Study on the Impact of Inflation on the Stock Market in China

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Abstract

The stock price is subject to the effects of inflation, the relationship between the two is exactly what kind of relationship has been great concern. "Fisher effect" is discussion of the relationship between inflation and capital gains. Of the clear view that the inflation rate = nominal rate of return - the actual rate of return. This paper introduces the Shanghai Composite index of stock prices and on behalf of the CPI index of inflation, in order to more accurately detect and verify the impact of inflation on stock prices, the above index, the least squares fit to the trend toward the use of Excel and correlations, and significant at the same time the use of the VAR model, impulse response and variance decomposition, econometric methods more in-depth study for the relationship between the results more credible. Have verified the findings of this article, combined with the actual situation of China's economic development process and then analyze and discuss the feasibility of high specific policy proposals, such as policy formulation in line with inflation current and future trends, respect for objective facts and reasonable policies.

Keywords: capital markets, inflation, stock prices, the CPI

Introduction

The problem of inflation in China can be called the key of Chinese economic whether can further growth. Due to many factors, such as interest rate, exchange rate volatility, liquidity surplus, pressure of appreciation of the RMB and so on, which caused a huge impact on people's lives and overall economic competitiveness. The recent volatility in the stock market, also quite interesting, whether there is significant both internal relationship, the most important is the interaction of a series of inflation and stock market through interest rate, monetary policy, exchange rate, price level, which is an important theoretical problem, academic circles think that inflation will affect the stock price, but its influence factors how to influence is controversial, the empirical results are different. In this paper, from the theoretical level, discuss the inflation rate how to impact on the stock price, and then using the regression statistical analysis, the empirical analysis of inflation is how to impact on the stock price and the fluctuation of the stock market, and stock market reaction effectiveness of inflation. In view of China's securities market is still not perfect and mature. Because of China in the development stage, securities market is still not perfect, so the research on this issue can not only deepen the theoretical problems, and can also provide some reference for China's current macro-control objectives, monetary policy implementation.

If the two are related, largely due to the base currency issued more than the actual demand, too much money into the stock market, rise stock price, bubble blowing. so China's monetary authorities can reduce issue the base monetary, reduce liquidity and inflation, stabilize the stock market at the same time; if present negative correlation, it indicate inflation further deterioration, the proportion of current consumption increasing, and the proportion of natural production declining. It is reflected bythe stock market, conclusions obtained can also give our country stock market investors to support in theory, enhance the confidence of investors and the credibility of the government at the same time can also reduce speculation, to protect our country's stock market orderly efficient operation; if the two are not related or have very weak correlation, it shows that China's securities market allocation of resources, financing in the lower stage. Also revealed the government needs to let the market of "invisible hand" to play more, to optimize the allocation of market resources.

In short, the conclusions of China's inflation having what kind of impact on the stock market, not only need to be able to give a reasonable explanation, but also use them better and guide practice.

1. Review of the Literature

Related research abroad began very early (early twentieth Century), also produced some valuable viewpoints and conclusions, and mainly has following several aspects:

1.1The Fisher Effect

This can be regarded as a western theory earliest, Erwin Fisher is the economist to explain the relationship between the interest rate and the inflation rate, formula is: the real interest rate = nominal interest rate - the rate of inflation, because in a certain economic system, the real interest rate is usually a fixed value, representing the actual purchasing power, not difficult to see that, if the inflation rate is expected to rise, the nominal interest rate also rises.

Of course, the stockis also similar, when inflation is serious, such as the Chinese nominal interest rates, the stock will be changed, the same as the actual income of the case, stock returns and inflation rate is positive correlation. Based on this, we can see, the whole in 2011, because of rising prices much, especially the price of agricultural products, the central bank over and over again hike. So the conclusion was as virtual assets stock, when inflation comes or goes through a period of time, the stock price will be rise. so the two are positively related, it is not difficult to understand why some people take stock investment value, as a hedging tool.

1.2 Thevolatility Hypothesis

The so-called volatility hypothesis is that Kevin and Perry, given another answer of this issue in the 1998.the main point is that, the inflation rate is very high, profit ofinvestors in the stock market will be greatly reduced. Because the risk is greater, the increase of uncertainty often indicates will pay a higher price, this very good understands, then leads to stock returns lower. In addition, high inflation makes the realization ability of the stock also greatly discount, which makes the expectations of investors reduce, it folded into present value, the stock yields are reduced, superposition comprehensive various factors result, stock returns and inflation is negative correlation.

1.3 Variability Hypothesis

This hypothesis has a condition of hypothesis, namely low inflation than high inflation has more stability. In fact, it has a part of the overlap with the "volatility hypothesis". Relatively high inflation, then it indicates that higher uncertainty, particularly investors of risk averse can't accept this. This will directly reduce the expected return of stocks, the reason is very simple, which makes the management risk of the enterprise, the expected cash flow of enterprise, the line of discount and so on have varying degrees of damage. These have come to the conclusion that inflation directly affect the stock returns.

In addition, a series of empirical studies using Gallagher and Taylor, especially the use of America from 1957 to 1997 of the historical data, results show that the developed countries for a long time inflation is likely to be affected by the relevant authorities to monetary policy, the two show negative correlation significantly, but if it is demand pull inflation, then, they also showed positive correlation between.

Sparrow, has done a lot of relevant research in 2004 for developing the stock market, he found that may be due to emerging market financial system being not very perfect and other factors, the answer is very inconsistent, some empirical studies show that the correlation between inflation and stock price is very weak, some countries have shown a positive correlation the relationship between the two. He concludes, the development of emerging countries' monetary policy is more big to inflation, the stock can be properly considered as value-added means inflation.

In China, research results are quite rich, although China's stock market from the establishment time is short, but the development speed is quick, the scale is big, the scholars of developed countries are inconceivable.
Li Hengguang, Tang Guanghua in 1999, discusses the relation between inflation and stock price both from the multi angle, that moderate inflation is helpful to the rise in share prices, but serious inflation on the stock price is destruction; Zhao Rong in the 2000 study shows, determine the impact of inflation on the stock price is not a single factor, and pointed out that different types of inflation, the theory has different effect on the stock market.
In addition, in the empirical study, Gang Meng in its 2003 Ph.D. thesis, using monthly data from the corresponding to the stock market from January to 2002 in 1995 January, "Fisher Effect" empirically, concluded that "Fisher Effect" it's hard to say.

Han Xuehong, Zheng Yanyan, Wu type etc. in 2008, data on 1992 May to 2007 August China collation and analysis, shows that during this period, inflation actually had no influence about to Chinese stock rate. In 1992 to 1999, due to the adjustment of monetary policy, the money supply is greater than demand, it lead to both showing a negative correlation. The difference is, in 2000 January to 2007 August, in the same situation: the supply is greater than demand, but at this time, they also show positive correlativity analysis. After 2000, the economy of Chinese country in the imbalance of supply and demand, real demand greatly exceeded expectations, finally led to the positive results.

These studies scholars, not only deepened the comprehension on the relation between inflation and stock price of understanding, but also given me a guide on the basis of this paper.

1.3 Method of Research

This paper studies the effect of inflation on the price volatility of China stock market. The official CPI (usually in the sense of the inflation rate) regard as the representative of inflation. At the same time, selected the Shanghai Composite Index, sample time interval for the comprehensive index in 2001 January to 2010 October industry, as the research object. The use of Excel and the relationship between the least square method to fit the trend toward the above index. And then selected in 2010 November to 2011 November time interval of data to test the conclusion, which makes the conclusion more convincing. (formula:$Y = \alpha + \beta X$,calculated as follows:$\alpha = \sum y / n - \beta \sum X / n$; $\beta = n(\sum XY) - \sum X \sum Y / n \sum X^2 - \sum X^2$, to more detailed exposition of the relationship between the two, using Eviews6.0 and the VAR model impulse response and variance decomposition to further illustrate.

The research framework of this paper:
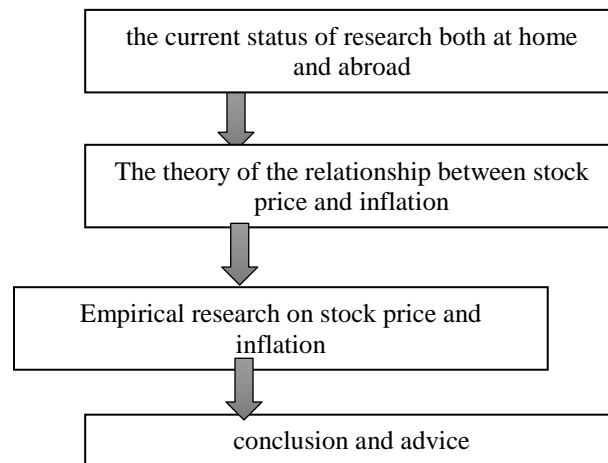
2. The Basic Analysis of China's Inflation and Stock Price Correlation

The inflation rates one of the important macroeconomic indicators. The price of the stock will be affected through a variety of macroeconomic policy on the stock market, In a market economy, inflation, be the first to bear the brunt of commodity prices. Commodity price changes can make all kinds of resources in the market have some degree of tilt or changes. The re allocation of resources results will have a significant impact on each link in market economy. The fictitious capital stock as an important component in the sure will be implicated.

2.1The Transmission Mechanism of the Effects of Inflation on the Stock Market

Inflation makes the price rise at the same time, wages have gone up. This is most likely to produce "money illusion". People will change the previous consumption habits, the marginal propensity to consume coefficient becomes larger. In mature capital markets, the consensus on the stock investment is very consistent, and enthusiasm is very high. Because this is an easy realization means of investment; in addition, real estate is also considered hedging tools good, especially the housing hot occasion before. When the funds flow into the stock market, this is good for stock market, and the final price rise also logical.

In addition, when social output has not yet reached the level of full employment, there is the existence of idle resources. This small inflation makes the nominal wages rise, and real wages fall. Which is advantageous for part of the enterprise? It will promote the enterprises to expand the scale of production, increase input, yield increase, profit increase. Then the performance of the stock market, is the listing Corporation's stock prices are rising with the increase in corporate profits. But this is also the stage. When people are aware of the wages to rise, this phenomenon will disappear. But in the entire value chain, appear to the result of some enterprises in the process of making money, while others not. Because the profits of the enterprise after all rose restrainedly. Most is not enough to offset the rising wages .So, it is a negative influence. The stock price changes are also more comprehensive results.

The people's expectation is the same as the results in the presence of inflation pressure. Then the stock market now may assume a certain safe haven role, because expectation of inflation make the bond prices fell. Then money is out of bonds and partially into the stock market. This is also positive for the stock market, and the stock price rise. Secondly, the inflation raise the bank interest rate .The RMB is relatively undervalued, entry of foreign hot money will make the stock market again inject capital. Above is positive effect; it is undeniable, in order to curb inflation, the government will take some the introductions of relevant macroeconomic regulation and control policy.The stock price has a negative effect, which is also belong to normal.

2.2Influence of the Expectations of Investors on the Stock Market

The stock market is not only affected by the macroeconomic and policy, but also by the expectations of investors and shows fluctuations. Almost all investors will be based on the current economic situation to predict what the future will be change, and then predict the future macro-economic situation. Inflation itself is one of the representations of overall macro-economic imbalances, which will obviously increase the uncertainty of investors for the future economic situation. So that inflation will reduce investors expected returns and the actual income directly. This is like a kind of "inflation tax", which brings a direct consequence of the reduced the actual future income. In addition, if the inflation pressure is more significant, investors' returns of expectation will decline and the desire of folding into the present value of the ratios increase. These factors will lead to stock price drop.The SSE (Shanghai Stock Exchange) Composite Index instead Chinese stock market index in this paper.
Table 1 the stock price and CPI changes in the past 10 years

Time	SSECI	Fluctuation of SSECI	CPI	Fluctuation of CPI
2000.12	2073.48	0.52	0.4	1.29
2001.12	1654.97	(0.20)	0.7	0.75
2002.12	1357.65	(0.18)	−0.8	(2.14)
2003.12	1497.04	0.10	1.2	(2.50)
2004.12	1266.50	(0.15)	3.9	2.25
2005.12	1161.06	(0.08)	1.8	(0.54)
2006.12	2675.47	1.30	1.5	(0.17)
2007.12	5261.56	0.97	4.8	2.20
2008.12	1820.81	(0.65)	5.9	0.23
2009.12	3277.14	0.80	−0.7	(1.12)
2010.12	2808.08	(0.14)	3.3	(5.71)

Note: data from the National Bureau of statistics, the Shanghai stock exchange of China.
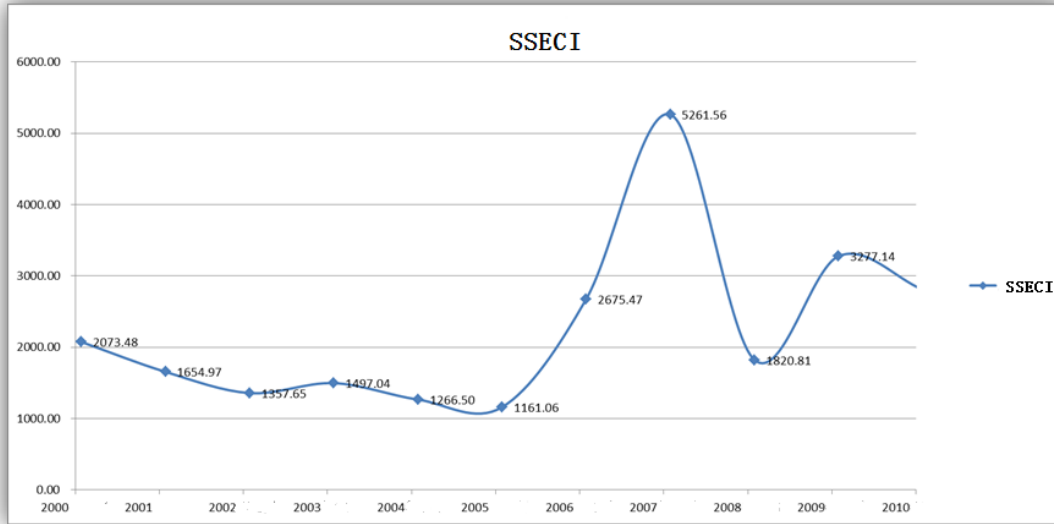
Fig. 1: The trend figure of SSE (Shanghai Stock Exchange) Composite Index
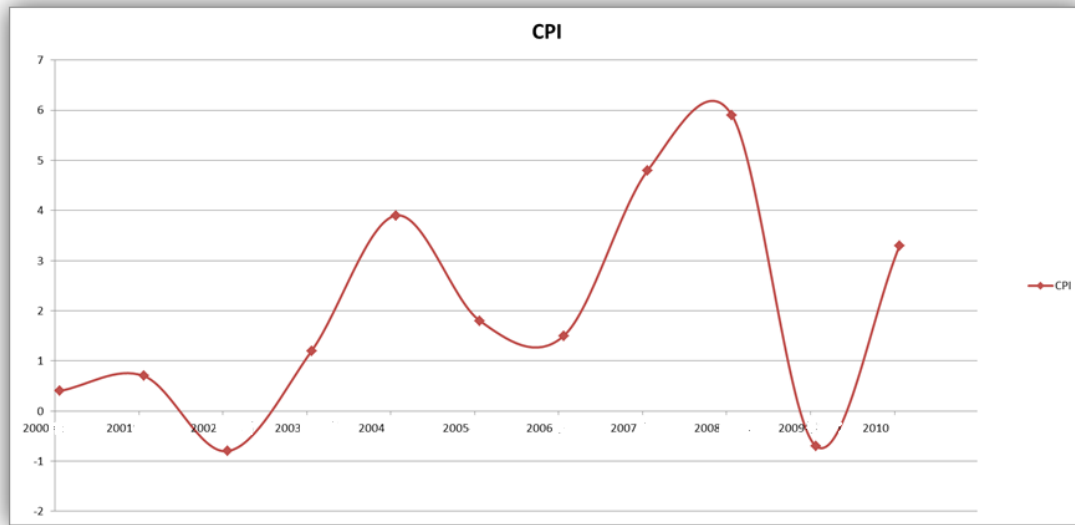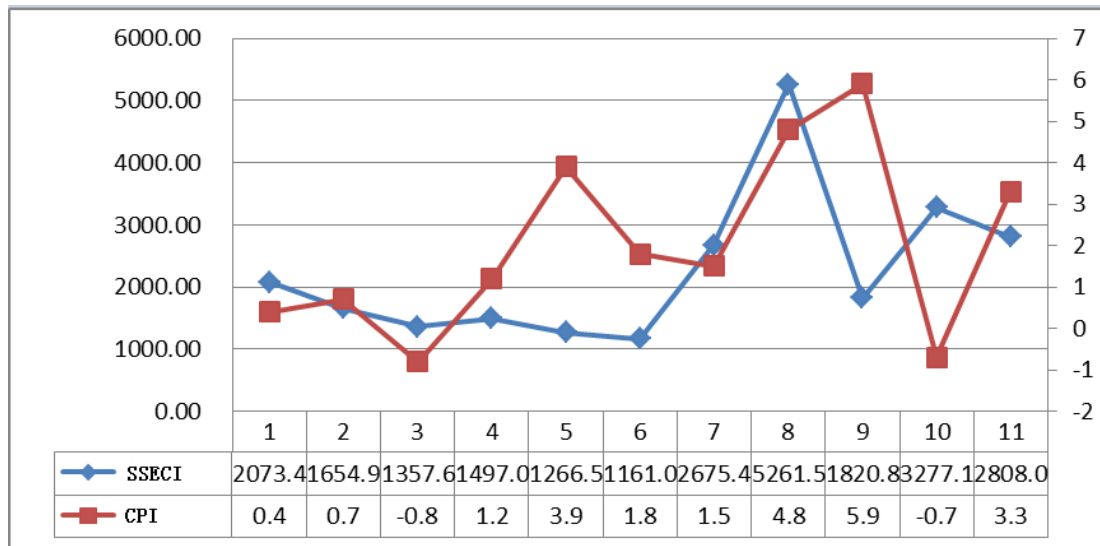

Fig. 2: Corresponds to the CPI trend

A careful analysis of China in the past ten years, the relationship of inflation between the stocks market (see Table 1), also can see some rules. It is seen from table 1, 2000 to 2006, China's CPI basically is kept below 3%.which are inseparable with China to adopt a prudent monetary policy. So the overall stock market is relatively stable. In 2007, Chinese economy began to have new change that CPI in the high operation, is 4.8%. In view of this situation, the central bank began a new policy to deal with. This period the overall volatility of stock market is hitherto unknown. From the beginning of the second quarter of 2008, CPI showed a downward trend, but then the economic growth rate will slow down. The new situation for the stock market generate new challenges. Since then, China's CPI and stock market showed negative correlation significantly (Figure 1). In 2011, China's monetary policy has fine-tuning again, which is from "moderately loose monetary policy" to "prudent monetary policy". The loose monetary policy is the measures that Chinese government response to the global financial crisis. This policy adjustment seems to release more signal, the rapid decline trend during this period CPI (Figure 2) is remarkable. In fact, the stock market can analysis: stock market are determined by the overall economic situation, which is the characteristic of this industry and has a certain periodicity. So a new generation of stock investors has reached an agreement!

In short, investors' expectation is influenced by the policy. Then there will be no consistent view of future inflation. We want to get a conclusion that a hand of investors in the future is also expected to affect inflation. With Premier Wen said: "confidence is more important than gold".

2.3 Analysis of China's Stock Market and Inflation Relationship

Thediagram of relationship of inflation rate and the Shanghai Composite index of Chinese stock market in 2000 to 2010:

	1	2	3	4	5	6	7	8	9	10	11
SSECI	2073.4	1654.9	1357.6	1497.0	1266.5	1161.0	2675.4	5261.5	1820.8	3277.1	2808.0
CPI	0.4	0.7	-0.8	1.2	3.9	1.8	1.5	4.8	5.9	-0.7	3.3

Fig. 3: Shanghai Composite Index and the Inflation Rate

Above left shows for the Shanghai Composite Index, the right shows for percentage of CPI, the horizontal axis shows for the 2000 to 2010. CPI has some small fluctuations in the 2000-2002 year, but on the whole it is decreased. the Shanghai index is relatively steady decline, at the same time, a slight decline continued volatility, and between 2003 and 2006 CPI rose by a big margin. But the stock index is relatively stable during the period of 2007 to 2009, CPI picked up significantly, the Shanghai composite index followed, way up, but then, the Shanghai composite index down, after CPI drop, after 2009, CPI before, the Shanghai Composite Index also great fluctuations.

The statistical significance, the relationship between Shanghai Composite Index and CPI most of the time is negative, but only a few appear some time correlation. These are just the surface chart of visual analysis, in the following sections we have carried out empirical test and detailed analysis on inflation type classification.

The stock market is a national economy "barometer", this is basically known. Of course, China stock market is no exception, but every country has different economic development mode and development stage. China has been world's second largest economy, the largest developing country in the world, the stock market capacity has been up to 23 trillion RMB in scale.It also has its own characteristics.

First of all, most companies are still very promising, so relative to the stock market and stock prices are still growing, which is beyond doubt. The development of social economy, especially the "Twelfth Five Year Plan" period, the economy rate rises slowly, but it does to ensure the quality of development and transform business and explore a more excellent innovation ability and so on. These are directly show that the equity financing in the process of economic development role is more and more large.

Secondly, China stock market after all young, some system is not perfect, the efficiency and the ability to allocate resources still need to be further improved. The risk control and the macro grasp of the market and correctly guide is very necessary, but also very necessary.

Finally, the efficient market hypothesis theory think that the stock market can be divided into three categories: strong type of effective market, semi strong efficient market and the weak form efficient market. Different markets have different characteristics. China is in the transition from a planned economy.

Although there is no denying that the development is very rapid, but Chinese stock market is also emerging markets compared to the western developed country. It is also defined as non-weak efficient market. Its remarkable characteristic is that the future stock prices exhibit more volatility.

3. An Empirical Study on the Impact of Inflation on the Chinese Stock Market

This paper studies the effect of inflation on the price volatility of China stock market. In the first official CPI (usually in the sense of the inflation rate) regard as the representative of inflation. At the same time, select the Shanghai Composite Indexas the research object, the sample time interval of the comprehensive index is from 2001 January to 2010 October industry. Finally use Excel and the least square method to fit the trend toward and significance.

3.1 Select and Process the Data

Find the Shanghai Composite Index from the Shanghai Stock Exchange on the website, the month and analysis its trend. As a comparison, adopt the Shanghai composite index K map from the Dazhihui of the web site, as follows:
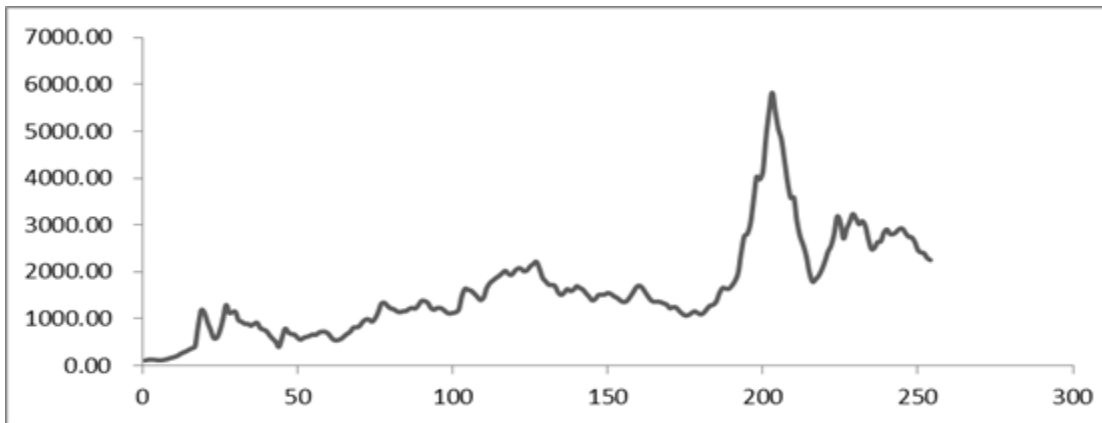
Fig. 4: The Shanghai Composite Index on the Line Chart
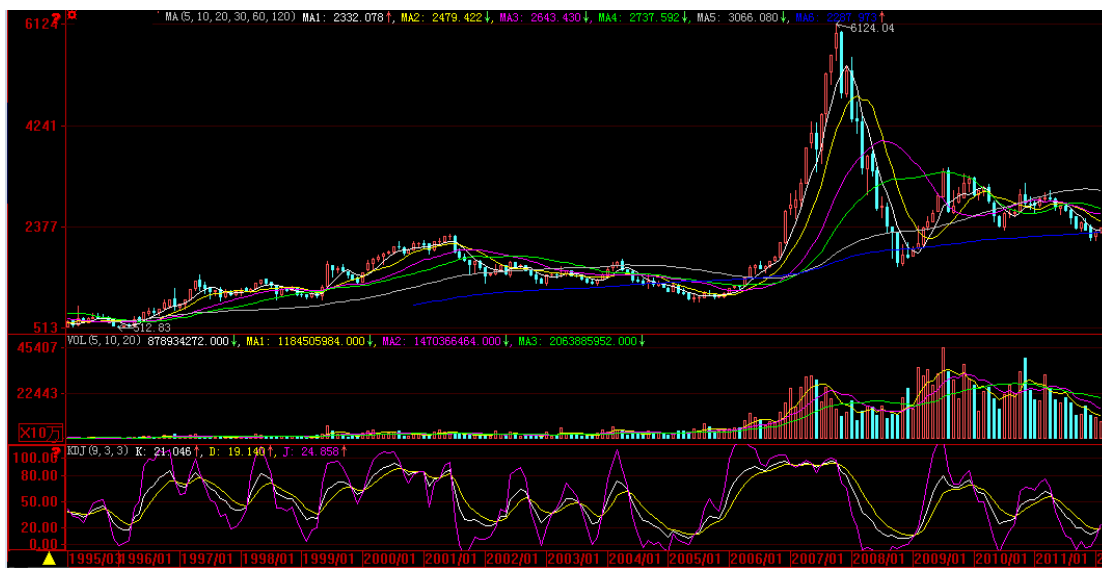
Source: the wisdom of the professional version of the Shanghai

Composite Index (000001) month line chart

Use the arrangement of data draw out the market trends of Shanghai composite index monthly over the years, as follows:

Fig. 5: Years the Shanghai Composite Index Monthly Chart (1990-2012)

From Figure 4 and figure 5, we can clearly see that graphic trend is very consistent. Which can directly show the overall operation of the stock market from the two maps: at the beginning the stock market are relatively stable and volatility is relatively small. This has a certain relationship about Chinese government previous cautious attitude. After 2007, the fluctuations continue to increase, this is closely related to the macro economy, national and international policies.

3.2An Empirical Study on the Effect of Inflation on the Stock Market Price

Using the 2000 to 2010 average annual inflation rate, denoted by CPI, and the annual average of the Shanghai Composite Index, can get the data table:

Table 2 Average of Years (2000-2010)

|	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
SSECI	1871	1960	1573	1462	1479	1148	1626	4234	3053	2679	2814
CPI	0.4	0.7	−0.8	1.2	3.9	1.8	1.5	4.8	5.9	−0.7	3.3

Note: data from the National Bureau of statistics, the Shanghai stock exchange of China.

The vector autoregressive (VAR) model is based on the statistical properties of the data.The VAR model system regard all of the endogenous variables as a system, and then each endogenous variable as the whole system lagged values of the function. Structure model finally. Inflation is indicated by CPI, the stock priceis indicated by the Shanghai Composite Index (SSECI), VAR model can be established as follows:

$$SSECI_t = \alpha_0 + \alpha_1 SSECI_{t-1} + \alpha_2 SSECI_{t-2} + \cdots + \alpha_k SSECI_{t-k} + \beta_1 CPI_{t-1} + \beta_2 CPI_{t-2} + \cdots + \beta_k CPI_{t-k} + \varepsilon_t$$

$\alpha_0 \ldots \alpha_k$，$\beta_0 \ldots \beta_k$ are The estimated parameters; $\varepsilon_t$is Random perturbation; The value of K specific value is set. Data from 2001 January to 2010 October, Entry of Eviews6.0, the results are as follows:

Figure 6: Non Constraint, the Lagging VAR Model Figure 7: Non Constraint, Lagged Two VAR Model
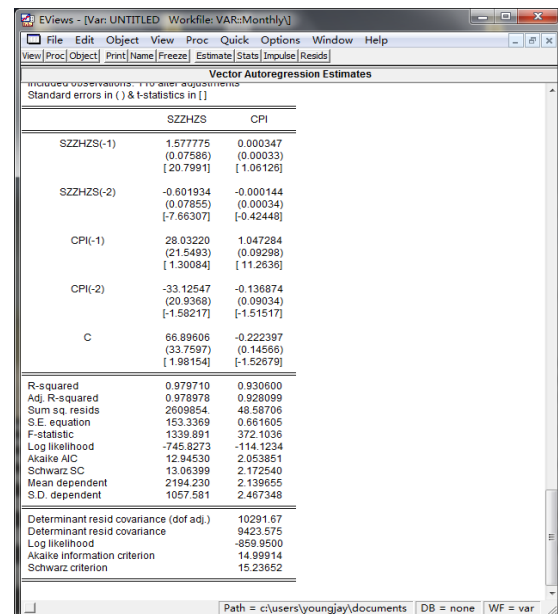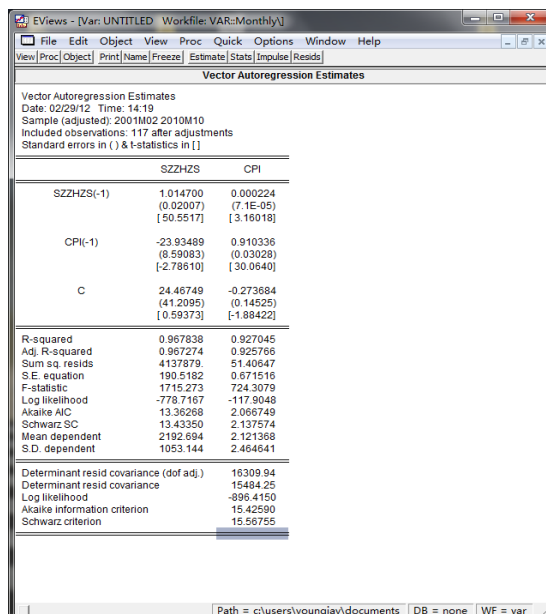
Table 5: To Determine the Optimal Lag Period Information Criterion Comparison Table

|	The first lag period	The second lag period	The third lag period	The forth lag period
AIC	15.42590	14.99914		
SC	15.56755	15.23652		

The second period is the minimum value, the results can be written as:

$$SSECI_t=1.577775SSECI_{t-1}-0.601934SSECI_{t-2}+28.03220CPI_{t-1}-33.12547CPI_{t-2}+67$$

[20.7991][-7.66307][1.30084][-1.58217][1.98154]

AdjR^2= 0.978978   F= 1339.891   AIC= 12.94530   SC= 13.06399

From the regression results can be seen that the value of the variable t is greater than the critical value. The statistical significance is value. R that is goodness of fit as 0.98 is better. On these ten years whole, China stock is still negative bythe effects of inflation, and the influence is more remarkable. CPI increased by 1%, the Shanghai Composite Index fell 5%, so you can to conclude, effect of CPI on the stock market is negative, the long-term effects is less thanthe short-term.

Impulse response function and variance decomposition:
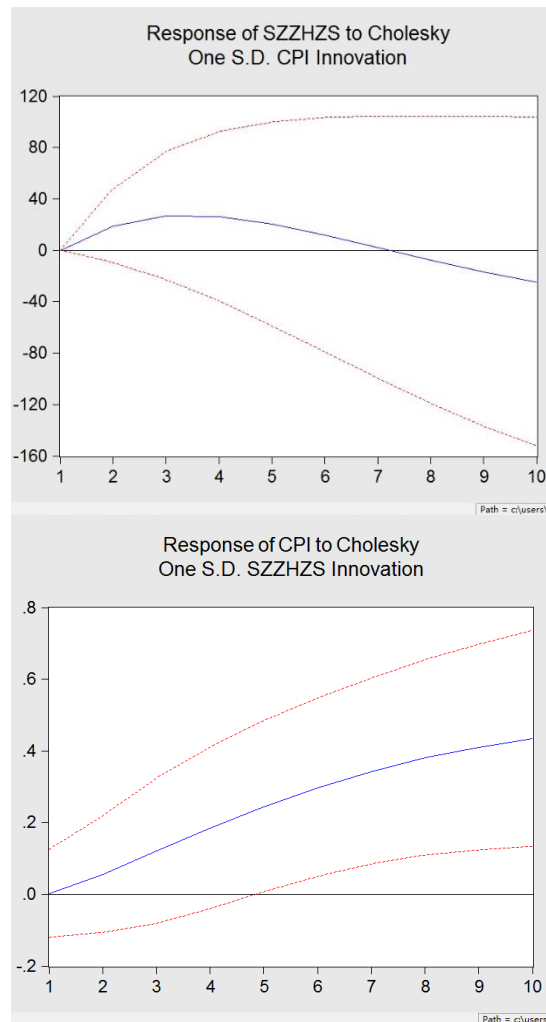
Fig. 8: The Shanghai Index and the CPI Impulse Response

Impact of CPI on the Shanghai Composite Index start value is zero, then the force rise, observation to tenth, basically reached the shock peak. Which shows "the impact of CPI" to "SSECI" persistence in general. But the overall trend is upward. Corresponding pulse show that, the impact of inflation on the stock market still exists and the downward trend is greater than the upward trend. Overall they are negative correlation.

We passed on the SSECI composite Index and the CPI data to construct the autoregressive distributed lag model. By the inflation rate impact on the stock price and the stock price impact on inflation in the two aspects of regression, we can get the conclusion: the CPI has a negative effect on the Shanghai Composite Index and the long-term effects are weaker. The Shanghai Composite Index Effect on CPI is very small. An empirical study on China stock market show that: the stock price and inflation showing a positive correlation is not established, at least in Chinese emerging market.

View	Proc	Object		Print	Name	Freeze		Estimate	Stats	Impulse	
Variance Decomposition											

Variance Decomposition of SZZHZS:

Period	S.E.	SZZHZS	CPI
1	153.3369	100.0000	0.000000
2	287.0850	99.58266	0.417336
3	409.6524	99.36804	0.631963
4	517.4097	99.34934	0.650660
5	610.2897	99.42296	0.577041
6	689.5520	99.51962	0.480383
7	756.8232	99.60049	0.399505
8	813.7165	99.64575	0.354246
9	861.6950	99.64681	0.353191
10	902.0390	99.60171	0.398292

Variance Decomposition of CPI:

Period	S.E.	SZZHZS	CPI
1	0.661605	0.001192	99.99881
2	0.959639	0.336918	99.66308
3	1.160544	1.299025	98.70097
4	1.312053	2.989288	97.01071
5	1.435468	5.389848	94.61015
6	1.541600	8.393321	91.60668
7	1.636343	11.84155	88.15845
8	1.722993	15.56117	84.43883
9	1.803375	19.38969	80.61031
10	1.878460	23.19061	76.80939

Fig. 9: The Variance Decomposition

Variance decomposition results show that, the standard deviation of SSECI from 100%~99.6 were their burden, and even to the tenth period is dominant; while the function of CPI is very small, even to the tenth period, not exceeding 0.5%.

In the standard deviation, SSECI about bear to 25%.The beginning is the increasing trend. While the CPI standard deviation is 80%, which is mostly by its bearing.

4. Conclusions and Suggestions

From the theoretical analysis and the model analysis, we can draw the following conclusions:

Firstly, China's current price index affected by inflation is very limited, the above analysis can be drawn the two weak correlation. But even if it is weak, it cannot be ignored, because inflation in China have begun to play its role in influencing stock price and influence cannot be underestimated. Now the stock market of China in the world economy has a large proportion, with the stock market development and ripe, the relationship between the two will continue to strengthen.

Secondly, although the current inflation momentum is fierce and the stock market turbulence is the fact that does not dispute, we should find the measures to response. The government regulation and control of inflation determination is very big still. We need to seize the main contradiction, handle the relationship between them by good measures.

Thirdly, though the two is not very obvious relation, we found that the effect of inflation on the macro economy is very obvious. Certainly many factors can influence the stock market. In order to deal with the Chinese overheating economy, "Twelfth Five Year Plan" argue that GPD growth should fall to seven point five percentage points. The Chinese economy l situation is still grim.

Finally, it should be noted that although inflation has little impact on Chinese current share price, or the correlation is very weak, we should know that, by the end of 2011, the total market value of the securities market of China has reached 23 trillion Yuan scale. It shows a small percentage will have very important effects. Inflation makes people complain the cost of living too high, the pressure too large. So, the government should take a prudent monetary policy and proactive fiscal policy or take further measures, such as reducing the base currency issuance of such measures, to have a successful soft landing for the Chinese economy.

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