The Spillover Effects of U.S. Monetary Policy on the Chinese Stock Market

Abstract: I study a vector autoregression model to estimate the effects of U.S. Quantitative Easing Monetary Policy on the Chinese stock market. I find that the increase of U.S. money supply would result in a significant increase in the Chinese stock market return but the influence is insignificant in the long run. Then I examine three potential mechanisms through which U.S. monetary policy transmits to China: short-term capital flow, monetary policy dependence and stock co-movement. Finally, using the variance decomposition method, I find that the monetary policy dependence mechanism turns to be the most important one among all the three mechanisms and the short-term capital flow mechanism plays the least important role.

Key words: international policy spillover, U.S. monetary policy, Chinese stock market

JEL number: C3; E4; E5; F3

1. Introduction

Since the outbreak of the Financial Crisis in 2008, the Federal Reserve adopted the Quantitative Easing Monetary Policy (QE henceforth) to let the federal funds rate hit the zero lower bound for long periods. In the meantime, the Federal Reserve increased the money supply by purchasing long-and-mid-term securities to stimulate the investment and consumption. Since 2008, US has carried out QE four times.

[Insert Table 1 about here]

Under the background of global financial integration, researchers have been interested in the impact of this unconventional U.S. monetary policy on emerging markets. With the rapid development of economy, China has become an important investment market of international capital and Chinese capital market opens to the outside world gradually. Therefore, the global liquidity caused by the U.S. QE policy may influence China's economy and capital market. However, there has been much debate on whether U.S. policy can influence the Chinese market, since the Chinese capital account is not fully open and Chinese exchange rates are not fully flexible.

Because the stock market is regarded as the barometer of a country's economy, by observing the stock market, we can estimate the money flow and liquidity situation. Therefore, the QE's influence on the economy can be reflected by the stock. According to the financial accelerator theory, the financial market can magnify the change of macro economy. Hence, studying the spillover effects of QE policy on the Chinese stock markets is an important tool to analyze QE's influences on China.

I investigate this question in this paper. I first examine the existence and magnitude of the spillover effect of U.S. QE policy on the Chinese stock market. By constructing the vector autoregression (VAR) model between U.S. M2 and Shanghai Composite Index, I find that U.S. QE policy has a significantly positive effect on the Chinese stock market in the short run, but in the long run, the Chinese stock market is mainly influenced by domestic factors. I next explore three potential mechanisms for how U.S. QE policy influences the Chinese stock market: monetary policy dependence, short-term international capital flow and stock co-movement. The results suggest that monetary policy dependence and stock co-movement play important.

This paper is primarily related two stands of the literature.

The first strand of the literature investigates the relation between the monetary policy and the stock market. The monetary policy is an important tool to adjust the macroeconomic operation and realize the economic goals. Since the stock market is a reflection of macroeconomic, the association between monetary policy and stock market reflects the influences that the monetary policy has on the macroeconomy. Theories focus on two aspects, whether the monetary policy will influence the economy and through what mechanisms. Most empirical study suggests that the monetary policy can influence the domestic stock market. Keran (1971) examines the relationship between the monetary supply and S&P 500 index from the first quarter in 1956 to the second quarter in 1970. Homa and Jaffee(1971) examine the quarterly data from 1954 to 1969. They all find that a positive relation between the money supply and S&P 500 index. To solve the endogeneity problem, some scholars put forward the VAR model to study the causal relationship between the monetary policy and the stock market. Thorbecke (1997) examines the relationship between the monetary policy and the stock price. By constructing the VAR model, this paper concludes that the constrictive money supply has negative influence on the small firm's stock price.

The second strand of the literature investigates the international spillover effects of monetary policy. In the open economy, the monetary policy can not only influence the domestic economy, but also influence other country. Most researches on the spillover effect of monetary policy are derived from the MFD model (Mundell, 1963; Feming, 1962; Dornbusch, 1976) and the NOEM model (Obstfeld and Rogoff, 1995). Existing studies investigate the spillover effect of one country's monetary policy on other countries' output, monetary policy, inflation and capital market. Using the structural VAR approach, Maćkowiak (2007) study the effects of an external shock on eight emerging economies (Hong Kong, Korea,Malaysia, the Philippines, Singapore, Thailand, Chile, and Mexico) and find that U.S. monetary policy affects the real output and price levels in emerging economies. Dedola, Karadi, and Lombardo (2013) study the international implications of unconventional monetary policy. They find that a lack of cooperation between countries will induce suboptimal credit policies. Ho, Zhang and Zhou (2018) develop a factor-augmented VAR model and find that the decline in the U.S. policy rate results in a significant increase in Chinese housing investment. However, the spillover effect of the monetary policy on other countries' stock markets is debatable. Hermann and Fratzscher (2006) find that U.S. US monetary policy has positive spillover effects on fifty countries including twelve Asia-Pacific nations. The results shows that if the federal fund rate increased 1%, the rate of return of global stock market will drop 3.8%. Mann, Atra and Dowen (2004) use the monthly data to study the effect of U.S. monetary policy to six international stock indexes, and the results showed that the U.S. monetary policy has no effect on the return of international stock.

The rest of the paper is organized as follows. Section 2 presents the model and data I use. Section 3 contains the main results and analysis. Section 4 illustrates the potential mechanisms through which U.S. monetary policy affects the Chinese stock market. Section 5 concludes.

2. VAR Model and Data

2.1 VAR Specification

The VAR model is commonly used to analyze the impact of random shocks on the system of variables. It models each endogenous variable as a function of the lagged values of all endogenous variables.

My basic VAR system includes five variables, four of which are U.S. variables and one of which is Chinese variables. I use M2 as the variable representing U.S. QE policy. Most papers choose federal fund rate to represent US monetary policy. However, during the rounds of QE, the Federal Reserve purchased kinds of bonds to pump in liquidity. Therefore, the biggest change in the Fed balanced sheet is money supply. Since the money supply can represent the QE policy better, this paper chooses M2 as the variable for US QE policy. I include U.S. Industrial Production (U.S. IP), U.S. Consumer Price Index (U.S. CPI) and U.S. Producer Price Index (U.S. PPI) to tease out components of the U.S. monetary policy attributed to domestic economic conditions in the United States. I use Shanghai Composite Index to represent the Chinese stock market. Shanghai Composite Index contains all listed firms in Shanghai Stock Exchange, so it is more comprehensive than other stock index.

I order the variables in the VAR system from the most exogenous to the least exogenous, thus the ordering of variables is U.S. PPI, U.S. IP, U.S. CPI, U.S. M2 and Shanghai Composite Index.

To examine the potential mechanisms, I choose China's short-term capital inflows to represent short-term capital flow channel, China's M2 and the one-year deposit and lending rates to represent monetary policy channel, and S&P 500 to represent stock co-movement channel.

2.2 Data

The Fed carried out the first round of QE policy at the end of 2008 and declared to withdraw from the QE policy in August, 2013. Therefore, the sample period runs from January, 2008 to April, 2014. Besides, this paper used logarithmic transformation to cope with China and U.S. M2, Shanghai Composite Index and S&P 500. Sources of the data include Wind Database, official website of the people's bank of China and official website of Fed.

3. Main Results

3.1 Unit Root Test

Before constructing the VAR model, I use ADF unit root test to test whether the data in the time series is stationary. Table 2 represents the results of ADF unit root.

[Insert Table 2 about here]

Next, I test the stationarity of the basic VAR system, {U.S. PPI, U.S. IP, U.S. CPI, U.S. M2, SH Index}. Figure 1 shows that every characteristic root is in the unit circle, so the VAR system is stationary.

[Insert Figure 1 about here]

By weighing four kinds of information principles, I set the lagged differences as two. Table 3 summarizes the results in different information principles.

[Insert Table 3 about here]

3.2 Granger Causality Test

Since the first order difference of the logarithm of U.S. M2 is stationary, I use the first order of U.S. M2 to represent the U.S. QE policy. Then, I do the Granger causality test on Shanghai Composite Index and the first difference of U.S. M2.

Table 4 represents the results of Granger causality test. The results show that under the significance level of 10%, I cannot deny the first hypothesis, but I can deny the second hypothesis, indicating that Shanghai Composite Index does not granger cause US M2, while US M2 granger causes Shanghai Composite Index.

[Insert Table 4 about here]

3.3 Impulse Response Analysis

Impulse response analysis examines that when the random disturbance term changes by one standard deviation, how the endogenous variable will respond. The impulse response figure shows the dynamic changes path of the endogenous variable. Figure 2 represents the results of impulse response analysis on the basic VAR model.

[Insert Figure 2 about here]

The solid line is the response of Shanghai Composite Index to its own unexpected changes. The response is positive and maximizes after 2 periods, but then the response decreases gradually. The long-term response is close to 0. Therefore, this result indicates that Chinese stock is influenced by its own unexpected in the short run, but the influence is weak in the long term.

The dashed line is the response of Shanghai Composite Index to the shock from U.S. QE policy. When the U.S. M2 changed by one standard deviation, China stock had negative response in the first period but the response became positive after the third period. Then the response increases gradually and reaches the maximum at the ninth period. After the ninth period, the response decreased. The long-term response is close to zero. This means that the liquidity created by U.S. QE policy influences China stock in the short and mid term. But in the long term, the response disappears.

3.4 Variance Decomposition

The variance decomposition determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables, indicating the amount of information each variable contributes to the other variables in the autoregression.

Table 5 represents the results of variance decomposition. Contribution rate from U.S. M2 to SH Index maximized at the first period, reaching 4.0191%. Then it decreases gradually and reaches 2.2679% at the 24th period. This means that the liquidity created by U.S. QE policy influences the Chinese stock market at the short term but decreases gradually. In the long term, the Chinese stock market is most influenced by its own unexpected changes. There are two reasons for this phenomenon. One is that the liquidity created by U.S. QE policy flows to the Chinese stock market in the short term, but in the long term, the liquidity may flow to other capital market such as real estate market. The other reason is that many factors influence the Chinese stock market, such as the domestic economic situation. In the long term, other factors may offset the influence of U.S. QE policy.

[Insert Table 5 about here]

3.5 The Dynamic Trend of Spillover Effect

In this section, I use rolling windows in the sample period to test the dynamic trend of spillover effect. Since the time interval between adjacent rounds of QE policy is about two years, I set the length of rolling windows as two years. The fixed-length window rolls forward. The earliest month is removed each time when the next month is added. Therefore, there are 52 windows in the sample period. The first window is from January, 2008 to December, 2009, and the last window is from April, 2012 to April, 2014.

By constructing the same VAR system and performing the Granger Causality test, I calculate the F statistics of "U.S. M2 does not Granger Cause SH Index" in every window. By comparing the F statistics in different windows, I analyze the dynamic trend of spillover effect of U.S. QE policy on the Chinese stock market.

Figure 3 represents the results of rolling tests. The solid line is the time series F statistics of Granger Causality test in different windows. I find that the F statistics fluctuate periodically. The F statistics are relatively large near the midpoint of each round of QE policy. Moreover, the spillover effects are relatively larger in the first two rounds than the last two rounds.

[Insert Figure 3 about here]

4. Potential Mechanisms

In this section, I run several tests to examine how U.S. QE policy influences the Chinese stock market. It is challenging to provide definitive proof of potential mechanisms, so the results are only suggestive.

4.1 Theoretical Analyses

4.1.1 Short-term Capital Flow

Since the Financial Crisis in 2008, the economies of developed countries recovers slowly, while in developing countries such as China, India and Brazil, the economy has better prospect. On the one hand, developing countries have raised interest rates to cope with the inflationary pressure. For example, China has raised the deposit and lending rates by 0.25% for five times from October, 2010 to July, 2011. The spreads between US and developing countries appeal much capital to flow into developing countries. On the other hand, since much capital flow into China, the demand for RMB increased, thus the upward pressure on RMB increased, further increasing the interest arbitrage space.

Under the background of interest rate spreads and expectations for appreciation of RMB，international short-term capital flow will not only flow into the real economy, but also flow into the Chinese stock market. Since the Split-share Structure Reform in 2005, the scale of tradable shares in the Chinese stock market increases greatly, thus enlarging the demand for capital. Therefore, the international short-term capital flow induced by U.S. QE policy will influence the Chinese stock market. On the other hand, most Chinese investors are speculators. They are easy to be influenced by market sentiment and hearsay, thereby increasing the stock price fluctuation.

4.2.2 Monetary Policy Dependence

Since the reform and opening-up, the relationship between China's economy and global economy has become closer and closer. Therefore, shock from U.S. QE policy may influence the China's monetary policy.

First, Impossible Triangle Theory has proved that one country cannot realize fixed exchange rate, free movement of capital and monetary policy independence at the same time. According to the theory, under background of the fixed exchange rate, with the level of capital flow increasing, the independence of Chinese monetary policy will decrease.

Therefore, under the background of limited floating exchange rate and mandatory exchange settlement in China, Chinese central bank cannot manage the money supply completely and independently according to the economic development of China.

Secondly, Chinese government gradually loosens control over capital flows. Since 1990s, much invisible capital has flowed into China. The invisible capital is greatly influenced by domestic and international economic environment, and its existence will affect the independence of Chinese monetary policy.

Therefore, the adjustment of US monetary policy will affect the money supply in China, and then influence the Chinese stock market.

4.3.3 Stock Co-movement

First, Economic Fundamentals Theory proves that if there are same factors affecting economies in different countries, the stock markets will change consistently when external shocks occur. Changes in one economy will not only influence domestic stock market, but also influence the economy and stock market in other countries.

Second, Market Contagion Hypothesis suggests that the relevance in different stock markets can be attributed to the behaviors of investors. The changes of stock prices in one market will influence investors' sentiment and strategy in other markets. Moreover, due to the time difference, investors can observe changes in other stock markets and then adjust their investment strategy in their own stock market. Therefore, the opening price in one market may be affected by the closing price in other markets, thereby causing the stock price co-movements.

4.2 Empirical Results

First, I test the effect of U.S. QE policy on the intermediary variables. I construct the {U.S. PPI, U.S. IP, U.S. CPI, U.S. M2, China M2} and {U.S. PPI, U.S. IP, U.S. CPI, U.S. M2, Chinese interest rate} VAR systems to test the effect of U.S. QE policy on Chinese monetary policy, {U.S. PPI, U.S. IP, U.S. CPI, U.S. M2, China's short-term capital inflows} to test the effect on China's short term capital flow, and {U.S. PPI, U.S. IP, U.S. CPI, U.S. M2, S&P 500} to test the effect on U.S. stock market.

Table 5 shows the results of Granger Causality test of the four VAR models. The results show that U.S. M2 granger causes China M2, China's short term capital flows and S&P 500.

[Insert Table 6 about here]

Figure 4 shows the results of the impulse response analyses on the four VAR models. The results indicate that the influence of U.S. QE policy on China monetary policy is relatively weak. The influence on China's short-term capital flow is strong in the short run but weak in the long run. As for the stock co-movement mechanism, the result indicate that the U.S. QE policy has negative impact on U.S. stock market but the effect turns positive in the mid and long run.

[Insert Figure 4 about here]

Next, I test the effect of the intermediary variables on the Chinese stock market by constructing {China M2, China's short-term capital inflows, S&P 500 and SH Index} VAR model.

Table 6 represents the results of Granger Causality test of the VAR model. I find that under the significance level of 10%, China M2, China's short-term capital inflows, and S&P 500 granger cause SH Index.

[Insert Table 7 about here]

Figure 5 shows the results of the impulse response analyses on the VAR model. I find that SH Index is mostly influenced by itself. The three intermediary variables only affect the Chinese stock market in the short term.

[Insert Figure 5 about here]

Table 7 shows the results of variance decomposition of the VAR model. The results indicate that China M2 has the greatest contribution rate among the three intermediary variables. The second variable is S&P 500, and short-term capital flows play the least role. The contribution rate of China M2 increases over time, while the contribution rates of S&P 500 and short-term capital flows are relatively stable.

[Insert Table 8 about here]

Finally, I compare the effects through the three potential mechanisms. Table 8 summarizes the results of Variance Decomposition, and Table 9 summarizes the direction of each mechanism. I find that the monetary policy dependence mechanism is the most important mechanism through which U.S. QE policy influence the Chinese stock market.

[Insert Table 9 about here]

[Insert Table 10 about here]

5. Conclusion

Using the VAR methodology, I find that the U.S. QE policy has a significantly positive effect on the Chinese stock market in the short term but the effect is in significant in the long term. Then I examine three potential mechanisms through which U.S. QE policy influences the Chinese stock market: short-term capital flow, monetary policy dependence and stock co-movement. Using the variance decomposition method, I find that the monetary policy dependence mechanism is the most important one among all the three mechanisms, while the short-term capital flow mechanism plays the least important role.

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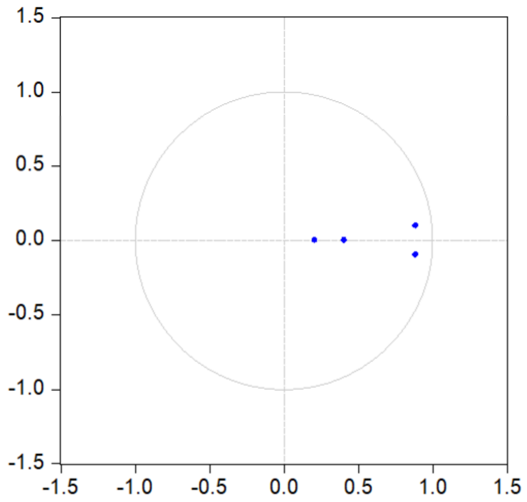

Figure 1. Inverse Roots of AR Characteristic Polynomial of the Basic VAR Model

This figure plots the inverse roots of AR characteristic polynomial of the basic VAR system, {U.S. PPI, U.S. IP, U.S. CPI, U.S. M2, SH Index}.

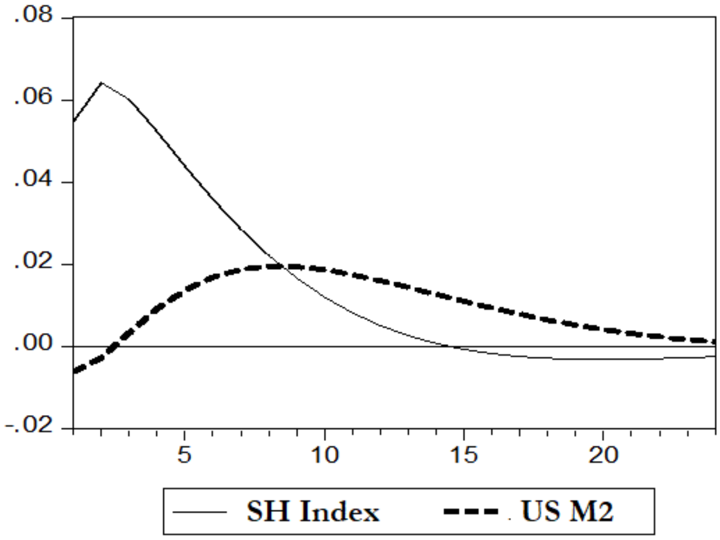

Figure 2. Response of SH Index to Cholesky One S.D. Innovations of US M2

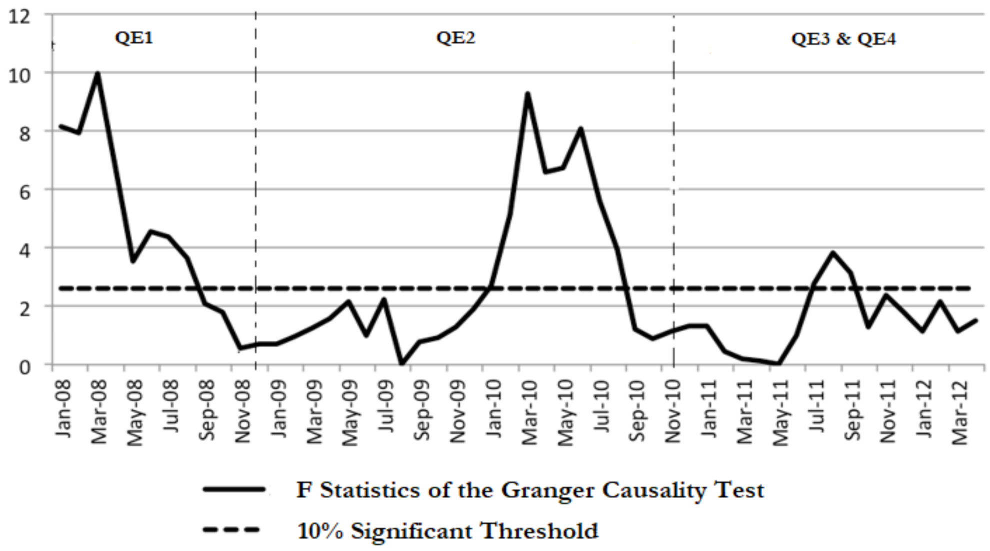

Figure 3. Dynamic Trend of the Spillover Effect

This figure plots dynamic trend of the spillover effect of U.S. QE policy on the Chinese stock market. The solid line is the time series F statistics of Granger Causality test in different windows, and the dashed line is the 10% significant threshold.

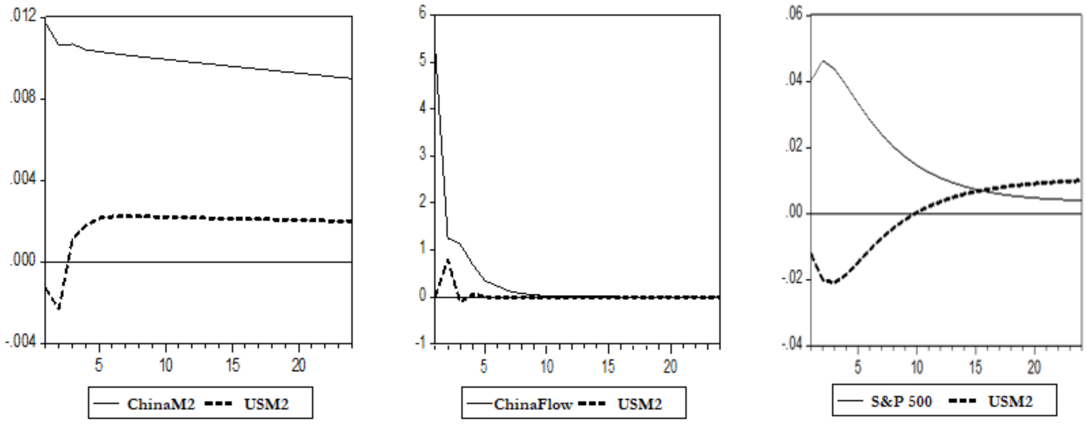

Figure 4. Response of the Intermediary Variables to Cholesky One S.D. Innovations of US M2

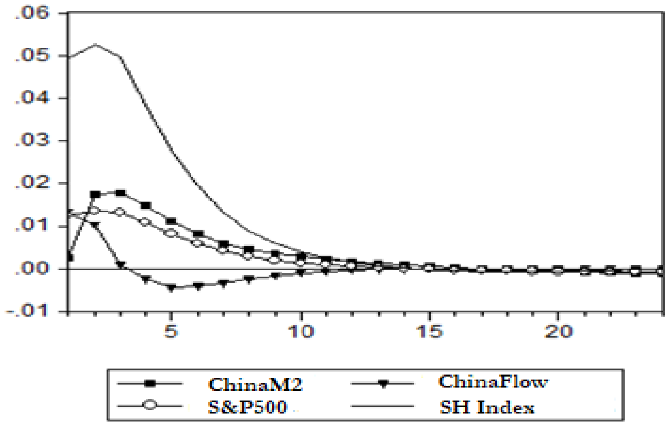

Figure 5. Response of SH Index to Cholesky One S.D. Innovations of Each Intermediary Variable

Table 1. U.S. QE Policy

This table presents start time, measures, background and goals of each round of U.S. QE policy.

	Time	Measures	Background	Goals
QE1	2008.11.25	Purchase the financial claim and asset backed Securities distributed by Freddie Mac, Fannie Mae and Federal Home Loan Banks. The main innovative monetary policy tools are TAF、PDCF、TSLF, etc.	The economy has seriously faltered since the Financial Crisis, and the financial systemic risks increased.	Inject liquidity, repair the credit system and restore stability of financial markets.
QE2	2010.11.3	Maintain the base rate at the range of 0~0.25%, purchase more treasury bonds and roll over the mature treasury bonds.	The rate of production improvement decreased and the unemployment rate increased significantly.	Lower economic instability and avoid deflation.
QE3	2012.9.13	Purchase $40 billion mortgage-backed securities, continue the inversion operation, which is to sell treasury bills and purchase treasury bonds, and continue the federal fund rate until 2015	The unemployment rate was high and the inflationary pressure was modest.	Stabilize real estate market and support the labor market.
QE4	2012.12.12	Purchase $45 billion every month to replace the inverse operation.	The rate of economic growth decreased and the fiscal cliff risk increased.	Improve the employment situation, solve the fiscal cliff risk and promote economic recovery.

Table 2. Results of ADF Test

This table presents results of ADF Test on all variables in the VAR systems.

Variables	ADF statistics	Forms	P statistics	Results
ChinaM2	-2.9572	c,0,8	0.0445	Stationary
SH Index	-3.0033	c,0,1	0.0394	Stationary
ChinaFlow	-6.7863	c,t,0	0.0000	Stationary
USM2	-2.2062	c,t,3	0.4785	Non-stationary
S&P 500	-4.8502	c,t,4	0.0010	Stationary
USCPI	-1.6541	c,t,0	0.7612	Non-stationary
USPPI	-3.8269	c,t,2	0.0208	Stationary
USIP	-6.7606	c,t,10	0.0000	Stationary
Variables	**ADF statistics**	**Forms**	**P statistics**	**Results**
ΔUSM2	-5.9187	c,0,0	0.0000	Stationary
ΔUSCPI	-3.7223	0,0,5	0.0003	Stationary

Table 3. Comparation of the lag intervals

This table presents the values of different lag intervals under different information criteria. * indicates that the lag difference is optimal under the corresponding information criterion.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	228.7310	NA	3.56e-06	-6.870636	-6.804283	-6.844417
1	293.7234	124.0764	5.60e-07	-8.718891	-8.519832*	-8.640234
2	300.7369	12.96440*	5.12e-07*	-8.810210*	-8.478445	-8.679114*
3	302.4596	3.079874	5.49e-07	-8.741200	-8.276727	-8.557665
4	307.8722	9.349026	5.27e-07	-8.784005	-8.186827	-8.548032
5	312.0105	6.897161	5.26e-07	-8.788196	-8.058311	-8.499784
6	312.8740	1.386899	5.81e-07	-8.693152	-7.830561	-8.352301

Table 4. Results of the Granger Causality Test Between USM2 and SH Index

This table presents the results of the Granger causality test between USM2 and SH Index in the basic VAR system, {U.S. PPI, U.S. IP, U.S. CPI, U.S. M2, SH Index}.

Null Hypothesis:	Obs	F-Statistic	Prob.
SH Index does not Granger Cause USM2	70	0.09267	0.9116
USM2 does not Granger Cause SH Index		3.12477	0.0506

Table 5. Results of Variance Decomposition in the Basic VAR System

This table presents the variance decomposition ratio in the basic VAR system, { U.S. PPI, U.S. IP, U.S. CPI, U.S. M2, SH Index}.

Period	S.E.	US M2	SH Index
1	0.057405	4.019087	95.98091
2	0.090389	3.817326	96.18267
3	0.111942	3.258371	96.74163
4	0.125710	2.884831	97.11517
5	0.134525	2.655328	97.34467
6	0.140230	2.515107	97.48489
7	0.143967	2.428069	97.57193
8	0.146441	2.372982	97.62702
9	0.148091	2.337493	97.66251
10	0.149198	2.314294	97.68571
11	0.149944	2.298961	97.70104
12	0.150446	2.288746	97.71125
13	0.150786	2.281902	97.71810
14	0.151016	2.277299	97.72270
15	0.151172	2.274196	97.72580
16	0.151277	2.272100	97.72790
17	0.151349	2.270683	97.72932
18	0.151397	2.269723	97.73028
19	0.151430	2.269074	97.73093
20	0.151452	2.268634	97.73137
21	0.151467	2.268336	97.73166
22	0.151477	2.268134	97.73187
23	0.151484	2.267998	97.73200
24	0.151489	2.267905	97.73210

Table 6. Results of the Granger Causality Test Between the USM2 and Intermediary Variables

This table presents the results of the Granger causality test between the USM2 and four intermediary variables.

Null Hypothesis:	Obs	F-Statistic	Prob.
ChinaM2 does not Granger Cause USM2	68	0.85494	0.4964
USM2 does not Granger Cause ChinaM2		4.72189	0.0023
USM2 does not Granger Cause ChinaRate	74	0.54419	0.4631
ChinaRate does not Granger Cause USM2		1.16585	0.2839
ChinaFlow does not Granger Cause USM2	71	2.5434	0.1155
USM2 does not Granger Cause ChinaFlow		5.19208	0.0258
S&P500 does not Granger Cause USM2	67	3.79516	0.1510
USM2 does not Granger Cause S&P500		1.69465	0.0050

Table 7. Results of the Granger Causality Test Between the Intermediary Variables and SH Index

This table presents the results of the Granger causality test between the intermediary variables and SH Index.

Null Hypothesis:	Obs	F-Statistic	Prob.
SH Index does not Granger Cause S&P500	74	33.8581	6.E-11
S&P500 does not Granger Cause SH Index		4.16597	0.0196
ChinaM2 does not Granger Cause SH Index	73	2.93248	0.0600
SH Index does not Granger Cause ChinaM2		7.82011	0.0009
ChinaFlow does not Granger Cause SH Index	70	0.24624	0.0155
SH Index does not Granger Cause ChinaFlow		4.44768	0.7825

Table 8. Results of Variance Decomposition for the Potential Mechanisms

This table presents the variance decomposition ratio in the VAR system, {China M2, China's short-term capital inflows, S&P 500 and SH Index}.

Period	S.E.	ChinaM2	ChinaFlow	S&P500	SH Index
1	0.052688	0.225537	6.411592	5.709843	87.65303
2	0.078480	5.089044	4.624777	5.570184	84.71600
3	0.095485	6.873424	3.132957	5.719491	84.27413
4	0.104579	7.723191	2.667224	5.826762	83.78282
5	0.109242	8.140824	2.606709	5.898505	83.35396
6	0.111492	8.354130	2.642382	5.943083	83.06040
7	0.112563	8.481688	2.680733	5.968560	82.86902
8	0.113074	8.566265	2.701038	5.982280	82.75042
9	0.113320	8.626539	2.708873	5.988920	82.67567
10	0.113439	8.670022	2.711018	5.991527	82.62743
11	0.113495	8.700665	2.711218	5.992005	82.59611
12	0.113520	8.721169	2.710969	5.991541	82.57632
13	0.113531	8.733844	2.710722	5.990862	82.56457
14	0.113535	8.740785	2.710555	5.990392	82.55827
15	0.113538	8.743849	2.710446	5.990357	82.55535
16	0.113540	8.744606	2.710362	5.990849	82.55418
17	0.113542	8.744322	2.710275	5.991873	82.55353
18	0.113545	8.743983	2.710168	5.993380	82.55247
19	0.113549	8.744336	2.710028	5.995288	82.55035
20	0.113553	8.745934	2.709846	5.997501	82.54672
21	0.113558	8.749179	2.709620	5.999914	82.54129
22	0.113564	8.754357	2.709350	6.002426	82.53387
23	0.113570	8.761661	2.709036	6.004938	82.52436
24	0.113578	8.771221	2.708683	6.007361	82.51273

Table 9. Variance Decomposition Ratios of three potential mechanisms

Variance decomposition	ChinaM2	ChinaFlow	S&P 500
From U.S. M2 to intermediary variables	4.27%	2.10%	3.94%
From intermediary variables to SH Index	8.77%	2.71%	6.01%
Total influence	0.374%	0.057%	0.237%

Table 10. Comparison of Three Potential Mechanisms

This table compares the short-term and long-term influences through different mechanisms.

	From U.S. M2 to intermediary variables		From intermediary variables to SH Index		Total influence	
	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term
ChinaM2	+	+	+	+	+	+
ChinaFlow	+	0	+	—	+	0
S&P 500	—	+	+	+	—	+

Appendix. Variable definations

Variable	Definition
USM2	U.S. money supply M2
SH Index	Shanghai Composite Index
ChinaM2	China money supply M2
ChinaRate	The one-year deposit and lending rate in China
ChinaFlow	The short-term capital inflows of China
S&P 500	S&P 500 Index
USPPI	U.S. Producer Price Index
USCPI	U.S. Consumer Price Index
USIP	U.S. Industrial Production Index