The Impact of Macro-economic Factors on Banking Industry Stock Return in China

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LINA TU

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Master of Business Administration

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ABSTRACT

This study examines the impacts of macroeconomic factors which including inflation rate, exchange rate, money supply and interest rate on banking industry stock return in China by using generalized least squares (GLS) model. The research covers 16 banks which listing on both Shanghai stock exchange and Shenzhen stock exchange as a whole banking sector be the dependent variable and moreover, the return of Shanghai stock market and the return of Shenzhen stock market are the control variables. The sample of data is from September 2007 to June 2012 and all data is collected by monthly data. The regression results indicate that both the change of inflation rate and the growth rate of money supply (M2) are positive but insignificant to the banking industry stock return, the exchange rate is positive and significant to banking industry stock return and interest rate is negative and significant to banking industry stock return. But when put the control variables into the model, it shows that all macroeconomic factors have no impact on the banking industry stock return.

Keywords: Banking industry stock return, Inflation rate, Exchange rate, Money supply, Interest rate, Shanghai stock market return, Shenzhen stock market return
ACKNOWLEDGEMENTS

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CHAPTER 1

Introduction

1.1 Background

In recent years, China banking industry is development and innovation on and on, the whole banking industry have taken place a historic changes, played an important role in supporting and promoting the economic and social development, strongly support to the China's national economy development. At present there are 16 Banks in the a-share listed, the banking sector as one of the most important part in the Shanghai index, the tendency will make a significant influence to the market.

There are many of factors that are important in determining the return of stock. It is generally believed that systematic economic and financial news will give impact on the stock returns and the stock returns were be affected directly or indirectly by a number of different economic factors and those factors could predict a notable portion of stock returns. (Lim, Tang and Yu, 2012).

Many studies have researched about how macro-economic factors, such as interest rate, exchange rate and money supply influence to stock prices. For example, some people studied the impact of individual factors such as real activity and inflation, interest rate on stock prices. And some examined the relationship between stock prices and a wider financial variety and macro-economic variables. (Liu and Shrestha, 2008).

The Chinese stock market is very different from other, especially according to the extent of government regulations and investor composition. The development of Chinese stock market is a milestone in china’s economic reform process. From 1990 to 1991, China set up two stock exchange markets, Shanghai stock exchange and Shenzhen stock exchange. There are five shares in Chinese stock market: A-shares, B-shares, C-shares, H-shares and N-shares.
These two stock markets have been growing fast over time. After China joined the WTO, the Chinese stock market became more and more concerning by the global investors. And it also plays a more important role in the world economy. (Seddighi and Nian, 2004). So Chinese stock market has become an attracting market that can attract both foreign investors and local investors to invest.

Macro-economic variables always seem as the important sources of stock market volatility, therefore, these variables role as the leading indicators of stock returns. Binder and Merges (2001) do the research about the volatility of the return on the market portfolio is related to the ratio of expected profits and expected revenues for the economic. Nardari and Scruggs (2005) point out that future return is a high uncertainty factor that is mainly associated with economic goes down. In literature, there are numbers of documents discuss this impact of macro-economic variables on stock returns.

Nowadays, banking sector plays a very important role in the economic development and is a very important part in financial system of a country. So a suitable and effective banking system would create a healthy economy. So how can we know that the banking system is effective or not, bank stock would be one of factors that can reflect the affection of banking system.

Besides of these studies which are all related in the developed countries, it also have some studies analyzed the impact of different kinds of macro-economic variables on stock market in emerging market. But less to study give more details the impact of macro-economic factors on some sectors in the stock market and less empirical studies have yet been published that examine the joint interaction of interest rate, inflation rate, exchange rate and money supply on banking industry stock return.

Not much is known about the Chinese stock market behavior. Moreover, some of investors who with little investment knowledge or experience, they only are speculators. Stocks buy and sell on historical price trends or on markets rumor, the last lead to stock market mania (Liu and Shrestha, 2008). But now, most of investors have a great interest in searching for variables that can help them to analyze and
forecast stock prices. They also focus on macroeconomic news that can help them to analyze the trend of stock prices, so that can increase the returns and reduce the investment risk. So this study can be a document which offers this kind of knowledge.

1.2 Statement of Problems

Although there are many studies found out that significant impact of economic factors on stock price, but less literatures indicate clearly that which macroeconomic variables are more relevant to be regarded as factors that significantly affecting the banking industry stock return and how these factors behave in influence the banking industry stock return. So the statement of problems in this study is to investigate the impact of macro-economic factors on banking industry stock return in emerging market such as Chinese stock market.

1.3 Research Objectives

The research objectives are:

1. To study the impact of interest rate on banking industry stock return in China.
2. To study the impact of inflation rate on banking industry stock return in China.
3. To study the impact of exchange rate on banking industry stock return in China.
4. To study the impact of money supply on banking industry stock return in China.

1.4 Research Questions

The research questions are:

1. How does the interest rate impact on banking industry stock return in China?
2. How does the impact of inflation rate on banking industry stock return in China?
3. How does the impact of exchange rate on banking industry stock return in China?
4. How does the impact of money supply on banking industry stock return in China?
1.5 Expected Benefits

1. Useful for the investors to analyze the trend of stock prices, so that can increase the returns and reduce the investment risk.

2. Useful for the policymakers pay attention to the situation of the stock market that can be regarded as a leading indicator of future macroeconomic activity. They can better control the stability of the stock market by using macroeconomic tools.

1.6 Scope of the Study

The study is to investigate the impact of interest rate, inflation rate, exchange rate, money supply on banking industry stock return over the period September 2007 to June 2012 in China. Because until August 2007, there just had the banking industry stock index record. The study will choose 16 banks which cover two markets and would be A-shares only to analysis, 14 banks from Shanghai stock exchange and 2 banks from Shenzhen stock exchange, they are: (see Chart 1)
**Chart 1** Banks listed on the stock market in China and the Initial public offering time

<table>
<thead>
<tr>
<th>Shanghai Stock Exchange</th>
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<tbody>
<tr>
<td>Name of Bank</td>
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<tr>
<td>ShangHai Pudong Development Bank Co., Ltd.</td>
</tr>
<tr>
<td>China Merchants Bank Co., Ltd</td>
</tr>
<tr>
<td>HuaXia Bank Co., Ltd</td>
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<tr>
<td>Industrial Bank Co., Ltd</td>
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<tr>
<td>China Citic Bank Corporation Limited</td>
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<td>Bank of Communications Co., Ltd</td>
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<tr>
<td>China Construction Bank Corporation</td>
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<tr>
<td>Agricultural Bank of China Limited</td>
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<td>China Everbright Bank Company Limited</td>
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<th>Shenzhen Stock Exchange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of Bank</td>
</tr>
<tr>
<td>Shenzhen Development Bank Co., Ltd.</td>
</tr>
<tr>
<td>Bank Of Ningbo Co., Ltd.</td>
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</table>


The study is based on monthly data rather than quarterly or annual data because those data more representative that can provide stronger evidence of the sensitivity of banking industry stock return to macro-economic factors. The study will
use monthly bank stock index sector both in Shanghai Stock Exchange (SHSE) and Shenzhen Stock Exchange (SZSE) to calculate the banking industry stock return, because bank stock sector index reflect the entire bank plate composite index rather than individual cases. It is more comprehensive to prove macroeconomic factors have an impact on the banking industry stock return. And the study will use monthly SHSE index and monthly SZSE index to calculate the Shanghai Stock Market return and Shenzhen Stock Market return.

First of all, the study will use the correlation testing to test whether every variable has strong relationship between each other. If one of variable has a strong relationship with another one, it would be apart them into different equation. After that, the study will use the multiple linear regression analysis to examine when the economic variables change, how the banking industry stock return change by using GLS method. And it’s expecting that there is a sensitivity impact of macro-economic variables on banking industry stock return. And then, also use the GLS method to examine when the economic variables change, how the Shanghai exchange stock return change and when the economic variables change, how the Shenzhen exchange stock return change. At the end, the study will use Shanghai exchange stock return and Shenzhen exchange stock return be the control variables, put them into the model with macroeconomic variables, to investigate when control these two variables, whether the macroeconomic variables have the impact to banking industry stock return.

1.7 Operation Definition

Stock market

A stock market or equity market is a public entity (a loose network of economic transactions, not a physical facility or discrete entity) for the trading of company stock (shares) and derivatives at an agreed price; these are securities listed on a stock exchange as well as those only traded privately.
Stock market return

Stock Market Returns are the returns that the investors generate out of the stock market. This return could be in the form of profit through trading or in the form of dividends given by the company to its shareholders from time-to-time. In the secondary market an investor could earn stock market return by buying a stock at lower price and selling at a higher price.

Interest rate

An interest rate is the rate at which interest is paid by borrowers for the use of money that they borrow from a lender.

SHIBOR

The Shanghai Interbank Offered Rate.

Inflation rate

The overall general upward price movement of goods and services in an economy, usually inflation rate as measured by the Consumer Price Index (CPI).

Exchange rate

Exchange rate (also known as the foreign-exchange rate, or FX rate) between two currencies is the rate at which one currency will be exchanged for another. It is also regarded as the value of one country’s currency in terms of another currency.

Real Effective Exchange Rate

The weighted average of a country's currency relative to an index or of other major currencies adjusted for the effects of inflation.

Money supply

It's the total amount of monetary assets available in an economy at a specific time.

M2

The money supply that includes M1 and M0 in addition to all time-related deposits, savings deposits, and non-institutional money-market funds.
1.8 Organization of the Study

This study is arranged in different chapters and each chapter has its content. The structure is as follow: chapter one is about the introduction; Chapter two is literature review; Chapter three is data and methodology; Chapter four is data analyses; Chapter five is conclusion.
CHAPTER 2

Review of Literature

2.0 Introduction

China banking sector plays an important role in the development of financial system and the economy as a whole. The total deposits of the whole banking industry account in year 2008 more than 20% of GDP and higher than year 2006 and year 2007. But the profitability of the banking sector in China is still below international standards, so the performance of the banking sector in stock market is not outstanding and low valuation by market, so investigate the factors which can influence the return of banking sector of helpful to solve these problems and is essential for the investors and shareholders.

In this study, it would like to study on four macroeconomic factors, such as inflation rate, exchange rate, money supply and interest rate, which each of them would contribute significant impacts to the movement of banking industry stock return. Next, the study will review the literatures of other’s.

2.1 Review of the Literature

2.1.1 Stock market development and the role of banks in China

Mohammed and John (2001) said that, to achieve the objective of increasing the growth rate of economy, cannot without increasing the level of investment. And one of ways to obtain this investment is that creating a strong stock exchange market for attracting local and foreign investment.

Liu and Shretha (2008) said that the development of the stock market is a milestone in China's economic reform process. Seddighi and Nian (2004) concluded that one of Chinese stock market’s characteristics is: high return and high volatility, and this characteristic is related to the corporate governance, government
interferences, and over speculation. There are two stock exchanges in Chinese stock market. One is Shanghai stock exchange which was formally established in 1990, the other is Shenzhen stock exchange which was formally established in 1991.

Stock market in China has five types of shares; they are A-shares, B-shares, C-shares, H-shares and N-shares. The official name of A-shares is Renminbi A common stock, it is within the territory of China issued by the company, for domestic institutions, organizations or individuals (excluding Taiwan, Hong Kong and Macao) investors subscribed in Renminbi and trading of shares of common stock. B-shares which denominated in RMB also, but subscribed for traded in the US dollars or Hong Kong dollars. Either the US dollars or HK dollars are traded by foreign investors, until in early 2001, this restriction is relaxed. Individuals with legal foreign exchange accounts also can buy and sell B share. C-shares are the share that only trading among Chinese state institutions, enterprises and departments with a legal person status, individuals are not allowed to hold it. H-shares are about the Chinese companies issued their shares in Hong Kong stock exchange, so it’s called H-shares. And N-shares are the share that Chinese companies issued the share in the New York stock exchange. (Nicolaas, Sam and Wu, 2003; Green 2004; Seddighi and Nian, 2004).

Banking system is a very important part for the economic growth. It is an essential part to complete the financial system. Banks offered service such as borrowing, lending and other activities, it play an integral or important role that contribute to the economic, especially to the financial aspect of a nation. Economic development of a country would be paralysis if without the soundness banking system. (Jeyanthi and Ailliam, 2010)

There is a uni-directional relationship between Shanghai Stock Exchange (SSE) Index and bank stock price, the movement of SSE composite index will trigger the movement of almost all bank stock prices. Increase of SSE composite index has positive relationship with bank stock price. And bank stock price also can influence the SSE index. (Shujie, Dan and Stephen, 2008)

2.1.2 Bank stock returns
Jeyanthi and Ailliam (2010) indicated that return is a motivating factor that stimulated the investors to invest money into stock market. Return is a profit that earned from the stock's prices.

Fama (1991) said that stock prices reflect earnings, dividends and interest rate expectations and future economic activity behavior. And stock returns affect the wealth of investors which in turn affects the level of consumption and investment.

Rebel, Fariborz and Wu (2007) indicated that financial functions provided by banks and important in promoting economic growth. Banking industry stock return reflects the performance of a country’s banking sector. In addition, they proved that banking industry stock return can predict future economic growth and the positive and significant relationship is independent of the previously documental relation between market stock returns and growth. On the other hand, much of predictive power of bank stock return is captured by a series of country-specific and banking institutional characteristics.

The commercial bank stock's performance is depending on two important issues in the emerging market, one is the position of bank to the economy, the other one is investment opportunities. So it is very important to know the risk factors that may influence the returns. (Girard, Nolan and Pondollo, 2010) There are many strong evidences supports that bank stock returns generating process is dependent by time-varying. And the risk measurement should also have timeliness. (Yourougou, 1990; Elyasiani and Mansur, 1998)

Menike (2006) choose 34 companies which is represented by eight sectors be the sample, and used monthly data for the period from September 1991 to December 2002 to investigate the effect of macroeconomic factors such as interest rate, inflation rate, exchange rate and money supply on the emerging Sri Lankan stock market by using multiple regression model and the natural logarithm to calculate. The study choose nominal interest rate which measure by treasury bill yield rate; inflation rate is measure by the Colombo consumer price index (CCPI), the exchange rate is the nominal exchange rate and the money supply is used the broad money supply (M2).
The result shows that stock prices have a negative relationship with interest rate, inflation rate and exchange rate, and it has a positive relationship with money supply.

2.1.3 The impact of inflation on bank stock returns

Inflation rate risk comes from the unexpected increase of the price of goods and services, so that leads to have an impact on the purchasing power of bank earning such as interest income. It would get less return and reduce the value of bank’s assets, equity and liability at the same time when inflation rate increases. Change of stock price as the link between inflation and stock returns. We can use the consumer price index CPI to measure the inflation rate because the fluctuation in the inflation rate represents proportion of risk associated with increase uncertainty in the movement of return. It is an important factor that should be concern because it is considered as one of the most serious problems to the economic and investors always have to take into account through their investment decisions.

There are four variables lead to inflation: employment, consumption, production and unexpected increase in money supply. Increasing inflation rate can raise the nominal risk-free rate and discount rate in the equity valuation model. Unexpected inflation has a negative relationship with stock price (Liu and Shrestha, 2008).

Tan and Floros (2012) used a total of 101 banks in China and annual inflation from 2003 to 2009 to examine the effect of inflation on bank profitability, while controlling for comprehensive bank-specific and industry-specific variables by using the two step generalized methods of moments (GMM), and the study found that there is a positive relationship between bank profitability, cost efficiency, banking sector development, stock market development and inflation in China.

Gultekin (1983) used the model $t+6R_{i,t} = \frac{i_{t+12}}{i_{t+6}} - 1$, where $i_{t+k}$ indicates the forecast of an index (CPI, WPI, or S&P 500) made at time $t$ for the month $t + k$. $t+6R_{i,t}$ is the expected six-month rate of return on index $I$ starting at month $t + 6$ and forecasted at time $t$. Likewise, the twelvemonth rate of return on an index can be computed for the period beginning at $t + 6$ and ending at $t + 18$ for each June. To
examine the Fisher hypothesis as a model relating expected stock returns and expected inflation and the study found that the expected real return on stocks is not constant over time but is positively related to expected inflation.

Eita (2012) use quarterly inflation rate which represent by the consumer price index (CPI) and the proxies of stock market returns which represent by all-share index (ALSI) and gold index from 1980 to 2008 to investigated the relationship between stock market returns and inflation in South Africa and revealed that stock market returns and inflation in South Africa are positively related. An increase in inflation results in an increase in stock prices. The results also indicate that when all-share index is used as the measure of stock market returns, the causality is bi-directional. However, when gold index is used as a proxy for stock market returns, the causality is unidirectional, running from inflation to stock market returns. The positive association between these two variables suggests that equities are a hedge against inflation in South Africa.

Lajeri and Dermine (1998) concluded that there was a negative impact of inflation on the market value of banks and the real economic activity and it would reduce the expected returns. And they used the three factors –model that combining a market factor, an unexpected interest rate and an unexpected to calculate the impact of unexpected inflation on the bank stock returns in France. And got the result is that inflation can be an independent factor that had an impact on bank stock returns.

Modigliani and Cohn (1979) suggest that stock market investors are depended on the inflation illusion in the inflation illusion hypothesis. They mention that when the inflation increase, the investors tend to reduce the expected future earnings and dividends from the stock market and use the higher nominal interest rate to take the place of. So the stock price is undervalue when inflation is high and overvalue when the inflation become low. As a result, reach a negative relation between inflation and stock returns. Feldstein (1980) explain that the relationship between the higher inflation and lower stock prices in the tax hypothesis. He depend on the basic features of US tax laws summarize that there is adverse effect of inflation increasing on stock
price. From the proxy hypothesis of Fama (1983), Fama also got the result about a negative stock return-inflation relation. Because a positive relationship between stock return and real economic activity combined with a negative relationship between the real economic activity and inflation, leads to the negative stock return-inflation relation. And Fama (1981) also explained that the negative relation between stock market returns and inflation exists because of the correlation between inflation and future output. According to stock market returns reflect the future earning potential of the firm and an economic downturn predicted by an increase in the price level will cause the prices of stocks to decrease.

Based on the equilibrium models, there are two factors can affect the relation of stock returns and inflation. They are supply shocks and demand shocks. Supply shocks such as oil price shocks, it would drive a negative relation between inflation and stock price, for example, if the oil price increase, then higher inflation will lead to lower stock price; And demand shocks such as monetary, it will drive a positive relationship between them. Just like if increasing the money supply, it will lead to increasing inflation and stock price (Lee, 2009).

Through the effects of unanticipated inflation and unanticipated changes in expected inflation, nominal assets of a firm’s holding is a very important point that can explain the behavior of common stock returns. Unanticipated inflation can affect the real nominal assets but not real assets, and shareholders who hold the nominal assets less than the nominal liabilities would get the benefit from the unanticipated inflation, on the opposite, if the shareholder who hold the nominal assets more than the nominal liabilities, because of the value of equity would decline, then it will get the loss in this unanticipated inflation. Unexpected changes in expected inflation would affect to the nominal contracts through discounting the cash flow (French, 1983).

2.1.4 The impact of exchange rate on bank stock returns

Exchange rate becomes more and more important for the China stock market. Renminbi appreciates will attract the hot money flow into china stock market. Then
will raise the stock prices (Wang 2010). Choi, Elyasiani and Kopecky (1992) found that the exchange rate can affect the bank’s profit though exposure to foreign translation risk.

Exchange rate as be an important financial and economic variable affecting common stock value. There are some reasons shows that why the bank stock returns can be responsive to exchange rate. Firstly, according to the contagion affection, random shocks can lead to higher volatility in financial market, investors such as bank also look abroad to invest in alternative financial assets. Diversification of international portfolio may lead an increase in the volatility of those assets returns, so greater exposure to exchange rate would affect bank stock returns when there is information impounds into their stock price. So arbitrage pricing theory will apply if exchange rate is priced factor that constitute important elements in the equilibrium price of stocks. Secondly, exchange rate has a directly affect to the financial institutions revenues and costs (Joseph and Vezos, 2006).

With the increasing international trade and the capital movement day by day, exchange rate become more and more important to decide the business profitability and equity prices. There are many studies to investigate the relationship between exchange rate and stock prices using the data from developed markets. For the developing countries, also have some documents study about the influence between exchange rate movement and stock prices in the emerging financial markets. Economic theory suggests that the exchange rate has a very important influence in stock market by affecting cash flow, investment and profitability of the firms (Aydemir and Demirhan, 2009).

Granger, Huang and Yang (2000) examined the relationship between these two elements by using the data from nine Asian countries through using a BVAR model. They found that exchange rate lead stock price in Korea, however, stock price lead exchange rate in Hong Kong, Malaysia, Thailand and Taiwan.

The relationship between exchange rate and the stock price are attracting by economists because these two things both are playing the important roles that can
affect to the country economic development. Due to the various and changeable international business and capital inflow and outflow, these changes would increase the investment decision uncertainly and the risk of the investment increase as well (Mishra et al., 2007).

Exchange rate can influence stock prices and it is also determined by marketing principles. It means that changes in stock prices would impact on exchange rate also (Granger et al, 2000). Exchange rate changes have impact on the import and export price for the firms (Joseph, 2002). Currency appreciation in a country, have both a positive and a negative impact to the firms. For the export firms, appreciate the money will lead to lose their competitiveness in international market, then it will make the profit decrease, and there is a negative influence in its stock price. The result is opposite to the case of importers. And depreciation of the currency would make adverse effects on exporters and importers. (Yau and Nieh, 2006)

Pan et al. (2007) use the data of seven East Asian countries to study, over the period 1988 to 1998, and found that the exchange rate and the stock prices have a bidirectional causal relationship. Ajayi et al. (1998) study the relationship between exchange rate and stock market. According to results of study, currency depreciation has a negative influence to the stock market both in the short-term and long-term.

2.1.5 The impact of money supply on bank stock returns

Seyed, Zamri and Wah (2011) study the relationship between four kinds of macroeconomic variables and stock market index in both China and India during the period from 1999 to 2009 and the study got the result that in the long run, money supply has a positive impact on the Chinese stock market and negative impact on the India stock market; but in the short run, money supply have negative and insignificant impact on the Shanghai stock exchange market.

The loose monetary policy is good for stock market, which will increase the stock price. Otherwise, tight monetary policy has a negative influence on stock market. Generally, the stock price will decrease (Thorbeke, 1997). Money growth rate goes up will lead to inflation rate goes up. So increase the money supply may lead to increase
the inflation. An increasing inflation can affect the discount rate of valuation go up. That will have a negative influence with stock market. (Fama, 1981)

Ehrmann and Fratzscher (2004) report that capital-intensive industries and the firms which are more financially constrained both are affected by the changes in monetary policy. Guo (2004) point out that the smaller firms’ stock returns would get more strongly impact by the monetary policy than the large firms. Other studies also provide evidence that monetary policy does have an impact on stock returns especially in a bear market (Chen, 2007).

Some studies found that with the competitive bank market structure situation, there is a positive relationship between money supply and bank stock returns. (Zatul and Mohamed, 2007)

Bank as a transmitter of changes of monetary policy, they use the optimizing behavior advantages to determine money supply (Holtemöller, 2003).

According to the empirical evidence, changes in loan will lead to changes in deposits, and changes in deposits will affect money supply. Traditional bank’s products are loan and deposit, so it will have an impact on its profits and share prices. In different situations, such as financial crisis, financial deregulation or policy regime change, there are different impacts on bank industry and individual bank stock returns by changing money supply (Zatul and Mohamed, 2009). Lee (1994) said that there is a long-run equilibrium relationship between stock prices and money supply.

Monetary policy whatever is a restrictive or an expansionary monetary policy might have bilateral effects to general economic. For the expansionary monetary policy, good for increasing in the supply of funds for working capital and expansion for all business to getting more profit, then the common stock prices will increase. For the individual investors, expansionary monetary means that lower interest rate will make lower required rate of return from bank savings, and thus, there is an excess liquidity in the market, it indicates there is an increase of demand to stocks because of getting the higher returns from the stock market, then the stock price will be increase. But monetary growth will lead to higher inflation and then, according to Fisher
equation, it will lead to interest rate increase and the higher required rate of return, then the money will flow into the bank from the stock market, makes the stock price decrease. Conversely, a restrictive monetary policy will reduce the growth rate of money supply and lead to higher interest rate and lower supply of funds for working capital and expansion for all business. Then companies will slow the developing and get less profit, and common stock prices will drop (Emrah, 2009).

Muradoglu and Metin (1996) indicate that money supply and stock returns has a positive relationship in short-run dynamic model. Yildirtan (2007) reveals that an increase in money positively and strongly affects ISE 100 Index.

Al-Sharkas (2004) shows that money supply (M2) has a positive influence on stock returns and Maysami et al. (2004) also point out that the positive relationship between changes in money supply (M2) and Singapore’s stock returns.

2.1.6 The impact of interest rates on bank stock returns

Interest rate is one of the important macroeconomic factors which are directly influence to economic developing. Generally, interest rate is considered as the cost of capital, it means that the price paid for the use of money in a period of time (Mahmudul, 2009).

Interest rate is one of macro-economic factors that have important influence to the common stocks. So that the bank stocks also can be responsive to this factor when it changes (Joseph and Vezos, 2006). And they also concluded that there are four important reasons that the bank stock returns are responsive to interest rate: first one is random stocks can induce higher volatility in financial markets because of contagion effects which are highest in more volatile markets. Secondly, changes in interest rate would affect directly to the revenues and costs of financial institutions. Thirdly, changes in interest rate would have the impact to the bank’s assets and liabilities when banks role as a financial intermediaries. Finally, it will composition of bank’s balance sheet.

Vaz, Ariff and Brooks (2008) used 51 banks in Australia which have 11 banks are listed on the Australian stock exchange and daily official interest rate to examine
the effect of publicly announce changes in official interest rate on the stock returns during the period from 1990 to 2005 and get the result Australian bank stock returns are not negatively impacted by the announced increase in official interest rate.

According to Choi, Elyasiani and Kenneth (1992) research, they used 48 largest US banking institutions for the period 1975-1987 as a sample that examined empirical the sensitivity of the common stocks returns of large US banking institutions to interest rate by using multifactor index model: \( R = E + SF + Z \). \( R \) means the nominal rate of stock returns. \( E \) means expect stock returns. \( F \) means a matrix of sensitivity coefficients to the risk factors. \( Z \) means idiosyncratic terms. This kind of multi-index model either can estimate directly, or has convenient mathematical properties if the indices are orthogonal to each other. And the mathematical properties can isolate the sensitivity of each factor after the exclusion of the correlated components. And get the result that interest rate has an important impact on bank stock return because it is a factor for the valuation of common stock of financial institutions while the returns and costs of financial institutions are directly dependent on interest rate.

Bank’s profit comes from the difference of the interest income and interest transaction cost. So interest rate is very important for the bank stock returns because it will have an impact to the discount profit of bank. Change the interest rate will lead to reevaluation the bank's discounted profit. That will lead to affect the bank’s returns (Choi, Elyasiani and Kopectky, 1992).

There is a negative influence on bank stock return by interest rate change and the sensitivity of interest rate on bank stock return is different over the time. (Kwan, 1991). So Yourougou (1990) pointed out that if the interest rate is stable, then it will have low sensitivity on bank stock returns and not significant for all kinds of industry. And he also point out interest rate have a significant impact on common stock of financial institutions, including banks. Many studies found that the sensitivity of the interest rate on bank shares more than interest rate to the sensitivity of the stock market. Furthermore, most of nonfinancial firms confirm that bank assets and
liabilities makes bank stock returns especially sensitive to changes in interest rate (Zhu and Li, 2007).

There always has conflicting about bank stock returns sensitive to interest rate. Akella and Chen (1990) said that bank stock returns just sensitive to long-term interest rate but not to short-term interest rate. However, Mansur and Elyasiani (2004) find out whatever long-term, medium-term or short-term interest rate has significant affect to bank stock returns. Long-term and medium-term interest rate affects the bank stock returns with a greater extent than do a short-term interest rate. Kwan’s (1991) point out the interest rate sensitivity of bank stock returns is time-varying. Mahmudul (2009) used 15 countries which including developed and developing countries be a sample, they found that all of these countries, the interest rate has significant negative relationship with share price, changes of interest rate and changes of share price both determined by time series and panel regressions.

The nominal contracting hypothesis suggests that the interest rate has a impact of a bank’s common stock return depends on the amount of net nominal assets held by the bank. Furthermore, lots of financial analysts and economists also agree that the changes of interest rate can influence directly on banks revenues, costs and profitability (Yourougou, 1990). Gilkenson and Smith (1992) said that with the financial market liberalization process, most of the banks generally carry out their operations in foreign countries and are exposed to the interest rate because of volatile financial market conditions in recent years. Therefore, interest rate changes could have an adverse effect on the viability of banks because their impacts cannot be eliminated through risk management techniques.

Kasman, Vardar and Tunc (2011) used a sample of Turkish banks to investigate the sensitivity of bank stock returns to interest rate changes over the period 1999-2009, by using both standard OLS and GARCH model, result is pointed out interest rate volatility is a main determinant in the bank stock returns volatility.

Kwan (1991) used the two-index random coefficient model of the bank stock returns to investigate the interest rate sensitivity of the bank with time-varying. He
found that the changes of the level of interest rate and time-varying can sensitive to the bank stock returns that can be explained by bank assets and liabilities.

According to the nominal contracting hypothesis, there is a relationship between the common stock returns and the changes of interest rate, generally, the interest rate sensitivity to the firm’s common stock returns is depend on the holdings of net nominal assets of the firm. The changes of interest rate have more sensitivity to the firm’s common stock returns when the firm has the higher proportion of the net nominal assets (Mark J and Christopher M, 1984).

2.2 Conclusion

Previous literature done by previous researchers has provided us a space to be more understand on the relationship between some of macroeconomic variables and stock returns and the impact of macroeconomic variables on stock market return, so according to the previous literatures, this study chooses these four macroeconomic variables to examine that whether these four variables can impact the banking industry stock return in Chinese stock market. Hence, the conceptual framework is set as below: four macroeconomic variables are inflation rate, exchange rate, money supply and interest rate which are the independent variables, it will investigate the impact of each variable on the banking industry stock return. And the study employs market returns which from Shanghai market return and Shenzhen market return as control variables to examine when put the market return be the control variable, then the macroeconomic variables have the impact to the banking industry stock return or not. And each variable has the literature supporting, but until now, this study cannot find out any literature study on the Shenzhen stock market return. So the study sets the conceptual framework as below:
Conceptual Framework

**Macroeconomic Factors**
1. **Inflation Rate**
   - Tan and Floros (2012)
   - Gultekin (1983)
2. **Exchange Rate**
   - Choi, Elyasiani, and Kopecky, 1992
   - Joseph and Vezos, 2006
3. **Money Supply**
   - Zatul and Mohamed, 2007
   - Muradoglu and Metin, 1996
4. **Interest Rate**
   - Yourougon, 1990
   - Zhu and Li, 2007

**Control factor**
1. **Market returns**
   - ShangHai Market return
     - Wang, 2011
   - ShenZhen Market return

**Banking industry stock return**
CHAPTER 3

Data and Methodology

3.0 Introduction

This chapter describes the approaches that have been applied to gather necessary information, it includes the data analysis, methodology description and the expected result.

3.1 The data

The data used in this study consist of the monthly closing of stock indices, Such as monthly Shanghai Stock Exchange (SHSE) composite index, monthly Shenzhen Stock Exchange (SZSE) composite index and monthly banking sector index price, monthly Shanghai Interbank Offered Rate (SHIBOR) be the interest rate, monthly average real effective exchange rate; and the change of inflation rate is measured by the monthly consumer price index (CPI), monthly money supply which is measured by monthly growth rate of M2. All data cover September 2007 to June 2012 and sample size has 58 observations. And these data are obtained from International Financial Statistics of the International Monetary Fund and Financial Statistics of the Federal Reserve Board and Statistics and Analysis Department of The People’s Bank of China and State Statistics Bureau of China.

3.2 Methodology

This study will use logarithmic method that come from Jeyanthi and Willian (2010) to calculate each return of Shanghai stock market, Shenzhen stock market and return of banking industry sector. The generalized least squares (GLS) regression analysis estimates the effect of interest rate (INT), inflation rate (INF), exchange rate (EX) and money supply (MS) change on banking industry stock return. First of all, following Moade Shubita and Adel Al-Sharkas (2010), the study uses the formula:
INFT = (CPIt - CPIt-1)/CPIt-1 to calculate the change of inflation rate. And then it will do the correlation testing between these four macro-economic factors, if some of factor has strong relationship with the other factor, then they will be apart.

Banking industry sector stock return is calculated using logarithmic method as follows:

\[ R_t = (\ln p^B_t - \ln p^B_{t-1}) \times 100 \]

Where:

- \( R_t \) = Banking industry sector index return at month t, is the proxy for banking industry stock return at month t
- \( p^B_t \) = Banking industry sector closing index at month t
- \( p^B_{t-1} \) = Banking industry sector closing index at month t-1
- \( \ln \) = Natural logarithm

Market Returns is calculated using logarithmic method as follows:

Shanghai stock exchange market return:

\[ \text{MRS}H_t = (\ln p^{SH}_t - \ln p^{SH}_{t-1}) \times 100 \]

Where:

- \( \text{MRS}H_t \) = Shanghai stock exchange market return at the period t
- \( p^{SH}_t \) = Shanghai stock exchange closing index at month t
- \( p^{SH}_{t-1} \) = Shanghai stock exchange closing index at month t-1
- \( \ln \) = Natural logarithm

Shenzhen stock exchange market return:

\[ \text{MRS}Z_t = (\ln p^{SZ}_t - \ln p^{SZ}_{t-1}) \times 100 \]

Where:

- \( \text{MRS}Z_t \) = Shenzhen stock exchange market return at the period t
- \( p^{SZ}_t \) = Shenzhen stock exchange closing index at month t
- \( p^{SZ}_{t-1} \) = Shenzhen stock exchange closing index at month t-1
- \( \ln \) = Natural logarithm

Generalized least squares (GLS) regression:

There are several method that can be used to measure the impact of
macroeconomic variables on banking industry stock return, for example, Mohammad and Orouba (2006) used both OLS and GLS to examine the impact of interest rate, market risk, inflation on bank stock returns. A multi-factor model is designed to test the impact of four macroeconomic factors on the stock return. The model is estimated with generalized least squares (GLS) regression analysis, because the study employ the time series data as the sample, then for dealing with the serial correlation, the study will use GLS.

\[ R_t = a_0 + a_1 \text{INF}_t + a_2 \text{EX}_t + a_3 \text{MS}_t + a_4 \text{INT}_t + e \]  

(1)

where:

\( R_t \) = Banking industry stock return at the period \( t \)

\( a_0 \) = the intercept term

\( a_1 \ldots a_4 \) = the coefficient of each variable for period \( t \)

\( \text{INF}_t \) = monthly inflation rate at time \( t \), which calculate by monthly CPI, and the formula is

\( \text{INF}_t = (\text{CPI}_t - \text{CPI}_{t-1}) / \text{CPI}_{t-1} \)

\( \text{EX}_t \) = exchange rate at time \( t \), the exchange rate is the monthly average real effective exchange rate

\( \text{MS}_t \) = money supply at time \( t \), here using growth rate of monthly M2 to present, and the formula is

\( \text{MS}_t = (\text{MS}_t - \text{MS}_{t-1}) / \text{MS}_{t-1} * 100\% \)

\( \text{INT}_t \) = monthly interest rate at time \( t \), here using monthly Shanghai interbank offered rate to present

\( e \) = error term

The second model is designed to test the impact of four macroeconomic factors on the Shanghai stock exchange market return.

\[ \text{MRSH}_t = b_0 + b_1 \text{INF}_t + b_2 \text{EX}_t + b_3 \text{MS}_t + b_4 \text{INT}_t + e \]  

(2)

Where:

\( \text{MRSH}_t \) = Shanghai stock exchange market return at the period \( t \)

\( b_0 \) = the intercept term
The third model is designed to test the impact of four macroeconomic factors on the Shenzhen stock exchange market return.

\[
MRSZ_t = c_0 + c_1 \inf_t + c_2 \text{EX}_t + c_3 \text{MS}_t + c_4 \int_t + e
\]  \hspace{1cm} (3)

where:

- \(MRSZ_t\) = Shenzhen stock exchange market return at the period \(t\)
- \(c_0\) = the intercept term
- \(c_1 \ldots c_4\) = the coefficient of each variable for period \(t\)
- \(\inf_t\) = monthly inflation rate at time \(t\), which calculate by monthly CPI, and the formula is
  \[
  \inf_t = (\text{CPI}_t - \text{CPI}_{t-1}) / \text{CPI}_{t-1}
  \]
- \(\text{EX}_t\) = exchange rate at time \(t\), the exchange rate is the monthly average real effective exchange rate
- \(\text{MS}_t\) = money supply at time \(t\), here using growth rate of monthly M2 to present, and the formula is
  \[
  \text{MS}_t = (\text{MS}_t - \text{MS}_{t-1}) / \text{MS}_{t-1} \times 100\%
  \]
- \(\int_t\) = monthly interest rate at time \(t\), here using monthly Shanghai interbank offered rate to present
- \(e\) = error term
The fourth model is designed to test the impact of four macroeconomic factors on the banking industry stock return when adding the control factor such as Shanghai stock exchange market return.

\[ R_t = d_0 + d_1 \text{INF}_t + d_2 \text{EX}_t + d_3 \text{MS}_t + d_4 \text{INT}_t + d_5 \text{MRSH}_t + e \quad (4) \]

where:

- \( R_t \) = Banking industry stock return at the period t
- \( d_0 \) = the intercept term
- \( d_1 \ldots d_5 \) = the coefficient of each variable for period t
- \( \text{INF}_t \) = monthly inflation rate at time t, which calculate by monthly CPI, and the formula is
  \[ \text{INF}_t = (\text{CPI}_t - \text{CPI}_{t-1}) / \text{CPI}_{t-1} \]
- \( \text{EX}_t \) = exchange rate at time t, the exchange rate is the monthly average real effective exchange rate
- \( \text{MS}_t \) = money supply at time t, here using growth rate of monthly M2 to present, and the formula is
  \[ \text{MS}_t = (\text{MS}_t - \text{MS}_{t-1}) / \text{MS}_{t-1} \times 100\% \]
- \( \text{INT}_t \) = monthly interest rate at time t, here using monthly Shanghai interbank offered rate to present
- \( \text{MRSH}_t \) = Shanghai stock exchange market return at the period t
- \( e \) = error term

The fifth model is designed to test the impact of four macroeconomic factors on the banking industry stock return when adding the control factor such as Shenzhen stock exchange market return.

\[ R_t = f_0 + f_1 \text{INF}_t + f_2 \text{EX}_t + f_3 \text{MS}_t + f_4 \text{INT}_t + f_5 \text{MRSZ}_t + e \quad (5) \]

where:

- \( R_t \) = Banking industry stock return at the period t
- \( f_0 \) = the intercept term
- \( f_1 \ldots f_5 \) = the coefficient of each variable for period t
INF\(_t\) = monthly inflation rate at time t, which calculate by monthly CPI, and the formula is

\[
INF\(_t\) = (CPI\(_t\) - CPI\(_{t-1}\))/CPI\(_{t-1}\)
\]

EX\(_t\) = exchange rate at time t, the exchange rate is the monthly average real effective exchange rate

MS\(_t\) = money supply at time t, here using growth rate of monthly M2 to present, and the formula is

\[
MS\(_t\) = (MS\(_t\) - MS\(_{t-1}\))/MS\(_{t-1}\) * 100\%
\]

INT\(_t\) = monthly interest rate at time t, here using monthly Shanghai interbank offered rate to present

MRSZ\(_t\) = Shenzhen stock exchange market return at the period t

e = error term

### 3.3 Expected result

The result expects that each macro-economic variables exert an important influence on bank stock returns independent of the other market factors. Such as the inflation rate have a positive impact on banking stock return which the same as Tan and Floros (2012) and Gultekin (1983); And exchange rate has a positive and significant impact on the baking stock return which the same as Choi, Elyasiani and Kopecky (1992) and Joseph and Vezos (2006); The money supply have positive impact on banking stock return which same with Zatul and Mohamed( 2007) and the interest rate has a negative and significant impact on the banking stock return which the same with Yourougon (1990) and Zhu and Li (2007).

### 3.4 Conclusion

In chapter three, we discussed the data and methodology. For the following chapter, we will discuss the results of the above statistical tests.
CHAPTER 4

Data Analysis

4.0 Introduction

This chapter presents the results and interpretation of the study. The first section of the chapter performed the description analysis for the stock returns in China and the macroeconomic variables that found to be potentially affecting the stock returns. In this section, the mean, median, maximum, minimum, standard deviation and observations of each variable will be analyzed. The second section is the empirical result which includes the correlation analysis and generalized least squares (GLS) regression.

4.1 Descriptive Analysis

This section of the chapter shows the descriptive analysis for the stock return of banking industry sector, Shanghai stock exchange market and Shenzhen stock exchange market in China, and the macroeconomic variables that found to be potentially affecting the stock return. In this section, the mean, median, maximum, minimum, standard deviation and observations of each variable will be analyzed. And the result is reported in Table 1.
Table 1 Descriptive Information of Macroeconomic factors impacting stock returns in period 9/2007-6/2012

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Std. Dev.</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>R(%)</td>
<td>-0.701</td>
<td>1.001</td>
<td>25.203</td>
<td>-32.658</td>
<td>10.403</td>
<td>58</td>
</tr>
<tr>
<td>MRSH(%)</td>
<td>-1.470</td>
<td>0.343</td>
<td>14.234</td>
<td>-28.278</td>
<td>9.696</td>
<td>58</td>
</tr>
<tr>
<td>MRSZ(%)</td>
<td>-1.090</td>
<td>0.724</td>
<td>16.713</td>
<td>-25.816</td>
<td>10.533</td>
<td>58</td>
</tr>
<tr>
<td>INF(%)</td>
<td>-0.068</td>
<td>-0.095</td>
<td>1.494</td>
<td>-2.574</td>
<td>0.723</td>
<td>58</td>
</tr>
<tr>
<td>EX</td>
<td>100.103</td>
<td>100.120</td>
<td>109.400</td>
<td>88.670</td>
<td>5.375</td>
<td>58</td>
</tr>
<tr>
<td>MS(%)</td>
<td>1.520</td>
<td>1.340</td>
<td>4.720</td>
<td>-1.010</td>
<td>1.214</td>
<td>58</td>
</tr>
<tr>
<td>INT(%)</td>
<td>2.300</td>
<td>2.290</td>
<td>4.560</td>
<td>0.830</td>
<td>0.994</td>
<td>58</td>
</tr>
</tbody>
</table>

Note: R, MRSH, MRSZ, INF, EX, MS, and INT stand for banking industry sector stock return, Shanghai stock exchange market return, Shenzhen stock exchange market return, inflation rate, exchange rate, money supply and interest rate.

Table 1 reports consolidated descriptive statistics of the macroeconomic variables that cause a fluctuation in stock returns which include banking industry sector stock return, Shanghai stock exchange market return, Shenzhen stock exchange market return. From the table, we can see that during the period from September 2007 to June 2012, the average of banking industry sector stock return is -0.7%, it means in this period the whole banking industry’s performance is not quite good, this result is the same with Yong and Christos (2012). And the maximum is 25.2% and the minimum is -32.7%. It also shows that the performance of banking industry is poor. According to the table, the average of MRSH and MRSZ also negative, they are -1.5% and -1.1%. It can reflect the whole stock market in China, the returns from both two stock market is negative, the performance of the Chinese stock market still week. The maximum return always less than the minimum return in both two markets. And the result also show that the mean of the MRSH is negative, at the same time, the mean of MRSZ and the mean of R also negative; and the median of MRSH positive, at the
same time, the MRSZ and the R also positive, and the maximum or the minimum also get the same trend. The average of the inflation rate in this period shows negative result, it is about -0.07%, and the median is -0.095%, the maximum is 1.494% and the minimum is -2.574%, the result indicate that during this time, Chinese inflation rate is not high and stable. The average of the exchange rate in this period it is about 100.103 and the median is 100.120, the maximum is 109.400 and the minimum is 88.670. The average monthly growth rate of money supply (MS) is 1.520%, the maximum growth rate is 1.340% and the minimum growth rate is -1.010%, it means in some month, money supply is decease. From the result of interest rate, the average interest rate is 2.300%, and the maximum is 4.560% and the minimum is 0.830%, it shows that the unstable interest rate change during this period.
Table 2 Average monthly R, MRSH, MRSZ and INF for each year from 09/2007 to 06/2012

<table>
<thead>
<tr>
<th>year</th>
<th>R</th>
<th>MRSH</th>
<th>MRSZ</th>
<th>INF</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>-0.301</td>
<td>0.204</td>
<td>-0.241</td>
<td>0.001</td>
</tr>
<tr>
<td>2008</td>
<td>-6.627</td>
<td>-8.843</td>
<td>-8.367</td>
<td>-0.421</td>
</tr>
<tr>
<td>2009</td>
<td>6.319</td>
<td>4.897</td>
<td>6.232</td>
<td>0.062</td>
</tr>
<tr>
<td>2010</td>
<td>-2.269</td>
<td>-1.287</td>
<td>-0.792</td>
<td>0.219</td>
</tr>
<tr>
<td>2011</td>
<td>-0.547</td>
<td>-2.036</td>
<td>-2.785</td>
<td>-0.039</td>
</tr>
<tr>
<td>2012</td>
<td>-0.327</td>
<td>0.196</td>
<td>1.053</td>
<td>-0.305</td>
</tr>
</tbody>
</table>

Note: R, MRSH, MRSZ and INF stand for banking industry sector stock return, Shanghai stock exchange market return, Shenzhen stock exchange market return, inflation rate.

Table 2 is the average monthly data of R, MRSH, MRSZ and INF. The data show the trend of such factor with respect to the trend of stock returns. From 2007 to 2008, banking industry stock return decrease from -0.3% to -6.6%, and Shanghai exchange stock return also decrease from 0.2% to -8.8%, and Shenzhen exchange stock return decrease from -0.2% to -8.4%, at the same time, inflation rate also decrease from 0.001% to -0.421%. From 2008 to 2009, banking industry stock return from -6.6% increase to 6.3%, and Shanghai exchange stock return also increase from -8.8% to 4.9%, and Shenzhen exchange stock return increase from -8.4% to 6.2%, at the same period, inflation rate also increase from -0.4212% to 0.06188%. Just in 2010 to 2011, when banking industry stock return increase, but the other three factors was decrease. And from 2011 to 2012, when banking industry stock return and Shanghai exchange stock return and Shenzhen exchange stock return increase, but the inflation rate was decrease. We can see the Figure 1, the trend of R, MRSH and MRSZ are very similar, and the other hand, the inflation rate in this period very stable, the result is the same with Table 1.
Note: R, MRSH, MRSZ and INF stand for banking industry sector stock return, Shanghai stock exchange market return, Shenzhen stock exchange market return, inflation rate.

Figure 1 the trend of R, MRSH, MRSZ and inflation rate
Table 3 Average monthly R, MRSH, MRSZ and EX for each year from 09/2007 to 06/2012

<table>
<thead>
<tr>
<th>year</th>
<th>R</th>
<th>MRSH</th>
<th>MRSZ</th>
<th>EX</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>-0.301</td>
<td>0.204</td>
<td>-0.241</td>
<td>89.458</td>
</tr>
<tr>
<td>2008</td>
<td>-6.627</td>
<td>-8.843</td>
<td>-8.367</td>
<td>96.516</td>
</tr>
<tr>
<td>2009</td>
<td>6.319</td>
<td>4.897</td>
<td>6.232</td>
<td>100.717</td>
</tr>
<tr>
<td>2010</td>
<td>-2.269</td>
<td>-1.287</td>
<td>-0.792</td>
<td>99.999</td>
</tr>
<tr>
<td>2011</td>
<td>-0.547</td>
<td>-2.036</td>
<td>-2.785</td>
<td>102.515</td>
</tr>
<tr>
<td>2012</td>
<td>-0.327</td>
<td>0.196</td>
<td>1.053</td>
<td>108.530</td>
</tr>
</tbody>
</table>

Note: R, MRSH, MRSZ and EX stand for banking industry sector stock return, Shanghai stock exchange market return, Shenzhen stock exchange market return, exchange rate.

Table 3 is the average monthly data of R, MRSH, MRSZ and EX. The data show the trend of such factor with respect to the trend of stock returns. From 2007 to 2008, banking industry stock return decrease from -0.3% to -6.6%, and Shanghai exchange stock return also decrease from 0.2% to -8.8%, and Shenzhen exchange stock return decrease from -0.2% to -8.4%, at the same time, exchange rate increase from 89.5 to 96.5. From 2008 to 2009, banking industry stock return from -6.6% increase to 6.3%, and Shanghai exchange stock return also increase from -8.8% to 4.9%, and Shenzhen exchange stock return increase from -8.4% to 6.2%, at the same period, exchange rate also increase from 96.5 to 100.7. Just in 2010 to 2011, when banking industry stock return increase, but MRSH and MRSZ are decrease, and the exchange rate is decrease same with banking stock return. And from 2011 to 2012, when banking industry stock return and Shanghai exchange stock return and Shenzhen exchange stock return increase and the exchange rate also increase. We can see the Figure 2, the trend of R, MRSH and MRSZ very similar, and the other hand, the exchange rate in this period is the increase trend, we can see the Figure 2:
Note: R, MRSH, MRSZ and EX stand for banking industry sector stock return, Shanghai stock exchange market return, Shenzhen stock exchange market return, exchange rate.

Figure 2 the trend of R, MRSH, MRSZ and exchange rate
Table 4 Average monthly R, MRSH, MRSZ and MS for each year from 09/2007 to 06/2012

<table>
<thead>
<tr>
<th>year</th>
<th>R(%)</th>
<th>MRSH(%)</th>
<th>MRSZ(%)</th>
<th>MS(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>-0.301</td>
<td>0.204</td>
<td>-0.241</td>
<td>0.228</td>
</tr>
<tr>
<td>2008</td>
<td>-6.627</td>
<td>-8.843</td>
<td>-8.367</td>
<td>1.380</td>
</tr>
<tr>
<td>2009</td>
<td>6.319</td>
<td>4.897</td>
<td>6.232</td>
<td>2.118</td>
</tr>
<tr>
<td>2010</td>
<td>-2.269</td>
<td>-1.287</td>
<td>-0.792</td>
<td>1.458</td>
</tr>
<tr>
<td>2011</td>
<td>-0.547</td>
<td>-2.036</td>
<td>-2.785</td>
<td>1.350</td>
</tr>
<tr>
<td>2012</td>
<td>-0.327</td>
<td>0.196</td>
<td>1.053</td>
<td>1.395</td>
</tr>
</tbody>
</table>

Note: R, MRSH, MRSZ and MS stand for banking industry sector stock return, Shanghai stock exchange market return, Shenzhen stock exchange market return, money supply.

According to table 4, from 2007 to 2008, the average of the growth rate of MS is increase, at the same time, the average of three of stock return is decrease. But in 2008 to 2009, the average of the growth rate of MS is increase, and the stock returns also increase. From 2009 to 2010, the average of the growth rate of MS is decrease, the stock returns also decrease. From 2010 to 2011, the average of the growth rate of MS is decrease a little bit, and the both MRSH and MRSZ also decrease, but banking stock return increase. And from 2011 to 2012, the average of the growth rate of MS is increase, the stock return also increase. We can see the Figure 3, the trend of MS and the stock returns almost the same.
Note: R, MRSH, MRSZ and MS stand for banking industry sector stock return, Shanghai stock exchange market return, Shenzhen stock exchange market return, money supply.

**Figure 3** the trend of R, MRSH, MRSZ and money supply
Table 5 Average monthly R, MRSH, MRSZ and INT for each year
from 09/2007 to 06/2012

<table>
<thead>
<tr>
<th>year</th>
<th>R</th>
<th>MRSH</th>
<th>MRSZ</th>
<th>INT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>-0.30126</td>
<td>0.203906</td>
<td>-0.24104</td>
<td>2.69</td>
</tr>
<tr>
<td>2008</td>
<td>-6.62685</td>
<td>-8.84288</td>
<td>-8.36691</td>
<td>2.528333</td>
</tr>
<tr>
<td>2009</td>
<td>6.318984</td>
<td>4.897414</td>
<td>6.23186</td>
<td>1.068333</td>
</tr>
<tr>
<td>2010</td>
<td>-2.2692</td>
<td>-1.28725</td>
<td>-0.79155</td>
<td>1.745833</td>
</tr>
<tr>
<td>2011</td>
<td>-0.54684</td>
<td>-2.03589</td>
<td>-2.78536</td>
<td>3.338333</td>
</tr>
<tr>
<td>2012</td>
<td>-0.32696</td>
<td>0.195941</td>
<td>1.052697</td>
<td>3.081667</td>
</tr>
</tbody>
</table>

Note: R, MRSH, MRSZ and INT stand for banking industry sector stock return, Shanghai stock exchange market return, Shenzhen stock exchange market return, interest rate.

Table 5 is the average of the monthly data of R, MRSH, MRSZ and INT. The data shows the potential relationship between these four factors. From 2007 to 2008, the average interest rate is decrease, stock returns also show the decrease trend. But from 2008 to 2009, when INT shows the decrease trend, the R, MRSH and MRSZ show the increase trend. When INT shows the increase trend, the R, MRSH and MRSZ show the decrease trend which according to the result from 2009 to 2010, 2010 to 2011 and 2011 to 2012, it always show the opposite trend with stock returns which includes R, MRSH and MRSZ. Like the Figure 4:
Note: R, MRSH, MRSZ and INT stand for banking industry sector stock return, Shanghai stock exchange market return, Shenzhen stock exchange market return, interest rate.

**Figure 4** the trend of R, MRSH, MRSZ and interest rate
4.2 Empirical Results

4.2.1 Correlation Analysis

It is often necessary to examine the relationship between two or more financial variables. There are many ways to examine how sets of data are related. So this study uses the correlation analysis to test the relationship between the variables in each model.

The correlation coefficient is a measure of how two data series are closely related. In particular, the correlation coefficient measures the direction and extent of linear association between two variables. A correlation coefficient can have a maximum value of 1 and a minimum value of -1. The correlation cannot exceed 1 in absolute value. A correlation coefficient greater than 0 indicates a positive linear association between the two variables: When one variable increases (decreases), the other also tends to increase (decrease). A correlation coefficient less than 0 indicate a negative linear association between the two variables: When one variable increases (decreases), the other also tends to decrease (increase). A correlation coefficient of 0 indicates no linear relation between the two variables. The closer the coefficient is to either -1 or 1, the stronger the correlation between the two variables (Emrah, 2009).

Table 6 is a correlation matrix of selected macroeconomic factors and the banking industry stock return (R). From the table, we can see that INF and EX has negative relationship, and the coefficient is -0.274795, it means that there is weak correlation between them. And INF and MS have a negative relationship, and the coefficient is -0.042590, also is a weak correlation between them. And INF and INT also have a negative relationship, and the coefficient is -0.088381, also is a weak correlation. And EX and MS has a positive relationship, and the coefficient is 0.218778, also is a weak correlation. And EX and INT also has a positive relationship, and the coefficient is 0.084616, also is a weak correlation. And MS and INT have a negative relationship, and the coefficient is -0.308027, also is a weak correlation. The result shows that these four factors can be together in the same model.
### Table 6: The correlation between INF, EX, MS, INT in the model (1)

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>INF</th>
<th>EX</th>
<th>MS</th>
<th>INT</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>1.000000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INF</td>
<td>0.036732</td>
<td>1.000000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EX</td>
<td>0.181177</td>
<td>-0.274795</td>
<td>1.000000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>0.154864</td>
<td>-0.042590</td>
<td>0.218778</td>
<td>1.000000</td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td>-0.201709</td>
<td>-0.088381</td>
<td>0.084616</td>
<td>-0.308027</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

Note: R is banking industry stock return, INF is inflation rate, EX is exchange rate, MS is money supply, and INT is interest rate.
Table 7 is a correlation matrix of selected macroeconomic factors and the Shanghai exchange stock return (MRSH). From the table, we can see the same result with table 6. From the table, we can see that INF and EX has negative relationship, and the coefficient is -0.274795, it means that there is weak correlation between them. And INF and MS have a negative relationship, and the coefficient is -0.042590, also is a weak correlation between them. And INF and INT also have a negative relationship, and the coefficient is -0.088381, also is a weak correlation. And EX and MS has a positive relationship, and the coefficient is 0.218778, also is a weak correlation. And EX and INT also has a positive relationship, and the coefficient is 0.084616, also is a weak correlation. And MS and INT have a negative relationship, and the coefficient is -0.308027, also is a weak correlation. The result shows that these four factors can be together in the same model.

Table 7

<table>
<thead>
<tr>
<th></th>
<th>MRSH</th>
<th>INF</th>
<th>EX</th>
<th>MS</th>
<th>INT</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRSH</td>
<td>1.000000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INF</td>
<td>0.062185</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EX</td>
<td>0.183810</td>
<td>-0.27</td>
<td>1.000000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>0.115516</td>
<td>-0.04</td>
<td>0.218778</td>
<td>1.000000</td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td>-0.196444</td>
<td>-0.08</td>
<td>0.084616</td>
<td>-0.308027</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

Note: MRSH is Shanghai exchange stock return. INF is inflation rate, EX is exchange rate, MS is money supply, and INT is interest rate.
Table 8 is a correlation matrix of selected macroeconomic factors and the Shenzhen exchange stock return (MRSZ). From the table, we can see the same result that like table 7, from the table, we can see that INF and EX has negative relationship, and the coefficient is -0.274795, it means that there is weak correlation between them. And INF and MS have a negative relationship, and the coefficient is -0.042590, also is a weak correlation between them. And INF and INT also have a negative relationship, and the coefficient is -0.088381, also is a weak correlation. And EX and MS has a positive relationship, and the coefficient is 0.218778, also is a weak correlation. And EX and INT also has a positive relationship, and the coefficient is 0.084616, also is a weak correlation. And MS and INT have a negative relationship, and the coefficient is -0.308027, also is a weak correlation. The result shows that these four factors can be together in the same model.

Table 8: the correlation between INF, EX, MS, INF in the model (3)

<table>
<thead>
<tr>
<th></th>
<th>MRSZ</th>
<th>INF</th>
<th>EX</th>
<th>MS</th>
<th>INT</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRSZ</td>
<td>1.000</td>
<td>0.055263</td>
<td>-0.274795</td>
<td>0.091355</td>
<td>-0.230250</td>
</tr>
<tr>
<td>INF</td>
<td>1.000</td>
<td>1.000000</td>
<td>1.000000</td>
<td>0.084616</td>
<td>-0.308027</td>
</tr>
<tr>
<td>EX</td>
<td>0.193</td>
<td>-0.274795</td>
<td>1.000000</td>
<td>0.218778</td>
<td>1.000000</td>
</tr>
<tr>
<td>MS</td>
<td>-0.230</td>
<td>-0.088381</td>
<td>0.084616</td>
<td>-0.308027</td>
<td>1.000000</td>
</tr>
<tr>
<td>INT</td>
<td>-0.230</td>
<td>-0.088381</td>
<td>0.084616</td>
<td>-0.308027</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

Note: MRSZ is the Shenzhen exchange stock return. INF is inflation rate, EX is exchange rate, MS is money supply, and INT is interest rate.
Table 9 is a correlation matrix of selected macroeconomic factors, the Shanghai exchange stock return (MRSH), Shenzhen exchange stock return (MRSZ). From the table, we can see that MRSH and MRSZ have a positive relationship, and the coefficient is 0.967839, it means that there is a strong correlation between them. It means that these two factors can’t in the same model when use the regression. And MRSH with INF, EX, MS, there is a positive and weak correlation between them. But MRSH and INT is a negative and weak correlation. And MRSZ with INF, EX, MS, there is a positive and weak correlation between them. But MRSH and INT is a negative and weak correlation.

<table>
<thead>
<tr>
<th></th>
<th>MRSH</th>
<th>MRSZ</th>
<th>INF</th>
<th>EX</th>
<th>MS</th>
<th>INT</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRSH</td>
<td>1.000000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MRSZ</td>
<td>0.967839</td>
<td>1.000000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INF</td>
<td>0.062185</td>
<td>0.055263</td>
<td>1.000000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EX</td>
<td>0.183810</td>
<td>0.193566</td>
<td>-0.274795</td>
<td>1.000000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>0.115516</td>
<td>0.091355</td>
<td>-0.042590</td>
<td>0.218778</td>
<td>1.000000</td>
<td></td>
</tr>
<tr>
<td>INT</td>
<td>-0.196444</td>
<td>-0.230250</td>
<td>-0.088381</td>
<td>0.084616</td>
<td>-0.308027</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

Note: MRSH is Shanghai exchange stock return; MRSZ is the Shenzhen exchange stock return. INF is inflation rate, EX is exchange rate, MS is money supply, and INT is interest rate.
4.2.2 Regression Analysis

In this study, we employ the GLS method to determine the impact of the macroeconomic variables on the banking industry stock return, Shanghai exchange stock return and Shenzhen exchange stock return.

4.2.2.1 Impact of Macroeconomic Variables on Banking Industry Stock Returns

The result of the GLS estimation about the impact of macroeconomic factor on R is presented in Table 10. The R is banking industry stock return which is a dependent variable. According to the result, the inflation rate has a positive and insignificant association with banking industry stock return. As reported in Table 10 below, the coefficient estimate of $a_1$ is 0.995560, indicating that an increase in the inflation rate by 1 unit will cause banking industry stock to respond by an increase of 0.99556 units. If a decrease in the inflation rate by 1 unit will cause banking industry stock to respond by a decrease of 0.99556 unit, but there is not significantly affects to the stock return which according to the result, the P-value is 0.5979. This result is supported by earlier study such as Tan and Floros (2012). For the exchange rate, the regression result indicate that exchange rate has a positive and significant association with banking industry stock return, the coefficient estimate of $a_2$ is 0.402124, it means when EX change 1 unit, the return will change positive 0.402124 unit, and exchange rate is significantly affects the banking stock return at 10% significant level depend on the result that P-value is 0.0907. This result is supported by the study of Choi, Elyasiani and Kopecky (1992). Banking industry stock return has a positive relationship with money supply(MS), from the table, we can see that when MS change 1 unit, the return will change positive 0.843772 unit, but is not significantly affects the stock return because of the P-value is 0.4978. The result is same with Zatul and Mohamed (2007). Here, banking industry stock return has a negative relationship with interest rate (INT), the result shows that interest rate change 1 unit, the banking industry stock return will change negative 2.187996 unit, it means an increase in the interest rate by 1 unit will cause banking industry stock to respond by an increase of 2.187996 unit. If a decrease in the interest rate by 1 unit will cause banking industry
stock to respond by a decrease of 2.187996 units. And there is a significant affect to the return at the 10% significant level which according to the P-value is 0.085. The result also supported by the earlier studies, such as Mohammad and Orouba (2006), Elyasiani and Mansur (2004), Saadet, Gülin and Gökçe (2011).

Table 10 the results of the GLS estimation about the impact of macroeconomic factor on the banking industry stock return (R)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-37.17145</td>
<td>0.1067</td>
</tr>
<tr>
<td>INF</td>
<td>0.99556</td>
<td>0.5979</td>
</tr>
<tr>
<td>EX</td>
<td>0.402124*</td>
<td>0.0907</td>
</tr>
<tr>
<td>MS</td>
<td>0.843772</td>
<td>0.4978</td>
</tr>
<tr>
<td>INT</td>
<td>-2.187996*</td>
<td>0.085</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.142875</td>
<td></td>
</tr>
</tbody>
</table>

Note: C, INF, EX, MS, INT stand for the intercept term, inflation rate, exchange rate, money supply and interest rate. ***, ** and * indicates significant at 1%, 5% and 10% significant level.

4.2.2.2 Impact of Macroeconomic Variables on Shanghai exchange Stock Returns

The results of the GLS estimation about the impact of macroeconomic factor on the MRSH are presented in Table 11. The MRSH is Shanghai exchange stock return which is a dependent variable. According to the result, the inflation rate has a positive and insignificant association with Shanghai exchange stock return. As reported in Table 11 below, the coefficient estimate of b₁ is 1.872063, indicating that an increase in the inflation rate by 1 unit will cause Shanghai exchange stock return to respond by an increase of 1.872063 units. If a decrease in the inflation rate by 1 unit will cause Shanghai exchange stock return to respond by a decrease of 1.872063 unit, but there is not significantly affects to the stock return which according to the result, the P-value is 0.2627. For the exchange rate, the regression result indicate that exchange rate has a positive and significant association with Shanghai exchange stock
return, the coefficient estimate of $b_2$ is 0.488349, it means when EX change 1 unit, the return will change positive 0.488349 unit, and exchange rate is significantly affects the Shanghai exchange stock return at 10% significant level depend on the result that P-value is 0.0197. This result is supported by the study of Menike (2006). Shanghai exchange stock return has a positive relationship with money supply (MS), it means when MS change 1 unit, the return will change positive 0.580649 unit, but is not significantly affects the stock return because of the P-value is 0.6039. Here, Shanghai exchange stock return has a negative relationship with interest rate (INT), the result shows that interest rate change 1 unit, Shanghai exchange stock return will change negative 2.321836 units; it means an increase in the interest rate by 1 unit will cause Shanghai exchange stock return to respond by an increase of 2.321836 units. If a decrease in the interest rate by 1 unit will cause banking industry stock to respond by a decrease of 2.321836 units. And there is a significant affect to the return at the 10% significant level too which the P-value is 0.0367. The result also supported by the earlier studies, such as Zhu and Li (2007).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>P-value.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-45.94752</td>
<td>0.0233</td>
</tr>
<tr>
<td>INF</td>
<td>1.872063</td>
<td>0.2627</td>
</tr>
<tr>
<td>EX</td>
<td>0.488349**</td>
<td>0.0197</td>
</tr>
<tr>
<td>MS</td>
<td>0.580649</td>
<td>0.6039</td>
</tr>
<tr>
<td>INT</td>
<td>-2.321836**</td>
<td>0.0367</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.196678</td>
<td></td>
</tr>
</tbody>
</table>

Note: C, INF, EX, MS, INT stand for the intercept term, inflation rate, exchange rate, money supply and interest rate. ***, ** and * indicates significant at 1%, 5% and 10% significant level.
4.2.2.3 Impact of Macroeconomic Variables on Shenzhen exchange Stock Returns

The results of the GLS estimation about the impact of macroeconomic factor on the MRSZ are presented in Table 12. The MRSZ is Shenzhen exchange stock return which is a dependent variable. According to the result, the inflation rate has a positive and insignificant association with Shenzhen exchange stock return. As reported in Table 12 below, the coefficient estimate of $c_1$ is 2.143166, indicating that an increase in the inflation rate by 1 unit will cause Shenzhen exchange stock return to respond by an increase of 2.143166 units. If a decrease in the inflation rate by 1 unit will cause Shenzhen exchange stock return to respond by a decrease of 2.143166 unit, but there is not significantly affects to the stock return which according to the result, the P-value is 0.2464. For the exchange rate, the regression result indicate that exchange rate has a positive and significant association with Shenzhen exchange stock return, the coefficient estimate of $c_2$ is 0.585144, it means when EX change 1 unit, the return will change positive 0.585144 unit, and exchange rate is significantly affects the Shenzhen exchange stock return at 5% significant level depend on the result that P-value is 0.0132. Shenzhen exchange stock return has a positive relationship with money supply (MS), it means when MS change 1 unit, the return will change positive 0.088497 unit, but is not significantly affects the stock return because of the P-value is 0.9425. Here, Shenzhen exchange stock return has a negative relationship with interest rate (INT), the result shows that interest rate change 1 unit, the banking industry stock return will change negative 3.077102 units, it means an increase in the interest rate by 1 unit will cause Shenzhen exchange stock return to respond by a decrease of 3.077102 unit. If a decrease in the interest rate by 1 unit will cause Shenzhen exchange stock return to respond by an increase of 3.077102 unit. And there is a significant affect to the return at the 5% significant level too because of the P-value is 0.0142.
Table 12 the results of the GLS estimation about the impact of macroeconomic factor on the MRSZ

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-52.77215</td>
<td>0.0206</td>
</tr>
<tr>
<td>INF</td>
<td>2.143166</td>
<td>0.2464</td>
</tr>
<tr>
<td>EX</td>
<td>0.585144**</td>
<td>0.0132</td>
</tr>
<tr>
<td>MS</td>
<td>0.088497</td>
<td>0.9425</td>
</tr>
<tr>
<td>INT</td>
<td>-3.077102**</td>
<td>0.0142</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.194741</td>
<td></td>
</tr>
</tbody>
</table>

Note: C, INF, EX, MS, INT stand for the intercept term, inflation rate, exchange rate, money supply and interest rate. ***, ** and * indicates significant at 1%, 5% and 10% significant level.

4.2.2.4 Impact of Macroeconomic Variables with Control Factor MRSH on Banking Industry Stock Return

The results of the GLS estimation about the impact of macroeconomic factor and with control factor MRSH on the R are presented in Table 13. The R is banking industry stock return which is a dependent variable. According to the result, the inflation rate has a negative and insignificant association with banking industry stock return. As reported in Table 13 below, the coefficient estimate of d_1 is -0.915199, indicating that an increase in the inflation rate by 1 unit will cause banking industry stock to respond by a decrease of 0.915199 unit. If a decrease in the inflation rate by 1 unit will cause banking industry stock to respond by an increase of 0.915199 unit, but there is not significantly affects to the stock return which according to the result, the P-value is 0.3768. For the exchange rate, the regression result indicate that exchange rate has a negative and insignificant association with banking industry stock return, the coefficient estimate of d_2 is -0.055194, it means when EX change 1 unit, the return will change negative 0.055194 unit, and exchange rate is insignificantly affects the banking stock depend on the result that P-value is 0.6520. This result is supported by
the studies. Banking industry stock return has a positive relationship with money supply(MS), it means when MS change 1 unit, the return will change positive 0.281899 unit, but is not significantly affects the stock return because of the P-value is 0.6883. Here, banking industry stock return has a negative relationship with interest rate (INT), the coefficient estimate of \( d_4 \) is -0.060773, the result shows that interest rate change 1 unit, the banking industry stock return will change negative 0.060773 unit, it means an increase in the interest rate by 1 unit will cause banking industry stock to respond by a decrease of 0.060773 unit. If a decrease in the interest rate by 1 unit will cause banking industry stock to respond by an increase of 0.060773 units. And there is an insignificant affect to the return because of the P-value is 0.9261. For the Shanghai exchange stock return, the result shows a positive and very significantly on the banking stock return, the coefficient estimate of \( d_5 \) is 0.938366, it means an increase in the MRSH by 1 unit will cause banking industry stock to respond by a decrease of 0.938366 unit. If a decrease in the MRSH by 1 unit will cause banking industry stock to respond by an increase of 0.938366 unit. And there is a very significant positive effect on the return which at the 1% significant level because of the P-value is 0. From the result, we can see that, when put the control variable like MRSH into the model, all the macroeconomic variables have insignificant to the banking industry stock return, and the change of banking industry stock return completely depend on the MRSH.
Table 13 The results of the GLS estimation about the impact of both macroeconomic factor and MRSH on the banking industry stock return (R)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>5.97074</td>
<td>0.6143</td>
</tr>
<tr>
<td>MRSH</td>
<td>0.938366***</td>
<td>0.0000</td>
</tr>
<tr>
<td>INF</td>
<td>-0.915199</td>
<td>0.3768</td>
</tr>
<tr>
<td>EX</td>
<td>-0.055194</td>
<td>0.6520</td>
</tr>
<tr>
<td>MS</td>
<td>0.281899</td>
<td>0.6883</td>
</tr>
<tr>
<td>INT</td>
<td>-0.060773</td>
<td>0.9261</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.730689</td>
<td></td>
</tr>
</tbody>
</table>

Note: C, MRSH, INF, EX, MS, INT stand for the intercept term, Shanghai exchange stock return, inflation rate, exchange rate, money supply and interest rate. ***, ** and * indicate 1%, 5% and 10% significant levels, respectively.

4.2.2.5 Impact of Macroeconomic Variables with Control Factor MRSZ on Banking Industry Stock Return

The results of the GLS estimation about the impact of macroeconomic factor and with control factor MRSZ on the R are presented in Table 14. The R is banking industry stock return which is a dependent variable. According to the result, the inflation rate has a negative and insignificant association with banking industry stock return. As reported in Table 14 below, the coefficient estimate of $d_1$ is -0.944351, indicating that an increase in the inflation rate by 1 unit will cause banking industry stock to respond by a decrease of 0.944351 unit. If a decrease in the inflation rate by 1 unit will cause banking industry stock to respond by an increase of 0.944351 unit, but there is not significantly affects to the stock return which according to the result, the P-value is 0.4226. For the exchange rate, the regression result indicate that exchange rate has a negative and insignificant association with banking industry stock return, the coefficient estimate of $f_2$ is -0.072285, it means when EX change 1 unit, the return will change negative 0.072285 unit, and exchange rate is insignificantly affects the
banking stock depend on the result that p-value is 0.6093. This result is supported by the studies. Banking industry stock return has a positive relationship with money supply (MS), it means when MS change 1 unit, the return will change positive 0.725314 unit, but is not significantly affects the stock return because of the P-value is 0.3522. Here, banking industry stock return has a negative relationship with interest rate (INT), the coefficient estimate of β is 0.262814, the result shows that interest rate change 1 unit, the banking industry stock return will change positive 0.262814 unit, it means an increase in the interest rate by 1 unit will cause banking industry stock to respond by an increase of 0.262814 unit. If a decrease in the interest rate by 1 unit will cause banking industry stock to respond by a decrease of 0.262814 unit. And there is an insignificant affect to the return because of the P-value is 0.7301. For the Shenzhen exchange stock return, the result shows a positive and very significantly on the banking stock return, the coefficient estimate of β is 0.811057, it means an increase in the MRSZ by 1 unit will cause banking industry stock to respond by an increase of 0.811057 units. If a decrease in the MRSZ by 1 unit will cause banking industry stock to respond by a decrease of 0.811057 units. And there is a very significant affect to the return which at the 1% significant level because of the p-value is 0. From the result, we can see that, when put the control variable like MRSZ into the model, all the macroeconomic variables have insignificant expect on the banking industry stock return, and the change of banking industry stock return completely depends on the MRSZ.
Table 14 The results of the GLS estimation about the impact of both macroeconomic factor and MRSZ on the banking industry stock return (R)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>5.759303</td>
<td>0.6721</td>
</tr>
<tr>
<td>MRSZ</td>
<td>0.811057***</td>
<td>0.0000</td>
</tr>
<tr>
<td>INF</td>
<td>-0.944351</td>
<td>0.4226</td>
</tr>
<tr>
<td>EX</td>
<td>-0.072285</td>
<td>0.6093</td>
</tr>
<tr>
<td>MS</td>
<td>0.725314</td>
<td>0.3522</td>
</tr>
<tr>
<td>INT</td>
<td>0.262814</td>
<td>0.7301</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.675974</td>
<td></td>
</tr>
</tbody>
</table>

Note: C, MRSZ, INF, EX, MS, INT stand for the intercept term, Shenzhen exchange stock return, inflation rate, exchange rate, money supply and interest rate. ***, ** and * indicate 1%, 5% and 10% significant levels, respectively.
CHAPTER 5

SUMMARY DISCUSSION AND CONCLUSION

5.0 Introduction

This chapter includes 4 parts, part one is summary, the study will summary the result that how does the impact of macroeconomic factors on banking industry stock return. Part two is limitation of this study, part three is recommendation and future research and part four is conclusion for all of this paper.

5.1 Summary

This study undertakes a research to seek the impact of the macroeconomic variables namely inflation (INF), exchange rate (EX), interest rate (INT) and money supply (M2) on Chinese banking industry stock return. The data is collected over the period of Sep. 2007 to Jun. 2012 and Generalized Least Square (GLS) method is applied to examine whether the banking industry stock return is sensitive to the macroeconomic variables changes.

At the beginning of the estimation, descriptive analyses have been done to all dependent and independent variables. From the result, we can see that these four macroeconomic factors have a relationship with banking industry stock return. Such as the inflation rate has a positive but insignificant impact on the banking industry stock return, because when the inflation rate increase, the price of the stock also increases. For the investors, while inflation affects the prices, stock price will increase, causing an increase in the amount of dividends, then the shareholders will get more return. According to the Fisher hypothesis, stocks which represent a claim against real assets of the company, may serve as a hedge against inflation. When the expected
inflation is pronounced, investors would sell financial assets in exchange for real
assets. If that occurs, the prices of stocks in nominal terms should reflect fully the
expected inflation and hence the relationship between the two variables should be
positive.

Based on the result, it is concluded that exchange rate is the most significant
variable in explaining the fluctuation of Chinese banking industry stock return though
it gives positive effect on the stock return. This shows that depreciation of home
currency (RMB) against the US Dollar will cause banking industry stock return to
drop. Appreciation of home currency (RMB) against the US Dollar will cause
banking industry stock return to goes up. Because if the home currency appreciates, it
will cause hot money flow into the stock money, the investors will wait a good chance
to get more returns from the market. For money supply (M2), there is a positive and
insignificant impact on the banking industry stock return. And the interest rate has a
negative and significant impact on the banking industry stock return, due to the
increase the interest, people will saving money more than do the investment. It is
found that the changes of market return are statistically significant and positively
affecting the banking industry stock returns in overall.

Regarding the Shanghai stock market return and Shenzhen stock market return
as control variables, there is a very strong significant impact of both these two stock
market returns on the banking industry stock return. It indicates that in Chinese stock
market, banking sector return is depended on the market returns. If market return
increase, the banking stock return also increase, if market return decrease, the banking
stock return also decrease, it has a positive relationship between them.

5.2 Limitations of Study

After carry out empirical test for our study, we noticed that there are some
limitations that prevent us for further improvement.

First of all, it would be the matter of data set. The data set that we used to
study on the research is on monthly basis. This was proposed by most of the previous
researchers whom did on the same study as us. Nevertheless, after testing on all the variables, we would observe that data which extracted on monthly basis was not enough to generate the accurate and reliable result. Therefore, this inaccurate monthly data set would cause the result to be inefficient. And the range of the data is from 2007 to 2012, this range is quite small to show the long term impact of these variables to the banking stock return.

This study, selects 4 macroeconomic factors to test the impact of macroeconomic factors to banking industry stock return. But there are a lot of other macroeconomic factors can be use, like GDP, IP and so on. And also can choose other plates in stock market to do the test.

While, another limitation is matter with the econometric model that employed in the test namely Generalized Least Square (GLS) model. When get the empirical result, may be it will have some problem open. And the model is simplification, if by employing other advance model, for example Generalized Auto Regressive Conditional Heteroscedasticity (GARCH) model, the result would be act in different way.

Though what recommended by most of previous researchers were same as what we are used in our study. There may be still a problem that the macroeconomic indicators used in this study may not be sufficient to generate for better result.

5.3 Recommendations and Future Research

In order to make a more precise and exact research, it is a need to improve and overcome those constraints. Since there are three major limitations stated on the above sections, hence, we would suggest the solutions for each of them.

To overcome the data constraint, we may be get a try on using the data series extracted on daily basis. As some of the researchers found that, the result has shown more exact by using daily data on carry out the relevant empirical studies.

For the factors constraint, future research may be done by adding more macroeconomic variables, such as Gross Domestic Productions (GDP) or Foreign
Direct Investment (FDI), in order to test on the impact of each of them of banking stock return. The additional variables that expected to use should be more relevant to the study and be supported by related supporting materials.

To improving the empirical result, it is better to apply Generalized Auto Regressive Conditional Heteroscedasticity (GARCH) model rather than Generalized Least Square (GLS), as this economic model is more advance in addressing and solving for econometric problems, such as heteroscedasticity. Previous research (Bollerslev, 1986, 1990; Muneer et. al, 2011) were found that the Generalized Auto Regressive Conditional Heteroscedasticity (GARCH) model is sustainable in capturing assets returns and volatility by allowing the means of assets return to be depends on their time-varying variance together with other contributory factors.

Other than these, future researchers may try to extend the study on other industry sectors in the Chinese stock market.

5.4 Conclusions

As a conclusion, this study could be more extended by employing more information from different aspects. As now Chinese is in building up a strong and convinced enough economy rapidly, especially in banking and financially sectors, thus research on these banks’ stock returns need to be carry on in deeper way in order to provide more improvement spaces to this sector.

Like what suggested by Muneeret. al (2011), this would be an indications for future researchers and academicians to examine more on the inference of economic growth in stock market development, particularly the inter-relationship between economic indicator and stock market performance should be taken into investigations to plan on an improved economic policy as well as to undergo the economic growth in China. The result of the study could be a useful mechanism in understanding the characteristic and roles of economic indicators and stock returns variations in forming the soundness economy in China.
REFERENCES


