematic risk cannot be eliminated.

V. James Tobin's model and Q

James Tobin's law of divisibility investment theory (Tobin & Swan, 1969) strengthens Keynes' investment theory and makes Markowitz's portfolio investment theory more inclusive. Tobin's law of divisibility states that investors should consider investment decisions on two levels. First, investors should divide the assets to be invested into two categories: safe and risky. Then, they should determine the proportion of each asset, which is related to investors' personality, financial situation and other factors. Afterward, investors can divide the risky assets into two categories according to the size of the risk; determine the proportion of investment for various assets; and form a portfolio to maximize the return and minimize the risk. However, since Tobin's theory is conditioned on the independence of various assets, the portfolio can only reduce non-systemic risks.

In addition, Tobin Q theory is the ratio of the market value of corporate stocks to the cost of asset replacement represented by stocks. For example, some companies that want to expand their production capacities may find that the cost of additional production capacity through acquiring other companies is much lower than the cost of expanding on their own. However, not everyone agree on the Tobin Q coefficient. The Tobin Q coefficient may no longer work as a warning because the U.S. economy is different than when Tobin's theory was proposed in 1969.

Today, the US economy is dominated by services rather than manufacturing companies. Thus the company's core assets are no longer lands and machines, but service and brand values. You cannot tell how much to spend on building a success brand.

VI. John Williams and dividends determination on stock value

True value and market price are distinct and should not be confused. John Williams (1964) proposed a mathematical formula for calculating the currant value of any stock, bond, or company, depending on the expected cash inflows and outflows discounted at an appropriate discount rate during the remaining life of the asset. He shifted the focus of his research from market price series to elements of asset value, and emphasized future earnings and dividends rather than predicting future stock prices. Evaluation should use the rule of the asset's present. Thus, for stocks, the intrinsic long-term value is the present value of their future long-term net cash flow, including future dividend distribution and sale price. With certainty, the value of a stock is the discount value of its future dividends.

VII. Myron Gordon and Gordon growth model

The dividend discount model is named after Myron Gordon, who originally published it with Eli Shapiro in 1956. Gordon and Shapiro's work borrowed heavily from John Williams's the theoretical and mathematical ideas published in his 1938

book, *The Theory of Investment Value*. Gordon and Shapiro (1956) explained that stock prices are expected to be equal to the discounted present value of future dividends. Since it is impossible to predict cash dividends indefinitely, people have constructed several dividend discount models using different assumptions about future growth rate. The Gordon growth model can be used to estimate the value of stable companies, which grow at a rate close to or slightly lower than nominal economic growth. These companies' dividends are expected to grow at a steady rate over a period of time. Gordon growth model enables investors to determine the absolute or intrinsic value of a company unaffected by the current stock market situation.

VIII. Fama and efficient market hypothesis

Fama (1969, 1995) believed that stock prices are moving randomly. He explained in his paper *Random Walks in Stock Market Prices*. He stated that in an efficient market, rational investors would reasonably respond immediately to a change in information. Later, he extended his idea, stating stock prices should be a "random walk". A change in a stock's price must be random since any cause for the change should not have been previously knowable. Therefore, people, who did not own the stock before the information was released, would not be able to benefit. However, there are still many arguments on whether the efficient market hypothesis

can prove that prices movements are always random. Fama also mentioned that because of information transmission disequilibrium, people may over-adjust or under-adjust or lag in the complete adjustment of a stock price.

Shiller, who believes financial markets are efficient because they accurately reflect all available information, does not agree that the market is random. He believes that efficient market theory is valuable in an ideal world but is not an accurate descriptor of actual markets. In his book *Irrational Exuberance*, Shiller (2000) describes the rise in the US stock market during the late 1990s as the result of psychological contagion leading to irrational exuberance. He believes the stock market boom and bust are based on more than economic fundamentals (e.g. earnings and dividends) but includes an idea similar to Keynes' "beauty contest" theory of investing. Shiller (2011) stated in the *New York Times*,

> "the best explanation for the market's back-and-forth swings is that each day we are conducting a Keynesian beauty contest, and reassessing what others think that still others are thinking. On days without considerable news, the market is simply reacting to itself. Also, since anxiety is increasingly high, investors make quick and sometimes impulsive responses to relatively minor events."

IX. Franco Modigliani and Merton Miller

Modigliani-Miller's (Braouezec, 2010; Miller, 2008; Modigliani, 2005) capital structure theory mainly suggests two viewpoints. One is to prove that under certain conditions, whether the company raises funds by accumulating debt or issuing

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stocks does not affect the company's market value. This view overturns the traditional thinking that the higher the debt, the greater the risk and the higher the reward. The second condition is the single price law, which states the cost of two risky assets must be the same. This discovery suggests that two stocks with the same risk have the same price in a portfolio because they provide the same reward. Modigliani-Miller's theorem allows investors to make correct stock price estimates and companies to formulate reasonable allocation schemes. The theorem holds that the market value of any enterprise is not related to its capital structure, but depends on the expected capitalized return level, according to the expected return rate corresponding to its risk level.

According to the preceding literature review, economic theories on how stock prices are determined can be grouped in three categories: Keynes, Bachelier, and Fama did not provide a way to calculate stock prices mathematically, and both Bachelier, and Fama believe stock prices move randomly. Markowitz, Sharpe, Tobin and Miller focus on risk and suggest portfolio investment. Since they do not calculate one stock price, but stock or portfolio return, they believe that market is efficient and the stock price represents its value while future stock prices cannot be predicted, or price can deviate from value and is unnecessary to calculate frequently. Furthermore, Williams and Gordon provide a way to calculate stock price. This method may be different with market price and not

associated with short-term investment return since they treat stock as bonds with perpetual dividends.

Chapter 3: Empirical Literature

Fundamentals

In real-world stock markets, investors often make investment decisions based on fundamental analysis. Numerous economists have similarly defined fundamental analysis. I cite an easy-to-understand definition of fundamental analysis by Malkiel (1999): to analyze an enterprise's financial statement, profitability, growth prospect, risk level, and all other relevant information to determine the enterprise's real value. For instance, Malkiel (1999) claimed that a single company's prospect is significantly impacted by the whole industry's situation. Furthermore, external forces (e.g., interest rate, exchange rate and economic situation) affect a firm's financing, profitability and growth.

Based on the literature review in the previous chapter, we identified the dividend discounted model or Gordon growth model as the most appropriate method to measure the fundamental values of stocks. In their article *Capital Equipment Analysis*: *The Required Rate of Profit*, Gordon and Shapiro (1956) explain that stock prices are expected to be equal to the discounted present value of future dividends. In their analysis using the Gordon growth model, a current-value formula in stock price analysis can

calculate the stock price. The price equals to the present value of future dividends.

Assuming that as an intrinsic value model[2], P=Div/(R-g), the price will always reflect the

total future dividends discounted where the dividends that are not received now will be

reinvested, and therefore, be future dividends. Hence, it does not matter whether

investors hold or sell, because the sellers get the same discounted present value as what

they hold. However, future dividends are unknown, and dividends are seriously affected

by the corporation's profitability. We provide some empirical evidence from studies all

over the world.

In another empirical analysis, Stephen Foerster and Stephen Sapp (2006) built their

model on the Bank of Montreal using over more than 120 years of data on the share

prices, dividend payments and earnings. They compared the actual share prices to the

calculated prices using several common fundamental valuation methods. Over the entire

sample period, they found that dividend-based models perform well at explaining actual

prices, which is better than commonly used earnings-based models. Moreover, Jennifer

Hinlo and Roy Gacus (2018) have tested valuation of the selected common stock listed

companies in the Philippine Stock Exchange. Their results support the theory that under

the constant growth dividend discount model, the dividend can be used to predict the

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[2] D is dividends, P is the stock price, g is the company growth rate and R represents the discount rate
applied to stocks. See more on page 47.

common stock prices. However, Tobias Olweny's study (Olweny, 2011), based on data from 1995 to 1999, was aimed to test the reliability of the dividend discount model (which is based on the discounted cash flow techniques) on the valuation of common stock at the Nairobi Stock Exchange. The study tested eighteen companies' stock prices and did not find significant results. Tobias used the capital asset pricing model to estimate the required rate of return for each company, with extremely high results. Furthermore, Soumya Iyer and Binu Paul (2019) used the dividend discount model in the valuation of top five dividend paying companies in the National Stock Exchange, India. The results suggested a significant difference in a single stock, but explained the group well.

Studies from all over the world had different results. Since the dividend discount model and Gordon growth model value a company in long term, the time span of historical data may be the most critical factor for theoretical empirical results. We provide those evidences to test whether we can use these models in our further study. We believe that in a term period, dividend discount model and Gorden growth model may provide significant results.

Technical analysis

A technical analysis is a direct analysis of market behavior. Technical analyses, according to Malkiel(1999), involve reading the charts or graphs of the stock's trading

price history to make investment decisions. Through the study of historical market price and volume, we can estimate stocks' past trading performance, current market behavior or future supply and demand. Technical investors are stock traders who believe price will move following chart logic and repeat past patterns. This logic primarily captures the effect of traders' psychology and habits. Any trading behavior will leave a mark on price graph. The more followers trading using technical analysis, the more the method's accuracy improves. Technical analyses have three assumptions (Edwards & Magee, 2011): (1) market behavior covers all information, (2) prices move along the trend, (3) history repeats. There are many kinds of technical analysis methods (Edwards & Magee, 2011) such as K-line school, morphology school, index school, wave school, and periodic school. The worth of technical analysis, however, has been severely questioned owing to the failure of its logic and to empirical findings contradicting its predictions. Some economists believe that current stock prices are independent and follow random variables. Therefore, traders speculating future price trends by studying historical prices and trading volumes is futile. Overall, technical analyses analyze traders' psychology to trade stocks, rather than price stock or calculate their value.

Speculation

Many investors do not invest in stock markets to earn dividends, but to gain profits by trading stocks. Fundamentals usually do not significantly change in the short term.

Therefore, for a trader to receive a high return on stocks, a company's stock being well thought of is more important than the company's actual success. Thus, speculative investors are not seeking stocks with correct fundamental prices and bright futures, but predicting or judging others' thoughts on stock prices to gain profits, or assuming they can leave before the bubble bursts. In the next few sections, the question of why there is speculation is answered using Keynes' ideas. Other literature is introduced as empirical evidence supporting his idea.

Keynes has listed many reasons why speculative behavior is common. In his book *The General Theory of Employment, Interest, and Money* (1942)*,* he highlighted five reasons that lead people to undertake speculation.

Most shareholders do not manage the business themselves, and they do not know the actual or prospective business well. In other words, not all people understand the business in which they have invested well enough. Likewise, in the stock market, most investors do not understand that business very well. When a strong movement in a stock price occurs, these people cannot understand what happened or determine whether the effect is temporary or lasting. This unctyertain interferes with their judgment.

On that basis, Keynes explained (Keynes, 1942) that some changes have temporary effects on business, not lasting effects, but sometimes the market reacts too much to immediate events. For instance, in some industries, there is a strong seasonal trend on

earnings that investors over-react to. To support this point. Chang, Hartzmark, Solomon and Soltes (2014) proved that investors appear to overweight recent lower earnings following a high seasonality quarter. The improvement in financial factors in one cycle, however, might not significantly impact overall earnings, since above average earnings may be balanced off by below-average earnings over time.

Furthermore, due to market participants' undeniable defects, (e.g., knowledge shortage or information delay) most people cannot accurately identify the real value of various assets. Thus, the assets' valuation may be determined by the outcome of mass psychology, which could lead to herd behavior. For example, Zheng, Li and Zhu's (2015) study on institutional herding in China found both short-term and long-term future excess stock returns are positively correlated with a herding measure. They first employed their regression model to examine the association between institutional herding and future excess stock returns in China for their whole sample. Then, they examined the differences between buy herding and sell herding by examining the effect of lagged excess stock return, share turnover variable, and the volatility of expected excess return to the expected excess return in the short, medium and long terms. When herding occurs for large, value or liquid stocks, the price effect is stronger and short lived, but it lasts much longer for smaller, growth or illiquid stocks. The herding effect on the buy side is significant while the herding effect on sell side is limited. Similar results have been

found in US market. Mouna Jlassi and Kamel Naoui (2015) have studied herd behavior

in the US stock markets. They investigated the presence and change in herding behavior

in the US Standard and Poor (S&P) 100 and US Dow Jones Industrial Average (DJIA)

stock indices from January 2000 through July 2012. Results provide strong evidence of

herding at a daily frequency. In particular, around 2007, herding behavior was

excessively strong on the bull market showing as high trading volumes. Moreover,

empirical evidence indicated a significant relationship between market sentiment and

herd behavior. Furthermore, the researchers found herding behavior was less obvious

when trading volume was low. In addition, Zhou and Sornette (2003) provided a general

methodology for using fundamentals to test herd behavior when describing bubbles and

anti-bubbles on the US market. They found that historical volatility played the key role

on creating bubbles before August 2002. Around October 2002, the interest rate

dominated. In the first six months of 2003, the foreign exchange rate became the key

factor. Since the end of 2003, all factors have played an increasingly large role. However,

the most surprising result is that the best model is the second-order Log-Periodic Power

Law (LPPL) without any factor. We thus present a scenario for the future evolution of

the US stock market based on the fit extrapolation of the second-order LPPL formula,

which suggests that herding is still the dominating force and that the unraveling of the

US stock market's unraveling anti-bubble since 2000, is still qualitatively similar to (but quantitatively different from) the Japanese Nikkei case after 1990.

With his understanding of investors, Keynes believes in the short term, speculators and other investors should choose what the market believes instead of what they believe. By guessing what the market believes, people can follow the trend to gain profits. However, determining objective expectations are difficult, suggesting that this strategy may become a gamble. Liang and Zhang (2016) found that there were some lottery-type stocks in China's stock market, with high idiosyncratic skewness, high idiosyncratic volatility, high previous month returns, high market beta, low market capitalization, high price-earning ratio (P/E ratio), and relatively low institutional ownership. Also, they found individual investors significantly overweight lottery-type stocks, and underweight nonlottery-type stocks in China's stock market compared with the market portfolio. This practice implies that individual investors are more likely to have a greater appetite for risk and are more willing to gamble. Based on the market structure in chapter four and herding behavior analysis, speculation is found a strong force in the China's stock market.

Keynes' last point is investors' confidence (Keynes, 1942). When investors lose confidence in the market, assets cannot be priced correctly. When the price of one stock drops sharply, people believe there might be a serious problem. The wise choice is to sell

that stock immediately, since others would, and investors might take more losses by holding. In addition, no one can tell how long the stock will take to rebound in a pessimistic market. Then, if the investor does not have enough information, he or she should make a wise decision by considering others' reactions. On the other hand, if investors are too confident and their risk preference increases, this increase may also produce overpricing.

Keynes (1942) points described the major speculation in the market. In addition, some speculators like to guess or forecast fundamentals to move one step earlier. Price fluctuation in stock markets is attributed to traders responding to information changes. Some speculators, often by guessing interest rates' moving trends, (primarily determined by central bank policy), make investment decisions based on different types of securities. By collecting relevant information, they try to predict whether the liquidity in the market is sufficient or insufficient, and whether the interest rates will rapidly increase or decrease. Thus, they try to anticipate fundamentals ahead of other investors to gain more profits. Their purchasing can push prices up, and if their guesses are incorrect, the prices will fall back to the fundamentals. During a period with strong confidence and real growth on the stock market, more irrational investors rush in. Thus, speculation leads investors away from fundamental valuations. Besides, people find reports and news that people bet on in advance, (e.g. when the US nonfarm payroll report is issued).

International Capital Flows

Since the barriers to invest in foreign countries have been reduced, foreign investors can access foreign countries' markets, purchasing assets with high returns. Continuing appreciation of domestic money, interest rate differentials across countries or beliefs about overall stock price movements are some of reasons international capital flows are sought. In fact, the government cannot completely control capital inflow, and at times, should respond against capital flow to stabilize the economy. This occurrence affects not only the different markets, but also the values of their currencies since foreign capitals must be exchanged for local currency to access those markets. Many studies have examined that international funds increase fluctuation in the stock market, even the whole financial market, especially in Asian countries. For instance, Sherazi and Ahmad (2014) conclude that the effect of capital flow in Sri Lanka and Pakistan increases stock market volatility in these countries. Volatility of return is calculated by a generalized autoregressive conditional heteroscedastic variance series, and the data is converted into a panel and regression is applied. The returns of these stocks are not affected by the international capital flows. The stock market in Pakistan has been trapped due to the extreme speculation, leading to excessive volatility.

Moreover, large and sudden inflows of capital will negatively affect the stock market. For example, the monetary base of the receiving country will increase if not

sterilized, which helps create a credit boom, rising asset prices, consumption and inflation. Previous studies have examined how short-term international capital flow affects China's stock market through its impact in China's macroeconomic variables, such as domestic interest rate and domestic inflation rate (Zhou, Lin & Li, 2013). Based on data from 2003 to 2011, they investigated the impact of short-term international capital flow on the volatility of China's stock market under different exchange rates and mechanisms, where an increase of 100 billion Yuan in short-term international capital flow can lead to an increase of 1.52% in the SSE Composite Index and a change of 0.3% in China's GDP. However, if a country's economy experiences a financial crisis or its high returns disappear, investors' capital will flow out in a panic, and financial products will be devalued, because investors seek a more attractive destination for their money. As a result, the exchange rate often depreciates, and foreign reserves quickly run out. Since international capital flows (especially speculative hot money) can create a market boom or crash rapidly with the huge capital involved, international capital flows can drive the market beyond fundamentals, increase market volatility, and negatively affect the economy. Furthermore, Yılmaz Akyüz (2012) found that quantitative easing and close-to-zero interest rates in the US have led to a surge in speculative capital inflows in developing and emerging economies offering higher interest rates and better growth prospects, giving rise to bubbles in currency, asset, credit, and commodity markets.

Major developing and emerging economies (e.g. Brazil, India, South Africa, and Turkey) witnessed their currencies appreciated faster than those of developing and emerging economies with trade surplus. This development paralleled an increased reliance on foreign capital to help them meet their growing external shortfalls. Most East Asian countries have been facing credit and asset bubbles. As a result, the major recipients are all exposed to the risk of a sudden stop and reversal and then to balance-of-payments and/or financial-market instability (Akyüz 2012). Similar to analysis above, when capital inflows plummeted as a result of a cut back in international bank lending and a plunge in portfolio inflows, the East Asian crisis was followed by a series of crises in several other emerging economies, including Brazil and Russia in 1998, Turkey in 2000-2001, and Argentina in 2001-2002. Reversals of capital flows were often associated with deterioration in recipient countries' external positions. In most cases, however, this resulted primarily from the effects of capital flows themselves. East Asian countries faced rapid outflows despite strong macroeconomic fundamentals and fiscal discipline (Akyüz 2012).

In brief, international capital flows matter because they can aggravate speculation, and the governments then faces great challenges.

How policy affects stock market

The efficiency of government policies have been long debated. Sargent and Wallace (1975) argued in accordance with rational expectation theory that the government cannot effectively intervene in the economy. Using a model with two versions, an autoregressive version and a rational anticipation version, they found when considering rational anticipations, no tradeoff between unemployment and inflation is possible. Grossman and Stiglitz (1980), however, disagreed. They believe that people will not receive the information from their limited knowledge and the policy is still effective. In reality, if markets were efficient, no one would analyze stocks or trade since no profit would arise. However, the market would then be inefficient. An informationally efficient equilibrium does not exist as any evolution towards such an equilibrium would automatically disincentivize any economic agent to acquire further knowledge, thus pushing the market toward less efficiency. Ding's paper (2001) analyzes China's macroeconomic policy in 1990s and shows the success of government monetary policy on the country's development in each period. Given people's saving behavior in China, fiscal policy plays an effective role in China's reform and development.

Researchers have also studied the effect of policy on the stock market. Stock markets are also affected by the economy and by movements or anticipations of movements in the exchange rate, capital inflows versus outflows, and developments in

the housing sector and so on. These sectors not only affect the economy, and all of them are affected by the economy, and all of them together with the stock market are concerns of policy. Policy tries to affect all of these things in the sense that policy must consider its effect on all of these things, trying to affect what it takes to be the most important target and hoping that its action there will also help its goals with the other targets, or at least not cause them to move too badly in an unfavorable direction. For instance, Sprinkel (1964) and Homa and Jaffee (1971) found that money supply and interest rate changes can affect stock prices. Using the quantity theory of money, Sprinkel found that money supply changes could be used to predict the stock prices. Using data from 1918 to 1960, he graphically displayed the level of money supply and the dynamics of the stock market and concluded that changes in the stock market lag behind changes in the money supply. An increase in money supply is expected to increase supply of money balance, which in turn leads to excess demand for shares, thus leading to a rise in stock prices. Furthermore, Homa and Jaffee (1971) found the average price of stocks was positively correlated with the money supply. Here, money supply and interest rate are the core controlling indicators for central banks. Furthermore, the research by Gabe, Thomas and Daniel (2010), using their fundamentals-based dynamic stock price model, suggests fundamental determinants can reasonably describe China's long-run stock prices, whereas policy actions have contributed to China's stock market booming. Liya Wang

(2009) achieved similar results, concluding real economic growth in China had a positive effect on the stock market, and government policy successfully created the China's stock market's rapid growth. All these literature indicate that government policy can intentionally or unintentionally affect stock markets. In addition, since government policies are involved in every industry, any change may cause fundamental variation. The government adjusts the exchange rate and economic growth, and almost every firm can benefit from an energetic market.

The empirical evidence indicate both mature capital markets, like the United States, and emerging capital markets, as in Asia, have the same problems. An enterprise's financial statement, profitability, growth prospect, risk level and all other relevant information were analyzed by fundamental analysis indicate its real value seems to make people's long-term expectations steady. Furthermore, speculation and trading psychology may affect price fluctuation in the short term or during excess fluctuations and trading volume. Academic theories confirm the disputes and divergences among different types of investors. The criticisms stress that speculation and other trading psychologies cannot be ignored in the market. In international capital flows, money flow in and out of markets, and policy actions can also affect prices.

Chapter 4: Chinese Stock Market: Its History and Characteristics

China's economic and social development has undergone significant changes in the past few decades. Understanding China's economic structure and development process is integral to understanding the status and shape of China's stock market. Walter and Howie explained the role of China's stock market in their book, *Privatizing China (2003)*, based on their experience in China. According to them, because of the special political situation in China, the initial purpose of the construction of China's stock market is to finance and to promote privatization of state-owned enterprises. The stock market provides a function for investors to enter and exit the market, as well as a way for companies to expand ownership under limited liability. A stable market with investors' optimistic expectations, it encourages investors to participate in the stock market, which helps with the privatization of state-owned enterprises' equity. As a result, these enterprises may improve their competitive energy and efficiency through the participation of new shareholders. Carpenter and Whitelaw (2017) summarized the processes and results of the reform on privatization: privatization helps improve the efficiency. This statement explains why the government participates in the stock market.

In addition, Qingxuan Meng and Mingzhi Li (2002) explained that there were three periods on Chinese economy development. In the first, 1949 to 1978, the government invested under under the centrally planned economic system. In the second, from 1978 to 1997, bank loans were the main source of industrial investment. The late, in the late 1990s had market investment reflecting the government's desire to develop a venture capital market. In different stages, different forces dominate the market, resulting in a short history of the stock market and privatization process in China. Furthermore, Morgan Stanley Asian (Qiao, H., Sun, J. & Zhang, Y., 2014) analyzed Chinese economic structure and monetary policy transmission mechanism in a 2013 report. The People's Bank of China has a multi-goal setup similar to those of other central banks, periodically shifting the order of policy objectives' importance and using a rich mix of policy tools to achieve objectives. China's traditional monetary policy transmission mechanism is that the central bank has a higher level of dependence on the credit channel to influence demand and prices. This partly reflects the underdeveloped financial market and the feature of transition economy. First, the financial market is still dominated by the banking sector: Bank lending still represents over 50% of total social financing. Second, the interest rates are not yet fully liberalized. Besides, monetary policy, as the tool to manage aggregate demand, is not effective in making structural adjustments.

Fiscal policy and industrial policy are more effective at addressing the structural problems such as the soft budget constraint of local government and state-owned companies.

Located in Pudong, Shanghai, the Shanghai Stock Exchange is one of the two stock exchanges in Mainland China. Founded on November 26, 1990 the Shanghai Stock Exchange opened on December 19, 1990. By the end of 2018, this exchange listed 145 companies in Shanghai, with a total market value of 2.7 billion Yuan. The total stock turnover in 2018 was 40.3 trillion Yuan, with an average daily turnover of 165.9 billion Yuan, and the total stock market financing of 611.4 billion Yuan. Only 12,089 bond markets were listed, with a trusteeship volume of 84 trillion Yuan and a total turnover of 216.9 trillion Yuan. The exchange listed 233 fund markets, with a total turnover of 720 million Yuan, as well as derivatives markets. The total annual turnover of the venue was 179.8 billion Yuan. The number of investors in Shanghai has reached 296.1 million.

The Shenzhen Stock Exchange was established on December 1, 1990. By the end of March, 2019, there were 2153 listed companies on the Shenzhen Stock Exchange, including 473 motherboards[3], 931 small and medium-sized boards and 749 Growth Enterprises Market (GEM) boards, with a total market value of 22.57 trillion Yuan. Besides, the exchange had 5229 listed bonds (including asset-backed securities) with a

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[3] Motherboard is the main board in Shenzhen Stock Exchange. The standard for List Company is stricter in motherboard than small and medium-sized board or Growth Enterprises Market board.

face value of 1.96 trillion Yuan and 520 listed funds with a net asset value of 168.456

billion Yuan.

The total market value of China's Shanghai and Shenzhen stock markets is about 50

trillion Yuan, about 1.25 times that of Japan's Tokyo Stock Exchange of Japan. The total

market value of the Hong Kong stock market was 34.3 trillion Yuan at the end of April

2019. The average daily turnover amount in April 2019 was 104.2 billion Yuan, and the

number of listed companies was 2,353.

Fig. 1

	Hong Kong Exchange (24/05/2019)		Shanghai Stock Exchange (24/05/2019)		Shenzhen Stock Exchange (24/05/2019)	
	Main Board	GEM	A Share	B Share	A Share	B Share
No. of listed companies	1,973	387	1,465	50	2,156	48
No. of listed H shares	248	24	n.a.	n.a.	n.a.	n.a.
No. of listed red-chips stocks	168	5	n.a.	n.a.	n.a.	n.a.
Total no. of listed securities	13,385	388	n.a.	n.a.	n.a.	n.a.
Total market capitalisation (Bil. dollars)	HKD 31,073	HKD 148	RMB 31,239	RMB 87	RMB 19,948	RMB 60
Total negotiable capitalisation (Bil. dollars)	n.a.	n.a.	RMB 27,057	RMB 87	RMB 15,075	RMB 59
Average P/E ratio (Times)	10.72	23.85	13.21	10.00	22.46	10.64
Total turnover (Mil. shares)	216,215	1,576	16,728	17	22,862	10
Total turnover (Mil. dollars)	HKD 76,007	HKD 211	RMB 162,822	RMB 112	RMB 218,545	RMB 43
Total market turnover (Mil. dollars)	HKD 76,218		RMB 162,940		RMB 218,588	

High percentage of retail investors

In the Chinese stock market, more than 90% of secondary market stocks' trading accounts[4] are individual accounts. At the end of April 2016, there were 105.4541 million accounts in China's mainland stock markets, of which 99.72% or 105.1573 million were individual accounts, according to data from China Security Regulatory Commission. The remaining 0.28% were institutional accounts. Through our analysis, as presented in Table 1 on next pape, about 75% of individual accounts held less than 100 thousand Yuan in stocks, in market value, and 95% held less than 500 thousand Yuan. Moreover, the total market value held by individual accounts was nearly 24% of whole tradable stocks' value. Founders held 62% and institutional investors owned the remaining 15%. Since founders and institutional investors tend to trade less frequently, individual investors are likely the main short-term traders. According to the literature and my analysis, since many individual accounts hold a higher market value, a considerable number of small investors in China's mainland stock markets may follow strong herding behavior. Although most stock holdings by value held by founders and institutional investors may be expected to exhibit less of this sort of behavior, stock prices' short-term behavior could still be most strongly influenced by those exhibiting herd behavior.

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[4] All accounts' information is organized according to the China Security Regulatory Commission.

Table 1

16-Apr	Individual investment	
Value (¥)	Account number	Proportion to total
0-10k	13033485	25.97%
10-100k	24412788	48.64%
100-500k	9944056	19.81%
500-1000k	1593238	3.17%
Above 1M	1202918	2.41%

High household savings and a hot housing market

High saving rates and a hot housing market also reveal speculation in the stock market. China now has an aging population with a high rate of household savings. According to the data from the World Bank (2016), China's gross savings rate was about 50% of its GDP from 2006 to 2014, while the world's overall performance was about 20%. Although Chinese households have a high percentage of savings, 60.91% of households had bank deposits, but only 8.84% invested in stocks, according to the China Household Finance Survey (2012). Stocks are likely not a major investment option for most households, as they are inclined to be speculation rather than investment. In addition, the income and wealth distribution affects this, thus the low percentage of households who own stock.

The housing market is a substitute market for investors in China. Some people gamble on the stock market, but almost everyone wants to invest in the housing market, treating the housing market as a safe and high return investment option. In 2016, housing prices in large cities doubled in one year. The rapid rise in housing prices also proves that

speculation is significant. Yongheng Deng, Joseph Gyourko, and Jing Wu (2012) found

the government owns all the land in China, and it wants to increase the housing prices to

earn more on land selling. High demand for residential housing steadily increases the

housing price over time. At times the Chinese government has even become concerned

about bubbles in housing prices and sought to deflate these bubbles through policy. As a

result, people should save more to buy an apartment and are more willing to invest in real

estate. As a substitute for the stock market, hot housing markets also attract many

households' savings. Zheng and Cheng (2015) revealed no significant relationship

between the real estate market and stock market during 2003 to 2008, whereas a

significantly negative long-term relationship appeared after the financial crisis in 2008.

Because of the high return in the housing market, most people seem to invest in the stock

markets only if they can have a similar or higher return, which increases investors'

speculative desire.

Daily trading limit

The daily price limit is another controversial characteristic of China's stock market

and affects speculation. According to the Shanghai Stock Exchange Stock Trading Rules,

to curb excessive speculation and prevent the occurrence of an excessive market collapse,

the daily price limit a special trading rule in China's stock market ensures the daily price

cannot increase or decrease by more than 10% of the previous closing price (Shanghai

Stock Exchange, 2006). When that limit is reached, stocks cannot be traded on that day.

The daily price limit[5] on most stocks is 10% per day, and some special stocks have a

limit of 5%. This rule restricts the liquidity of securities in the stock market and can

cause systemic trouble.

This daily price limit rule, in the short term, could encourage speculation by

changing people's expectations. A stock reaching the limit in a few minutes implies that

institutions, banks or brokers with high funding just bought in. therefore, these

high-funded players must believe that this stock is worth more, and there may be good

news released soon. This situation is probably because some investors obtain the

information earlier than others. Therefore, a stock reaching the limit can attract

individual investors attention. Zhang, Ping, Zhu, Li and Xiong (2016) found that both

upper and lower price limits can cause a volatility spillover effect and a trading

interference effect. The price limits can erratically increase after price limits are hit,

possibly because trading increases following the price limits hitting day. However, some

gamblers spend most of their money on one small cap stock over a few days to avoid the

price rising too much. Subsequently, these investors can spend some money to push the

stock's price to the upper limit in a few days. Raising the limit will attract other investors.

A few days of raising the limit can multiply the price, so those people can sell to gain

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[5] More details about price limit are available at page 9 of the Trading Rules of Shanghai Stock Exchange (2006).

profits. This huge wealth effect further enhances speculative behavior. People would like to focus on how to find those stocks earlier and sell them before the bubble bursts. This mentality might be consistent with the herding behavior in China.

The reverse is also true. Because of the daily price limit, market panic could result in large selling action, like in a bank run. According to a CNN report in April 2015, *Ugly day for China markets: Stocks nosedive* (2015), regulators concerned about high leveraging and rapid increases over a few weeks, strictly investigated violations of borrowing funds to slow down the market. People began selling stocks to pay back these funds, which depressed the stock market, and trading volume decreased significantly. More people decided to sell stocks. Because of the forced liquidation protection, when leveraged investors, using stocks as pledge to borrow money from institutions, reached their loss-limit, the system automatically sold their stocks. Too much selling makes stock prices decrease more seriously. Then, more people reached their loss limit, creating a vicious cycle that ultimately became a sharp decline. The stock market crisis was not stopped until late August. The sharp decline in China's stock market in late June 2015 became a crisis, and the Shanghai Stock index almost lost almost a third of its value in three weeks.

Guppy. D. (2017) explained China's trading rule, specifically the limit-up /limit-down restrictions, using this example, When the price move reaches 10%, trading

will be halted until the next day. A seller wants to sell at 100, but the stock is locked

down at 100 and the seller's order is not filled. The rational reaction is to sell on the next

day at a lower price, like 98, to ensure the seller can sell all his stocks before price locks

again.

However, although many research studies have found the trading limit can increase

the volatility in the market, trading limit rules can still have positive effect on limiting

market volatility. Bildik and Elekdag (2004) found in Istanbul that two-hour break,

between two daily sessions, reduces volatility by acting as a circuit breaker and

preventing severe overreactions. Kim and Yang (2008) found similar results in the

Taiwan market. Furthermore, Brogaard and Roshak(2016), through their three year study

on 2000 US stocks, concluded price limits can enhance market stability, because price

limits reduce extreme events, and cause the path to be less extreme and less likely to

cross the limit threshold to an extreme event. Moreover, Chen, Rui, and Wang (2005),

using the generalized autoregressive conditional heteroskedasticity (GARCH) model

found that price limits in the Shanghai Stock Exchange and Shenzhen Stock Exchange

effectively reduced stock volatility for downward price movements, but not for upward

price movements from 1996 to 2000. During 2001 to 2003, price limits were relatively

effective in reducing stock volatility for upward price movements, but not for downward

price movements. Based on their analysis, they believe that price limits delay efficient

price discovery for upward price movements, but not for downward price movements. For downward price movements, price limits effectively reduce panic market overreactions to negative news. Therefore, price limits may enhance the speculation in China, but can also limit the speculation.

Overall, the herd mentality, the pursuit of high returns, and the special trading rules, may be the reasons for speculation in China's stock market.

Government Intervention

Government intervention in the free market has often been reviled for limiting the market self-regulation function (supply and demand assumed the best to allocate scarce resources and set prices) in traditional economic theory, including Adam Smith. Government interference in the stock market disrupts the market order and creates more uncertainty and risk for investors. Government interference also induces investors to not choose stocks simply based on the company's intrinsic value, but instead gamble on policies' speculative effect. The Chinese government intervenes rather heavily in the stock market. As people complained, perhaps anticipating government policy is the key rule to success in China's stock market. Whether those complaints and description are an accurate representation of the Chinese government's actions is in question.

To explain why the Chinese government intervenes in the stock market, the initial purpose of China's stock market to finance and to promote privatization of state-owned

enterprises must be understood. The stock market provides a method for investors to enter and exit the market, and a way for companies to expand ownership under limited liability.

Furthermore, the secondary market's valuation on enterprises as referents can explain how investors evaluate similar enterprises in the primary market, as well as the difficulty and the cost of financing. Unlike the low risk preference of banks' credit and loans funds, high-risk preference funds are the best investors for small and medium-sized enterprises to bear high risk and earn high-yield returns. This suggests that the primary market is the right place to support entrepreneurship growth for equity financing.

However, social stability is the Chinese government's core task. Most investors in China's stock market are individuals. Although there are many individual investors, most are not very knowledgeable of the market. The government tries to protect these investors from too much volatility or to correct for market failures. Through policies and press reports, the government can lead public opinions and relieve market panic to avoid the risk being amplified. However, this manipulation eventually results in social problems. Yao, Yang, Liu, Hasan (2013) found that government intervention successfully rescued bearish markets in China and led to a fundamental change in institutional trading strategy after the intervention. According to their research, institutions are more sensitive to long-term stock market regulations, whereas individual

investors are more concerned with the news related to their short-term investments. We also believe this might be the reason why China's Stock Market can consist with fundamentals, and dampening excess irrational fluctuations may be the only navigation for the Chinese government doing this.

Finally, financial market systemic risk is the most important factor, which is also the reason why the government is reluctant to have stock market booms and busts. A stock market boom, stimulated by an accommodative monetary policy, may easily turn into a financial bubble. If the bubble bursts, both the financial system and the real economy will be devastated. As in 2007 and 2008 in China's stock market, a boom market in a short time can attract " hot money". How much that hot money helped firms' growth is still questionable, but when hot money left in a short period, it did bring huge damage. As a result, available finances decreased sharply. Firms found obtaining banks' loans difficult, and some went bankrupt. Unemployment rates rose, consumption dropped, and the currency reserve decreased. The economy was headed for deflation. Therefore, refusing speculative hot money might be why the government wants to stabilize the stock market. The government also wants to protect Chinese banks and large financial institutions deeply involved in stock market financing. Stock market booms are accompanied by high leverage. When bubbles burst, high leverage could hurt banks or

financial institutions. To avoid large fluctuations caused by personal profit purposes or market panic, the Chinese government stabilizes the stock market.

The stock markets in China are still young, the government lacks experience, and related laws and rules have flaws. The governments' rules and intervention sometimes seem problematic to investors, which may result in arbitrary Chinese stock prices, and the relationship between stock prices and a company's prospects might not be meaningful. The overall price trend is consistent with the fundamentals, which might be because the Chinese government's stabilization attempts prevent the prices moving violently under speculation. For some of the companies in my sample[6], stock prices can be significantly different from fundamentals as Chinese firms are young and risky owing to their uncertain future prospects. Calculating the fundamental price for such companies may be difficult. However, Hsu (2016) explains that the Securities Regulatory Commission, by limiting margin loans, tries to lower leverage in the markets, which could reduce speculation and help the market return to rational fundamentals. The government limits speculation, while investors may like to speculate more. The Chinese government may be right to fear that a more volatile market could have unwanted repercussions on capital flows, exchange rates, and macroeconomic performance.

The background and characteristics of China's stock market explains why the government stabilizes the market. The government should continue to reform on

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[6] See graphs in Appendices 5 and 6.

privatization, protect social stability, and avoid financial market systemic risk. While an

overall correlation between fundamentals and stock prices exists, some companies in the

sample have discrepancies between prices and fundamentals. These discrepancies may

indicate that the government is simply reducing overall price volatility, which keeps the

index from deviating from fundamentals. The Chinese government's aim to attract

foreign capital is to establish a stable stock market. Government intervention is vital to

combat short-term speculation, at least for index, which makes the overall price

fluctuation along with fundamentals. In addition, the government should be cautious and

understand that government intervention leads to complicated results. However, over

intervention may not lead to positive results. Shen Hong, and Stella Yifan Xie (2018)

exposed many government intervention actions on speculative investors, for instance,

calling investors not to sell. Those interventions reduced the stock market's attraction

and pushed the short-term investors out of the market. Insufficient investment

enthusiasm will result in a loss of investors, which can lead to illiquidity in trading and

price mismatches[7], further reducing the markets' attractiveness. Any of those factors can

hurt the development of China's stock market. Therefore, the government should be

cautious about their interventions.

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[7] Considering the liquidity preference, investor need more time or a higher yield when converting low
marketability goods into cash, which make these goods lower value.

Chapter 5: An Empirical Examination of Fundamentals in the Chinese Stock

Market

This chapter provides our own empirical analysis of whether the prices of stocks in

the Chinese stock market follows or not their fundamental values. But, first, an overview

of China's stock market provides a clear image. The graph Figure 2 presents a

one-decade review (from 2006 to 2015) of price fluctuation on the Shanghai Stock

Exchange Index.

Fig. 2
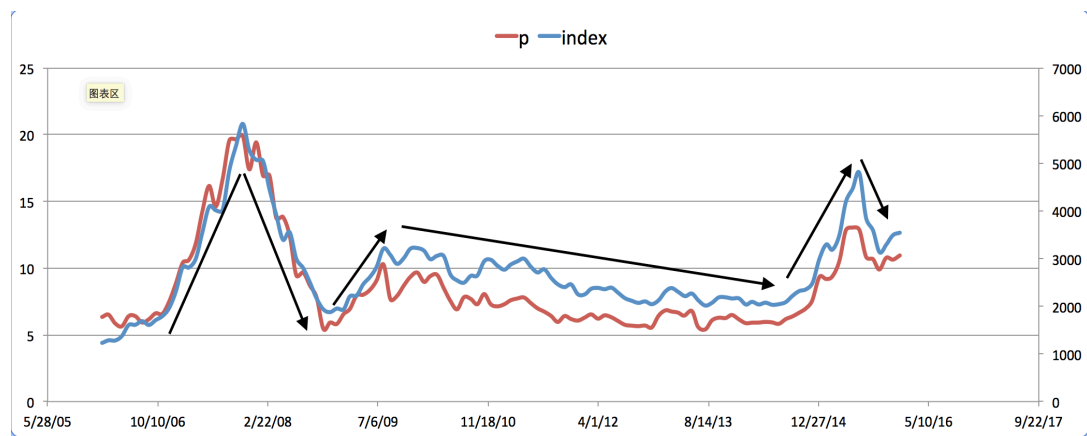
In Figure 2, the blue line represents the monthly stocks index of the Shanghai Stock

Exchange. A boom from 2006 to 2007 and a bust from 2007 to 2008 are apparent.

Another small boom happened just after the bust in 2008. Then, a slow decline lasted

from 2009 to 2014, followed by another sharp increase and decline in 2015. The red line indicates the monthly market prices of my sample, a selected collection of 22 stocks[8] in the Shanghai Stock Exchange[9]. I chose 22 stocks from the first 30 listed in the Shanghai Stock Exchange by considering their operating situation. Companies in the sample include airports, banks, and oil companies, etc. Comparing the sample's market prices with the index reveals a clear difference between two lines, but the sample market prices' trend is generally consistent with the Shanghai stock index. This result has been verified by the correlation coefficient test for these two lines: +0.92. Thus, the analysis of the sample closely reflects the index. Instead of calculating hundreds of stocks in the index, sample fundamental prices can be calculated based on these 22 firms' financial reports. Comparing the fundamental prices and past market prices presents an aerial view of the past 10 years of China's stock market. Thus, when market prices deviated from fundamentals, how prices were affected by the investors' confidence and expectations of government policy or speculation can be determined.

In the fundamental analysis, stock prices were expected to equal to the discounted present value of future dividends. To calculate the discounted present value of future dividends, the dividend-discount model was employed (Myron Gordon, Eli Shapiro
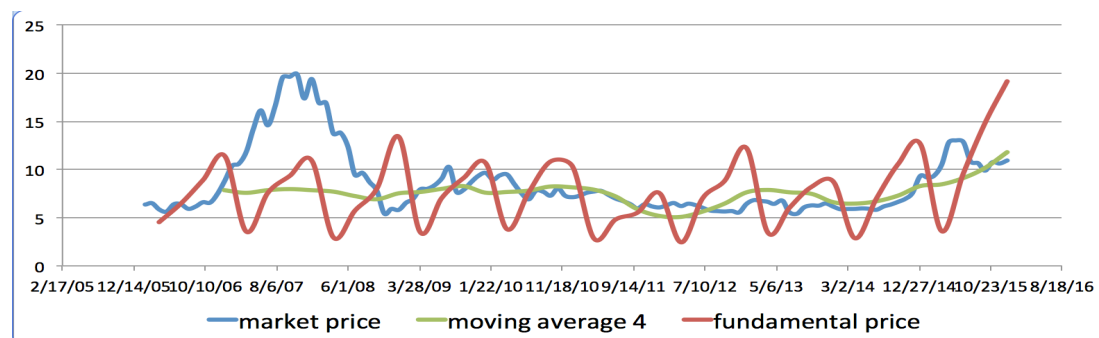
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[8] Listed on page 77, Appendix D.

[9] Listed companies' information, financial data and stock prices were collected by Tonghuashun, a stock trading and analysis software.

1956). The present value formula for stock price analysis is likely to calculate the

discounted present value of future dividends, and the stock price is equal to the present

value of future accumulated dividends. This is also referred to an intrinsic value model,

where P=$\sum_{t=1}^{n} \frac{F_t}{(1+i)^t} = \sum_{t=1}^{n} \frac{D_t}{(1+R)^t}$. D is dividends, P is the stock price, g is the company

growth rate and R represents the discount rate applied to stocks. If D=$\delta\pi$ and π=ρK, then

Kt+1 −Kt=(1-δ)π=(1-δ)ρKt, where δ is the dividend payment rate, ρ is the company's

profit rate, and K= the company's capital value. The firm grows at the rate of g=(Kt+1 −

Kt)/Kt=(1-δ) ρ. If δ is unchanging, π and D grow at the same rate, then Dt = (1+g)tD0. If

investors only want dividends, capital gains will always reflect only future discounted

dividends. Whether investors hold or sell does not matter to valuation since the sellers

receive exactly the discounted present value of what they would have received by

holding. Back to the equation, P=$\sum_{t=1}^{n} \frac{F_t}{(1+i)^t} = \sum_{t=1}^{n} \frac{D_t}{(1+R)^t} = \sum_{t=1}^{n} \frac{(1+g)^t D_0}{(1+R)^t}$. As

n→ ∞, P→D$_0$(1+g)/(R-g) = D$_t$/(R-g) = $\frac{\delta\rho K}{R-(1-\delta)\rho}$. If, as mentioned, the present value of

expected dividends define the valuation, and earnings enable dividends to be paid today

and in the future, we could assume that δ=1; if we then cay ρK= E, we can reduce our

intrinsic-value formula to P=E1/R to analyze the true value of stocks. Thus, using the

data from company's financial reports and market risky investment return rate in each

period, the stock price can be calculated.

We can similarly calculate the sample fundamental prices. The graph Figure 3

presents the sample's fundamental prices and market prices. The blue line represents

market price, and the red line represents the fundamental prices, and the green line

represents the fundamental prices' moving average. Fundamental prices are calculated

based on firm's earnings data and monthly data on a one-year AA bond Shanghai

Interbank Offered Rate (Shibor[10]). Fundamental factors have a strong seasonal pattern.

An appropriate explanation should be that the Chinese New Year is in the first quarter

every year, and during this long holiday, people do not engage in much business. Some

companies move business to the fourth quarter and some store more supplies in advance

of the holiday. Thus, more average earnings in the fourth quarter and lower earnings in

the first quarter. Since investors following fundamentals should correct for this pattern,

using moving averages is reasonable, offsetting the pattern and resulting in smooth stock

price movement.

Fig. 3

By comparing the sample fundamental prices with the sample market prices in the graph, other than the booms and busts in 2008 and 2015, the market prices were found consistent with fundamentals.

2008 and 2015 stock market review: Before concluding this chapter, it is important to provide a brief summary of extraordinary developments in Chinese stock market in 2007-2008 and 2015.

2008 market review

During the market boom and bust around 2008, stock prices significantly deviated from fundamentals. The news and reports about market boom in 2007 indicate a high percentage of retail investors' overconfidence and over-optimistic expectations were the main cause of this market boom. This was the first huge boom in China's stock market. Yao (2008) attributes the reasons for this boom to investors' desire to become rich quickly and the fear of missing the opportunity. Yao also found that the overvaluation existed but provided no clear explanation. The rising GDP may have catered to investors' expectations that companies increase their revenue, and large funds inflow invested in the stock market made investors believe that those funds would also help companies to increase their profits, which would be returned to investors as higher dividends. We explain below why investors' beliefs were not completely true and what else should matter.

Gross domestic product provides a macro overview of the economy's overall performance. If fundamentals are a critical determinant of stock prices, macro economy is undoubtedly associated with stock prices. However, this correlation is weak, and the rate of GDP growth is not a perfect variable to forecast the stock prices. Investors' expectations, for instance, suggested that companies would have more profits and stocks might have been undervalued, but investors did not pay attention to risk, which can balance the increase in earnings. In fact, the increase in GDP did not have much direct effect on most listed companies' revenue. Most affected industries were competitive private industries like factory-assembled exports and clothing. Increases in GDP theoretically indicate higher value products or services produced in that year, which could suggest more consumption, resulting in higher revenue in most industries. Most companies' balance sheets had large increases in their assets, as expected, but they also had large increases in fixed assets. Most of these fixed assets were land or buildings, which might help on production later, but not immediately. The graph Figure 4 shows the GDP growth rate and sample prices from 2006 to 2016. The GDP growth rate appears to lag behind the movement of stock prices.

Fig. 4
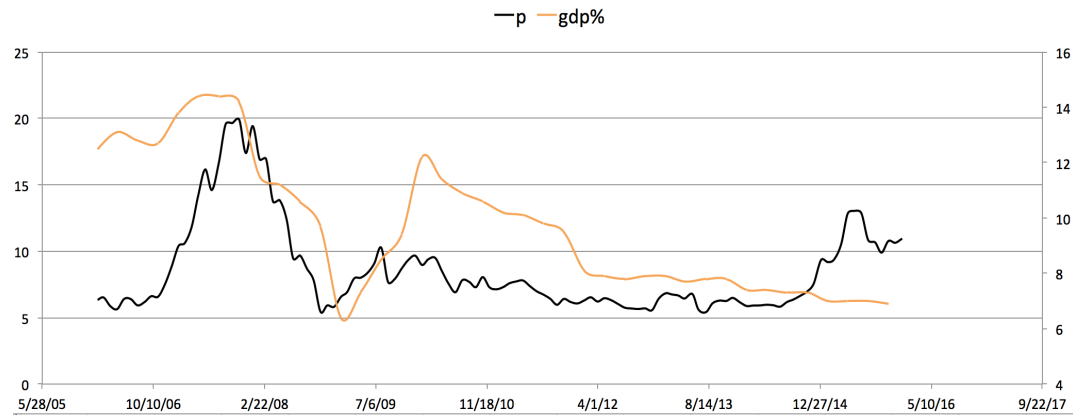
This is not surprising if both stock prices and GDP are affected by similar factors,

for instance, interest rates and profits. In a recession period, prices drop and profits

decrease. Then, interest rates decrease to help the economy recover. Interest rates usually

decreases slowly at first and then quickly. Therefore, interest rates can be a lagging

indicator of economic growth, which is also important for the firm's profits. Since stock

prices should be inversely correlated with the interest rate, the stock price is a leading

indicator of the economic growth, according to the relationship between stock price and

interest rate and economic growth. As Andreou, Desiano and Sensier (2000) found, the

initial upward movement of interest rates in the UK reached its peak 6 weeks after the

recession. However, in the USA, the stock prices' peak was 12 weeks before the

recession, but the coefficients are not significant. For the USA, there is a significant

positive effect of DREC[11] in the GARCH estimations, which implies that prior to the

recession periods the stock prices increased in the US stock market and reached a peak 7

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[11] DREC is the contemporaneous recession indicator dummy variable that takes the value 1 during recessions and 0 during expansions.

to 8 weeks prior to the recession. The UK stock market's stock prices fell 6 months prior

to the recession and continue unabated on this downward trend until after the recession

began. However, Andreou, Osborn and Sensier (2000) stated that the real short-term

interest rate and real long-term interest rate are lagging indicators for US and Germany

from 1970 to 1998, but are leading indicators for the UK, respectively. The stock price

index is the opposite: a leading indicator for US and Germany but a lagging indicator for

the UK. Since the policy makers could not know the exact peak of recession, they might

increase or decrease the interest rate earlier than the peak, but interest rate could still

affect growth rate and stock prices.

Although GDP growth rate provides a general overview of Chinese economy, it is

not a strong indicator to forecast stock price. In particular, the GDP growth cannot

improve every firm's revenue in the short term. Later, we discuss what changed demand

and supply in the short term.

In addition, capital flows rushed into China. The Yuan rose against the dollar

dramatically until June 2008. According to the Federal Reserve economic data, the

appreciation of Yuan to dollar first began in 2006, and increased 2007 and 2008. This

appreciation encouraged considerable foreign capital to be injected into China's stock

market and real estate markets. In 2007, the foreign direct investment inflow was 84

billion, and in 2008 it was 108 billion. Meanwhile, the amount of foreign direct

investment outflows in 2007 and 2008 were 22 and 52 billion, thus the net inflows were

62 and 56 billion, respectively. The devaluation of dollar to Yuan and worries about the

US financial market bubble led to international investors investing in China. However, as

mentioned before, the money invested in companies did not create immediate profits,
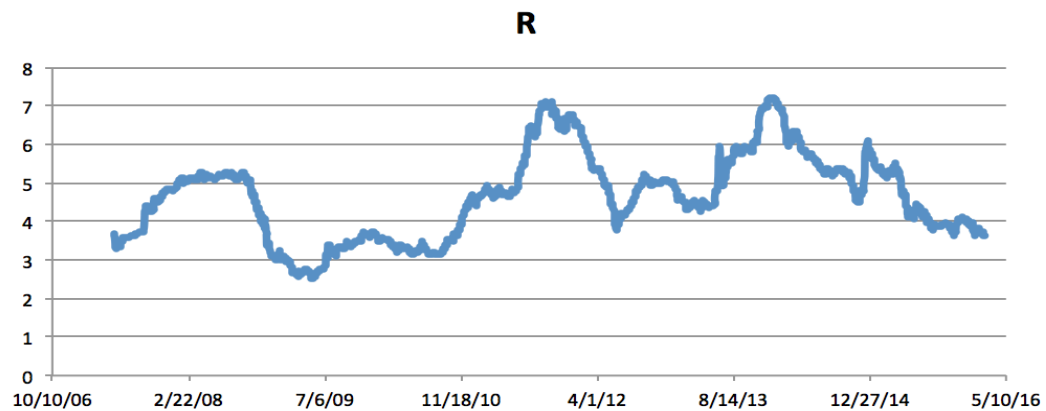
which did not support the stock market boom.

Fig. 5

Source: Board of Governors of the Federal Reserve System (US)
research.stlouisfed.org
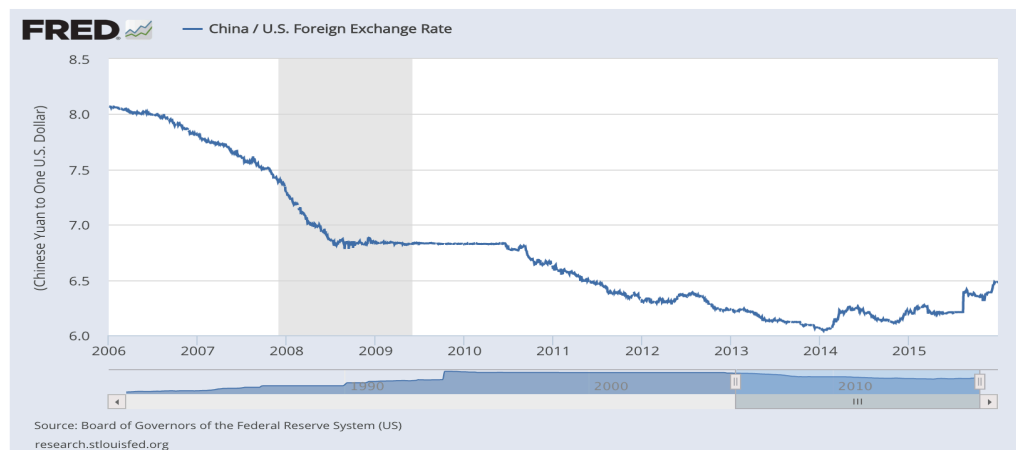
In addition, the government had helped more domestic funds become involved in

the stock market through policies. Insurance funds and the social security fund were

allowed to invest in the stock market, and the government stipulated that securities

companies could offer clients the service of securities margin trading to clients. The

government's support of the stock market greatly increased investors' confidence.

Government policies also helped to provide more liquidity into the stock market, thus

market risk preference increased. In sum, the sharp increase on demand rapidly increased

prices.

According to the equation, P=E/R, we cannot ignore the change in discount rate when obtaining an estimate of P. Figure 6 provides an overview of one-year AA bond Shanghai Interbank Offered Rate from 2007 to 2016. A sharp increase in R happened in 2007, and it remained high in 2008. Why R increased is not explained here, but R matters. Either investors did not pay attention to the increases in the discount rate, or expectations of future earnings and willingness to take on more risk raised more than the discount rate did. Speculators were at least betting that other investors believed this.

Fig. 6

However, the stock market boom did not stop even when the new financial reports were released, when investors found the fundamental data was not as strong as they had expected. Investors seemed to believe there was no reason to quit when the prices were still increasing. Some smart investors may have sold their stocks little by little. However, the prices kept increasing. Therefore, under the speculative and profits pursuits mind-set, the stock market did not stop until late 2007.

Before the price were too high, the government tried to take some measures to cool it down. On March 18th, 2007, the People's Bank of China announced that it would increase the base interest rate[12] 0.27%. Afterward, on May 19th, the central bank raised the reserve requirement ratio by 0.27% and the base interest rate another 0.18%. This process occurred again on July 20th with a rise of 0.27% for the base interest rate and 0.27% for the reserve requirement ratio. Another 0.18% increase of the base interest rate happened on August 22nd. Furthermore, on May 30th, the Securities and Exchange Commission raised the transaction tax from 0.1% to 0.3%. These policies, to increase financing cost and stocks' trading cost, worked for a while, but did not stop the trend. Changes in government policy had affected people's expectations and market participation by telling investors that R increased, which was reflected as a short decline in the index. However, the stock market did not slow immediately.

One reason for the bubble busting in 2008 is the capital out flow, which resulted in a liquidity shortage. According to the J.P. Morgan report, around 60 billion capital left China in the second half of 2008. As mentioned above, sudden rapid outflows are usually followed by serious crises. Moreover, data and analysis from Yılmaz Akyüz (2012) suggest that net private capital flows from the US to developing countries fell from 468 to -178. There were many reasons for this sudden stop and reversal.

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[12] According to the description from global rates and the People's Bank of China, the central bank in China sets the interest rates for commercial banks as base interest rates. Commercial banks can set deposit interest rates at around 10% of the base rates.

Fig. 7

Figure 2: China's capital inflow/outflow
$bn per quarter, proxied by the change in FX reserves minus the current account balance. Q2 2015 represents an estimate.
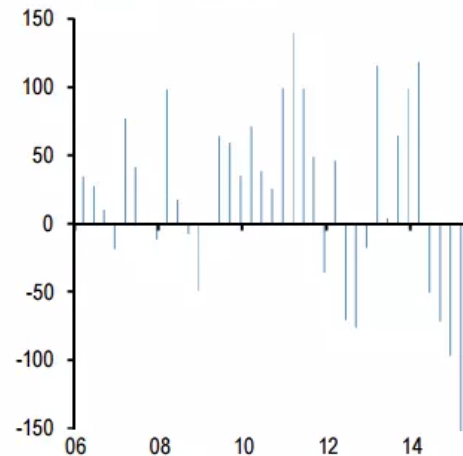
Source: SAFE, J.P. Morgan calculations

First, with the collapse of a number of leading financial institutions in the US, the volatility in financial markets led to international lenders and investors' extreme risk aversion. Global deleveraging by highly indebted investors, promoted liquidity constraints and higher margin calls added momentum to the exit. Foreign bank subsidiaries in some developing and emerging economies (DEEs) also funded their parent banks in advanced economies (AEs) during the crisis to strengthen the latter's liquidity and overall financial positions (BIS, 2010a). Finally, as it became clear that DEEs would not be immune to the AEs' turbulence and that prospects for any economic growth were not encouraging, there was not much interest in equity investment.

The reverse of capital outflow from US and Europe caused the bubble to burst, financial products to devalue, and the economy to suffer.

However, John Wong (2008) has another opinion of how the US recession affected Chinese economy. He believes that defaults in the US affected every important market, reducing the liquidity of the Shanghai and Hong Kong markets. The recession in the US and Europe decreased their need for Chinese exports, and its multiplier effect is a critical factor affecting China's economy. The expectation of lower economic growth could lead to lower future profits and reduce investors' confidence, which would result in the reduction in prices. Thus, capital outflow, liquidity shortage, and export demand decreased and were originally caused by the US recession. These decreased hurt the Chinese economy and stock markets.

In conclusion, the international and domestic capital flows quickly changed supply and demand while GDP performance led to investors' overconfidence. As capital moved out of the market, stock prices rapidly fell and what happened in the US led to the market pessimism.

2015 market review

On January 19, 2015, the Shanghai stock market lost about 8% of its value in one day because of the increased regulatory supervision of risky margin lending. Before this, the People's Bank of China had cut one-year benchmark lending interest rates for

financial institutions by 0.4% to 5.6%, and one-year benchmark deposit interest rates by

0.25% to 2.75%. The bank had also raised the limit of the deposit rate floating range

form 1.1 to 1.2 which means that the financial institutions could adjust their deposit rate

to 1.2 times the base rate. Lowering the interest rate and other relative changes cause an

increasing in liquidity and market risk preference. According to the literature and my

analysis, this change could lead investors to have positive expectations. As the result, the

Shanghai Stock Index increased about 1000, about 2/5 of its value, in two months. The

sharp increase aroused the attention of regulators, and their investigation indicated that

illegal marginal lending was the major cause of this boom, which contained high risk.

Things that happened later are similar to this.

Subsequently, the People's Bank of China cut the reserve requirement ratio 50 base

points on February 4th, cut the benchmark lending interest rate 0.25% on February 28th,

cut reserve requirement ratio another 100 basis points on Aprill 19th, and cut benchmark

lending interest rate another 0.25% on May 10th. As the result, the Shanghai Stock Index

increased by about 2000, about two-thirds of its value, from February to June, and

doubled its value over seven months. More than one trillion Yuan was rumored to be

invested in the stock market, either legally or illegally, but there is no evidence to support

this claim. Regulators tried to prohibit umbrella trusts and shadow banking to cut off

illegal margin lending.

The loss of money and market panic for this unpredictable investigation created a considerable number of sales. According to *Business insider*, the funds invested in markets were nearly 4.4 trillion or more. When the stock market crash began, investors lost their confidence, and because of the special trading rule, the system broke and almost no deal could be performed during that period. As mentioned in Chapter 4, the pricing limit rule restricted further free trade. Prices kept falling and everyone waited for a lower price. When the loss reached a certain value, the system forced those with margin lending funding stocks to sell and the stock market fell by 30% in just three weeks. In the following month, continuous pessimism and strong power on the short selling side dropped stock market prices another 20%.

Although the central bank lowered the reserve requirement ratio and interest rates on June 27th, these measures did not completely stop the trend. Hsu, Sara (2016), described the government intervention during this period:

The government laid a floor on the freefell by creating measures against short selling, injecting funds into the market via large brokerages, altering margin lending rules, and permitting trading suspensions on some stocks. Brokerages were requested to raise a share-purchasing fund in the amount of RMB 120 billion. The China Securities Regulation Corporation and the People's Bank of China injected RMB 260 billion into the China Securities Finance Corporation to lend to brokerage firms to purchase shares.

Furthermore, on August 11, the Yuan was officially devalued by 1.9%. Peter Coy (2015) stated that the currency war in August took most of the government energy, and the government had to sell some shares to prepare. The Shanghai Stock Exchange dropped another 1000 points during this period. Subsequently, to avert downward pressure on the stock markets, the government cut the reserve requirement ration and benchmark interest rates on August 25th and October 23rd.

Therefore, the government's easing policy and speculators' participation pushed the market to rapidly increase. Although fundamentals data supported this bull market at the beginning, speculation had carried the market beyond the fundamentals. Then, government intervention and special trading rules caused the prices to plummet, which resulted in an underpriced market panic.

Chapter 6: Conclusion

Several articles and books have analyzed the stock prices and macroeconomic

factors in stock markets. Similar to previous findings, by comparing the sample stock

prices with sample fundamental prices, this study indicates that China's stock market is

consistent with fundamentals in the long-term trend. In addition, government

intervention appears vital to combat short-term speculation, at least for the index, which,

in combination with fundamentals, creates the overall price fluctuation. Speculation

caused by the high percentage of retail investors could drive stock prices away from the

fundamentals. Furthermore, Chinese residents have considerable savings, but the stock

market is currently not a major investment option. In the short term, changes in stock

prices can have limited connections to fundamentals, but more connections to

speculation and trading psychology. Moreover, policies and government intervention are

serious for China's stock market policy makers. The government needs to be cautious

and understand that government intervention has complicated results. The policy's

efficiency in China's stock market can facilitate planning and managing securities

companies and investors. However, excess intervention may not be a positive choice, and

the Chinese government is still required to reform and develop the stock market in future given the 2008 and 2015 incidents. Overall, speculation can affect price trend in short term, but results from fundamentals factors close to the long term trend according to the historical data. Government policies and intervention are also important to investors.

Limitation and suggestion

This research had encountered some limitations, which may have influenced the results. The sample composition, only 22 stocks, may not describe the whole stock market. These 22 stocks were supposed to be chosen randomly; however, using the first 30 may not be an appropriate method for random sampling, and the sample index matching the market index may be contingent. Moreover, describing the relationship between fundamentals and market performance from charts may be inaccurate. Numerical statistical methods can provide more convincing conclusions. Another limitation is the limited access to data and information. Some data were not updated to 2016, and some information and government policies were not released to public. In addition, non-systematic difficulties with information transmission, like policy or news were extremely difficult to numerically realize, so these interventions were hard to accurately calculate in an analysis. Correlation may not be the best method to measure whether the sample accurately describe the market. However, people can use this paper to develop new analyses using new data. It is normal to observe the width of prediction intervals to be larger as the prediction period becomes longer from the point of reference. Therefore, a possible extension would be further investigation into abnormal market behavior.

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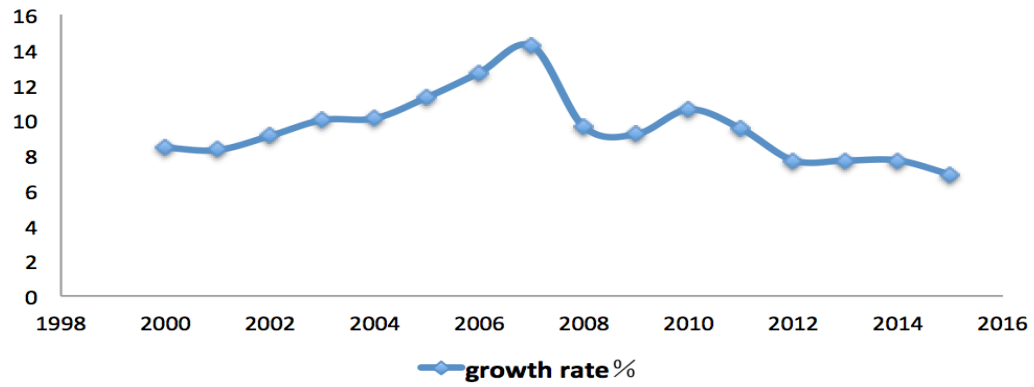William, S. F. (1964, September). *Capital Asset Prices: A Theory of Market Equilibrium*

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Appendices

Appendix A

Gross savings (% of GDP)

World Bank national accounts data, and OECD National Accounts data files.
License: Open

Line   Bar   Map   ⋮ Also Show   < Share   ⓘ Details

CHINA

Appendix B

Appendix C

Correlation Coefficient result for the sample market prices and the Shanghai stock index

R	0.92
t	25.84
p-value	0.00

1 indicates a strong positive relationship.

-1 indicates a strong negative relationship.

A result of zero indicates no relationship at all.

Appendix D

600000	600004	600005	600006
Pufa Bank	Baiyun Airport	Wuhan Iron and Steel Company	Dongfeng Motor Coroation
600007	600008	600009	600010
China World	Beijing Caiptal	Shanghai Airport	Baotou Iron and Steel Company
600011	600012	600015	600016
Huaneng Power	Anhui Expressway Company	Huaxia Bank	Minsheng Bank
600017	600018	600019	600020
Rizhao Port	Shanghai Port	Bao Steel	Henan Zhongyuan Expreeway
600021	600026	600027	600028
shanghai power	Cosco Shipping Energy transportation	Huadian Power	Sinopec
600030	600036		
CITIC Security	China Merchants Bank		

Appendix E

The chart shows four data series plotted over time (x-axis from 2/17/05 to 6/14/17, y-axis from -5 to 25): sample price, sample fundamental, 600005, and 600005fundamental.

Appendix F