



COULD ZHOU XIAOCHUAN PUT OPTION SAVE CHINA'S CAPITAL MARKET?

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This article proposes a new framework to analyze the impact of monetary policy on asset price. Based on the Sign-Restriction Approach proposed by Uhlig (2005) some orthogonal restrictions are imposed to filter out the interferences of money supply shock, easing monetary policy shock and national rescue shock on Zhou Xiaochuan Put Option shock in order to fully explore the effects of reserve requirement ratio (RRR) reduction and interest rate cut (so called "Double Down") in China's financial market system. It shows that Zhou Xiaochuan Put Option has faint but relatively enduring positive effects on share price, causing a slight RMB devaluation and a plunge of SHIBOR rate and treasury yields. Moreover, the impact on short-term financing cost and benefits is significantly larger than that on the long-term. In this rescue operation, Zhou Xiaochuan Put Option plays a certain role, but its effects are less vigorous than expected.

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Keywords: Monetary policy, Asset price, Sign-restriction approach.**JEL Classification:** G18, G10, E44.**Received:** 22 January 2016/ **Revised:** 29 March 2016/ **Accepted:** 4 April 2016/ **Published:** 16 April 2016**Contribution/ Originality**

This study contributes in the existing literature on the nexus between monetary policy and asset price. Based on newly proposed Sign-Restriction Approach, we find faint but relatively enduring positive effects of monetary policy. However, they are less vigorous than expected during the rescue mission.

1. INTRODUCTION

After going through the most terrible two weeks of Chinese stock market since December 1996 (Figure 1), the People's Bank of China (PBoC) announced both reserve requirement ratio reduction and interest rate cut (so called "Double Down") on June 27th, 2015. It is the first time that the PBoC take the "Double Down" measure since December, 2008, which means China has opened a new chapter with the lowest interest rate in history. This move is similar to the easing monetary policy carried out by the former Federal Reserve Chairman, Alan Greenspan, to save the falling down financial market.

“Greenspan Put” refers the measure that the Federal Reserve Chairman Alan Greenspan actively cuts the interest rate or injects liquidity when the capital market crashes to ease the market decline. It is equivalent to providing insurance to investors. Since the “Black Monday” in 1987, Greenspan Put began to be well-known all over the world.

In the past few years, the practices similar to Greenspan Put have become common. On September 14th, 2012, the Fed announced the launch of a new round of quantitative easing (*QE3*), with the monthly rate of \$40 billion to purchase mortgage-backed securities issued by the US federal agency. In particular, *QE3* did not pre-set the total scale of asset purchasing. Only if the US labor market made sustained improvement, the Fed would stop purchasing. The open QE fully demonstrates the Fed’s strong determination to promote employment, which is also known as “Bernanke Put”.

Coincidentally, there is similar “Draghi Put” in the euro zone besides in the US. Mario Draghi’s commitment “whatever it takes” led to the rise of euro and a sustained bull market of European debts when he was the governor of the European Central Bank in 2012.

The plummeting of A-shares gave birth to Zhou Xiaochuan Put Option. Actually there exist some conflicts between “Double Down” and reverse repo on June 25. Earlier, the PBoC had consecutively suspended open market operations, without any investment or withdrawal for eight weeks. Meanwhile the monetary policy stays in a short “silent” state. The market generally believes that reverse repo reduces the possibility of further easing monetary policy in the short term. In fact, it also excludes the probability of RRR reduction and interest rate cut. From a fundamental perspective, it is difficult to explain why the People’s Bank selects further easing at this point. After all, the easing policy fails to make substantive progress in the previous operations. Obviously, “Double Down” is designed to boost the market after the market crash.

Faced with such a rapid waterfall plunge, regulators and investors are more concerned whether “Double Down” is able to rescue the turbulent equity market. The article makes use of Pure Sign-restriction Approach proposed by Uhlig (2005) to analyze the actual effects of Zhou Xiaochuan Put Option. Avoiding the insufficient theoretical development and the unclear understanding of transmission mechanism, Sign-restriction Approach applies widely acceptable sign restrictions which could effectively reduce the possibility of the incompatibility between theoretical expectations and empirical results avoiding unnecessary mysteries. This makes us explore the impacts of monetary policy on asset prices in a more realistic economic environment.

2. ASSET PRICES AND MONETARY POLICY: DEBATES AND PRACTICES

Should monetary policy make reactions to the fluctuations of asset prices? What kind of monetary policy is optimal facing the asset price fluctuations? The relevant debates on this question have been lasting till now (Mishkin, 2001). And the relevant literature can be divided into three categories: Inaction Theory, Action Theory and Compromise Theory (Qian and Ding, 2015).

Inaction Theory is also known as “Benign Neglect”, which claims monetary policy should respond to the falling down of asset prices after the bubble burst but not before. It could release enough liquidity to stabilize financial market and real economy through the implementation of easing monetary policy. And monetary policy should be aimed at “Cleaning Up in the Aftermath”.

Action Theory is established on the basis of the painful experience of huge impact after the asset pricing bubble burst. It claims asset prices should be included in the monetary policy analyzing framework to make forward-looking responses aiming at reducing the risk of bubble formation.

Compromise Theory which is drawn from the two assumptions “Non-Linear Monetary Policy Rules” and “Endogenous Asset Pricing Bubble” believes that the monetary policy with prospective active intervention could cause actual inflation deviating from the target level of inflation, resulting in “Immediate Cost”; and “Benign

Neglect” connives with the inflating of asset prices. The burst of asset price bubble will lead to financial and economic instability (even a crisis or recession) and generate potential “Future Cost”. Compromise Theory calls for a reasonable trade-off between the two kinds of costs when facing increasingly frequent and intense fluctuation of asset prices and the cost of prior optimal monetary policy intervention.

Theoretically, Zhou Xiaochuan Put Option is a typical practice of “Inaction Theory”.

In the field of theoretical researches, Bernanke and Gertler are typical representative scholars of Inaction Theory (Bernanke and Gertler, 1999) and Svensson also endorses the similar views (Svensson, 2009). Inaction Theory even once turns into the research mainstream. In practice, many policy makers and implementers support Inaction Theory, represented by the former Fed Chairman Alan Greenspan and Ben Bernanke. The famous conclusion by Greenspan that “We do not know enough about how the financial system works” has become the important basis for central banks to take rescue measures after the bubble burst, ignoring asset prices temporarily. From the experience of international practices, it has become a kind of international convention for monetary authorities to save the market after the asset price bubble being pricked.

We try to avoid participating in the debate on the reactions of monetary policy to asset prices in this article while focus on exploring the effectiveness of rescue actions after the asset price bubble burst to contribute to the literature on the nexus between monetary policy and equity market (Rigobon and Sack, 2001; Hayford and Malliaris, 2002).

3. THEORETICAL LOGIC AND ANALYTICAL FRAMEWORK

We start from the General Equilibrium Analysis Framework building a system made up of four financial markets, namely the equity market, bond market, money market, foreign exchange market. Any deviation from market equilibrium will affect other markets as well as the entire financial system. The monetary policy, as the exogenous shock controlled by the central bank, will stabilize asset prices and make impacts on the entire financial system when the capital market bubbles burst and asset prices tumble.

The analytical framework of this analysis consists of two parts: financial market and the basis of monetary policy.

Financial market system consists of equity market, bond market, exchange market and money market. Equity market is an important part of capital market, and share price is an important kind of asset prices. Considering the domestic equity market is in the relay of “Reform Bull” and the Shanghai Stock Exchange Composite Index has rapidly risen to the local peak of 5178 in less than one year from the historic low of 1848 on July 2014, a slump to 3373 within just 18 days existing a huge short-term market volatility has indeed formed the international sense of “Stock market Disaster”. Apparently, the recent “Double Down” (lowering both deposit reserve ratio and interest rate) action of PBoC is intended to maintain the stability of stock market. We follow the study of Wu (2007) and take equity valuation as the representative of asset prices.

So far, there are many methods to measure equity valuation, and P/E ratio is a more conventional measurement method due to its simplicity and practicality. Thus we choose monthly P/E value of Shanghai Stock Exchange A-shares to measure the domestic equity valuation. Meanwhile, we take the average monthly exchange rate of the RMB against the US dollar released by the China Foreign Exchange Trade Center to reflect the basic situation of foreign exchange market, SHIBOR to reflect the current money market, and the treasury yields released by National Interbank Funding Center as the representative of bond market.

The basis of monetary policy consists of RRR published by the People's Bank of China, one-year deposit rate and narrow money M_1 .

At this point, the empirical analysis framework is composed of seven variables: RRR , one-year deposit rate, M_1 , P/E of Shanghai A-shares, monthly average exchange rate of the RMB against the US dollar, SHIBOR rate, and treasury yield.

4. IDENTIFY RESTRICTIONS

In the announcement issued by the People's Bank of China, “Double Down” appeared to be unrelated to asset price volatility. Despite the grim downward pressure on the economy in China’s New Normal, it’s easily understandable to have a RRR reduction and interest rate cut. Still, an inevitable real problem is that why the PBoC took actions at the key moment of the stock market crash. The reasons for falling off a cliff in stock market are clearing the over-the-counter high leverage financing led by the China Securities Regulatory Commission (CSRC) on the one hand and on the other hand the taking profits and getting out of the market consideration in a bull market due to the huge rise of early stage. Irrational market decline made many stocks lose liquidity. And the plunge of asset prices made the high leveraged funds break and private equity continuously touch the winding-up line. As the share prices spiral collapsed and the active leverage reduction stepped off, the market decline began to threaten the brokers’ margin tradings and banks’ low leveraged products. If the stock market continued to fall down, the stock market disaster will evolve to the debt crisis in the bank system, thus spread to the entire financial system thereout, resulting in a systemic financial crisis. Facing the serious market situation, domestic and foreign financial circles cannot help claiming that “China has never been so close to the financial crisis”.

Could “Double Down” effectively reverse the predicament of the rapid decline of asset prices? What are the effects on the financial system? The answers are very important not only to the theoretical study of the relationship between monetary policy and asset prices, but also to the rise and decline of nations and the great rejuvenation of China. We make use of pure Sign-Restriction Approach in the Vector Auto-regression Framework to analyze the effects of Zhou Xiaochuan Put Option shock.¹

Our Vector Auto-regression Model consists of seven variables: RRR , one-year deposit rate, M_1 , Shanghai A-shares P/E , the monthly average of RMB exchange rate against U.S. dollar, SHIBOR rate, and treasury yields. All of the variables are added to the VAR system in level except that M_1 is in logarithm. AIC criteria is used to determine the optimal lag length and the VAR is established with a constant but without trend (Doan, 2010).^[9] All of the data come from CEIC database, ranging from July 2008 to June 2015.

Considering the complexity and urgency of rescue work, “Double Down” is just one of many rescue operations. To exclude the interference of other rescue actions and analyze accurately the effects of Zhou Xiaochuan Put Option, we identify the money supply shock, easing monetary policy shock and “National Team” rescue shock before identifying “Double Down” shock and impose mutual orthogonal restrictions to rule out possible interferences. The Sign-Restriction Approach is further expanded from the methodology of Uhlig (2005) similar to the method of Mountford and Uhlig (2009). Table 1 is the general summary of the sign-restriction identification procedure. Following Mountford and Uhlig (2009) we set the restriction range to 4, namely $k=4$.^[10]

Money supply shock is identified as a shock that increases the narrow money M_1 . Easing monetary policy is identified as a shock that lower SHIBOR and treasury yields. National Team rescue shock is identified as a shock that directly promote the asset prices. Zhou Xiaochuan Put Option shock is identified as a shock that simultaneously cut down the RRR and interest rate.

¹ The advantage of Sign-Restriction Approach is that it doesn’t have to be based on a too harsh theoretical assumption. With the help of Sign-Restriction Approach, we can avoid the empirical puzzles that appear to be inconsistent with the theory through imposing a widely acceptable sign restrictions to the response of relevant variables

5. EMPIRICAL RESULTS

We establish a first-order VAR Model on the basis of AIC criterion.² To compare with traditional analysis results conveniently, we simultaneously give one unit of negative impact on *RRR* and interest rate respectively within the VAR(1) framework. Then we make a 20 period impulse response analysis and obtain the error bands through bootstrap to explore the possible effects of “Double Down” under the paradigm of traditional analysis.

Figure 2 shows the effects of “Double Down” on financial market under the paradigm of traditional analysis.

In the empirical results, “Double Down” has a positive impact on equity market from periods 1 to 4, with the specific extent between 2.5 and 5. The result suggests that “Double Down” could stabilize share prices in the short term, and promote the slump market to turn up effectively.

In the foreign exchange market, the impact of “Double Down” is faint and insignificant. It dispels the concerns of exchange rate depreciation to some degree during the process of using monetary policy to intervene in asset price fluctuations by the PBoC and provides much supports for more positive rescue operations.

In the money market, “Double Down” further loosens the monetary policy and releases the liquidity. In the short term, periods 1 to 4, it lowers down the market interest rate and financing costs, but brings significant different impacts on the short-term, medium-term and long-term interest rates: the influence on the overnight SHIBOR rate is between -2 and -1, the influence on three-month SHIBOR rate is between -1.5 and -0.5, and the one-year SHIBOR rate is between -1 and -0.5. Obviously, “Double Down” has a sharper impact on the short-term interest rate.

In the bond market, “Double Down” leads short-term treasury yields down in a very short term (1 or 2 periods) with an unclear influences on medium-term and long-term interest rates. “Double Down” has an impact on one-year treasury yield with the extent between -1 and -0.5, five-year treasury yield with the extent between -0.5 and -0.25. So the effect of “Double Down” on short-term treasury yield is sharper than the medium-term and long-term ones.

In a word, “Double Down” creates a looser monetary environment which seems to achieve the rescue aim to relieve the asset prices down pressure.

Through the retaliatory rebound performances of Shanghai and Shenzhen stock markets starting from July 9th, the multi-sector joint rescue operation seems to be successful under the leadership of the State Council. But it is difficult to judge the effects of Zhou Xiaochuan Put Option among various measures. To get a truly better understanding about the actual effects of “Double Down”, we identify three other relative shocks, namely the money supply shock, easing monetary policy shock, “National Team” rescue shock and isolate their effects from Zhou Xiaochuan Put Option shock using newly proposed Sign-Restriction Approach. We rule out possible mutual interferences through requiring these shocks to be orthogonal to each other to separate out the actual impact of Zhou Xiaochuan Put Option precisely.

Figure 3 shows the effect of “Double Down” on the stock market and exchange market under sign restriction approach.

The empirical results of sign restrictions show that “Double Down” has a positive impact on stock market from periods 2 to 14, with the extent between 0.25 and 0.75. Compared with traditional impulse results, the positive effect of “Double Down” under sign restrictions is more enduring, but the actual effect is significantly reduced. Apparently, as one of the most important part of rescue operations, Zhou Xiaochuan Put Option still needs many other measures to cooperate with.

Different from previous research, sign restriction approach reveals that “Double Down” has a faint positive impact on RMB exchange rate from periods 1 to 7, with the extent between 0.003 and 0.006. It suggests that “Double Down” leads to the devaluation of the RMB against the U.S. dollar to some degree. Under the back ground of the U.S. dollar’s periodical strength and dollar entering an interest rate increase cycle, “Double Down” results in the

² The range of the maximum lag length is equal to 5, and the minimum value of AIC is equal to -1028.5704, corresponding to the optimal lag length 1.

RMB devaluation, possibly further inducing the risk of large-scale cross border capital flows. To a certain extent, the results restrict the display space of Zhou Xiaochuan Put Option for rescue.

Figure 4 shows the effect of “Double Down” shock on money market and bond market under sign restrictions. In the empirical results of sign restrictions, “Double Down” has a negative impact on the overnight SHIBOR rate from periods 1 to 8, with the extent between -0.2 and -0.05, a significantly negative impact from periods 2 to 7, with the extent between -0.15 and -0.05, and a negative impact on one-year SHIBOR rate from periods 1 to 8, with the extent between -0.15 and -0.05. In contrast, the effect of Zhou Xiaochuan Put Option on the money market is more enduring under sign restrictions, but the actual effect is significantly reduced. Thus, to some degree, this decreases the side effect of “Double Down”.

In the case of reactions of bond market under sign restrictions, “Double Down” has a negative effect on one-year Treasury yield from periods 2 to 5, with the extent between -0.075 and -0.05, a negative impact on 5-year treasury yield from periods 1 to 2 and 10-year treasury yields on 1 stage respectively, with the same extent of -0.025, and a negative effect on the 30-year treasury yield from periods 1 to 2, with the extent between -0.04 and -0.02. In contrast, in the general tone of unchanged easing monetary policy, “Double Down” would comprehensively lead treasury yields down although its decline space is relatively limited. Moreover, similar to the conventional decomposition findings, the impact of “Double Down” on short-term treasury yields is significantly larger than long-term ones, and thus suggests “Double Down” has a more significant facilitating effect on short-term bond prices than medium-term and long-term bond prices.

6. CONCLUDING REMARKS

Whether there exist bubbles in Chinese stock market or not? Opinions are divided about the question. But from the performances of the over 70 times *P/E* ratio of Small and Medium Enterprise Board and over 130 times *P/E* ratio of Growth Enterprise Board, the answer seems to be obvious. Falling off a cliff since the asset price bubble being poked out directly caused by clearing over-the-counter leveraged financing has become an unbearable burden to Chinese stock market. When the theoretical circles are on the debate whether to rescue or not, the most urgent realistic problem facing the practical field is how to rescue the market.³ From the authority’s experience to deal with previous stock disasters, the key to success is to inject enough liquidity into the asset market promptly, thus giving birth to the Chinese version of Zhou Xiaochuan (Central Bank) Put. After Saturday’s action, there are still three unsolved questions need to be answered: that is, should the leveraged transactions be canceled? To what extent of stock market fluctuation could be accepted by the Chinese authority in the process of capital account liberalization? What should the PBoC do to guide expectations to the market?

Whether Zhou Xiaochuan Put Option could successfully rescue the market or not? We need to analyze this question based on China’s reality. The U.S. Financial Crisis was to a greater extent affected by the cyclical economic fluctuations and the problems of financial system. So it is correct to reconstruct the financial system and revive real economy through injecting liquidity, and now appears to have achieved the expected results. However, China is faced with economic structural transformation now, and needs to get rid of the early stage economic growth model dependent on real estate and infrastructure investments as well as driven by low-end exports. So the excess capacity needs to be cleared in real estate, infrastructure, SME concentrated in labor-intensive industries and so on. Real estate industry should be integrated to improve the degree of industrial concentration. So far, flooded liquidity injection pumps into virtual economy, raises asset prices and blows new asset bubbles. Even worse, liquidity injection pushes

³ The representative scholar who supports to take immediate rescue actions is Prof. Liu Jipeng. However, Prof. Wu Jinglian is a representative who is against administrative intervention and advocating free market adjustment.

back the excess capacity clearing, brings a lot of inefficient or invalid industries which take up a lot of productive inputs and make emerging industries lack of liquidity. Thus it is difficult to reduce financing cost effectively.

From the performances of Shanghai and Shenzhen stock markets since 9th July, it is easily to find that the multi-sector joint rescue plan under the leadership of the State Council is clearly successful. Shanghai Composite index achieved six continuously winning streaks and captured the gate of 4100 points, finally standing firm on 4,000 points successfully. The mastermind of rescue is not Zhou Xiaochuan Put Option, but the direct support behaviors of “National Team”. Judging from the recent market performances, the dependence of market on “National Team” is increasingly heavy, and an appropriate getting out mechanism is important to repair the market trend. In the empirical results, the duration of Zhou Xiaochuan Put Option shock is significantly prolonged after isolating the money supply shock, easing monetary policy shock and “National Team” rescue shock. Meanwhile, the boosting effect on asset prices is dramatically weakened. So “Double Down” is not as efficient as expected. All in all, stock market is a barometer of the economy. Under the background of the excess capacity clearing and structural adjustment in “New Normal”, taking advantage of monetary policy is the radical way to advance “National Bull” and “Reform Bull”.

Funding: The authors are grateful for the comments and suggestions from anonymous referee and the editor. Meanwhile, the authors would thank for financial supports from the Ministry of Education Humanities & Social Science Fund under Grant No. 15YJC790086; the China Postdoctoral Science Foundation under Grant No. 2015T80276; Jilin Social Science Fund under Grant No. 2014B40; Jilin Scientific Development Plan under Grant No. 20150418048FG and Jilin Education Department the 12th Five-year Plan Social Science Research Project.

Competing Interests: The authors declare that they have no competing interests.

Contributors/Acknowledgement: All authors contributed equally to the conception and design of the study.

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Table-1. Identification about different shocks under the framework of sign restrictions

	<i>RRR</i>	Interest rate	M_1	SHIBOR rate	Treasury yields	Stock valuation	Exchange rate
Money supply shock			+				
Easing monetary policy shock				-	-		
"National team" rescue shock						+	
Zhou Xiaochuan Put Option shock	-	-					

Note: The table shows the sign restrictions of the impulse responses to each of the identified shock: "+" represents positive response of a variable; "-" represents negative response of a variable.

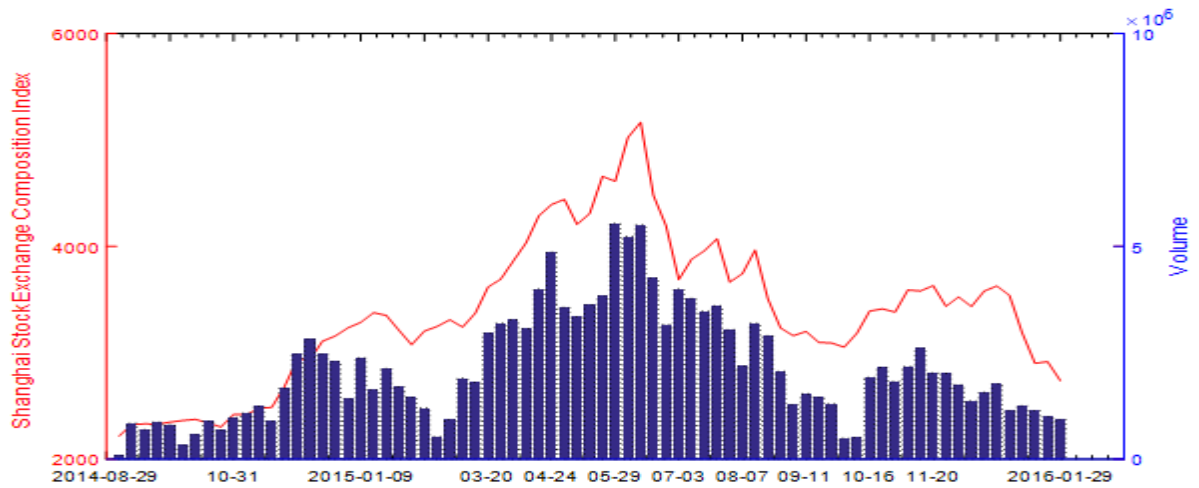


Figure-1. Weekly Market Performance of Shanghai Stock Exchange A-shares since August 29th, 2014

Source: CEIC database.

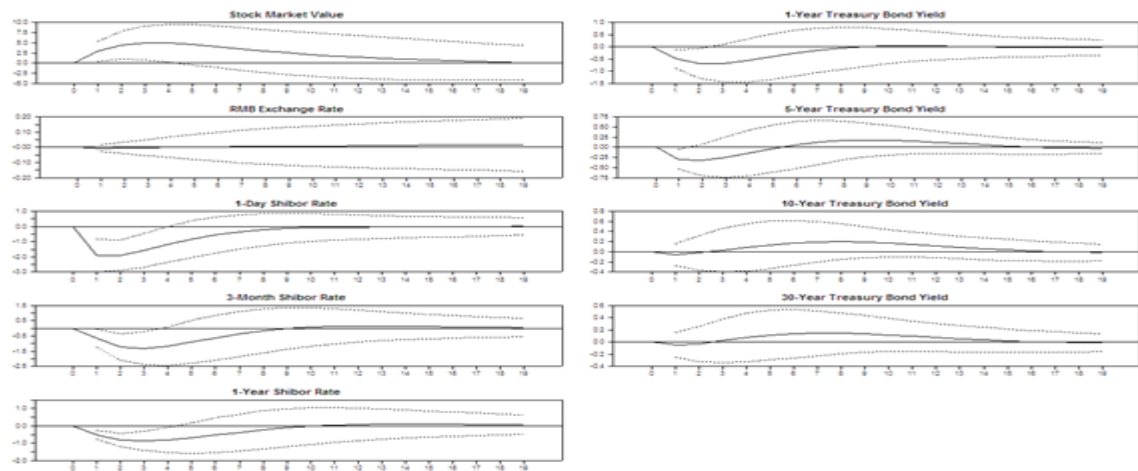


Figure-2. Effects of "Double Down" shocks under the traditional paradigm

Source: The author's calculation.

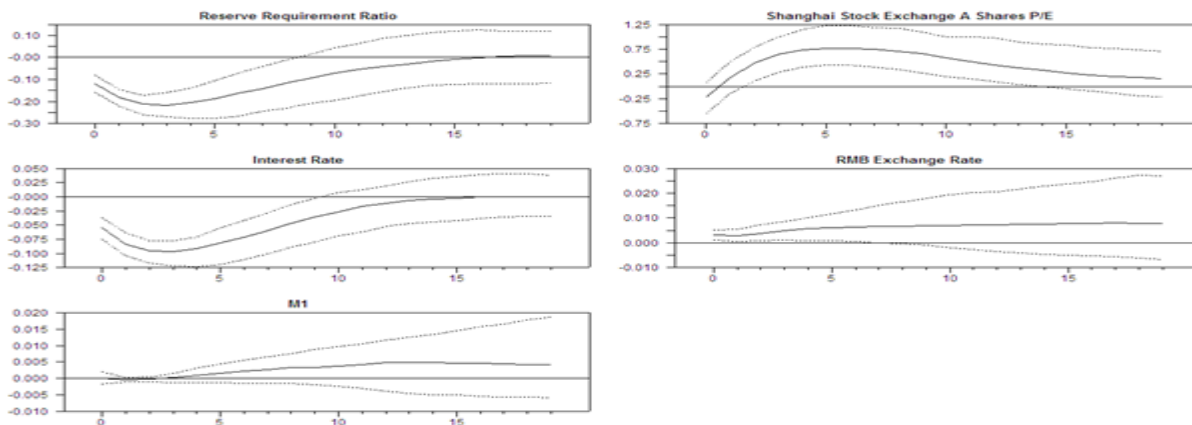


Figure-3. Effects of “Double Down” shock on stock and exchange markets

Source: The author’s calculation.

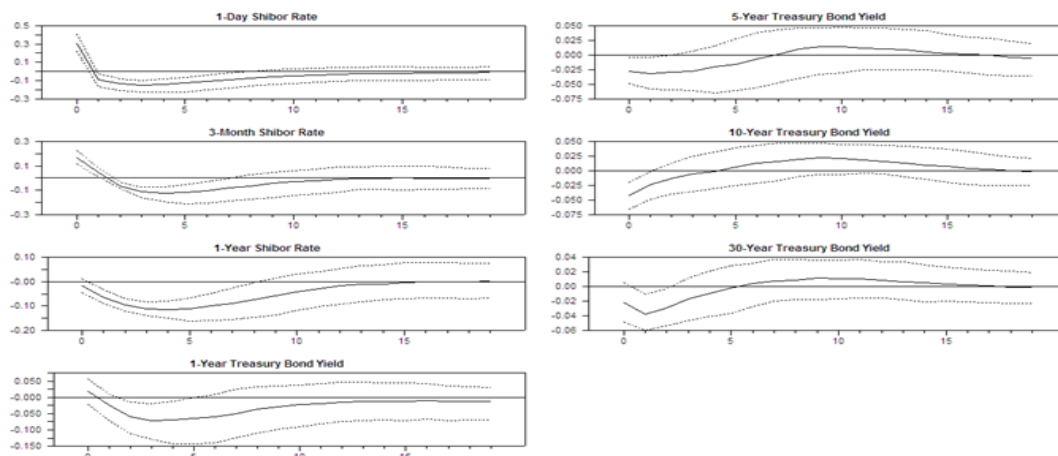


Figure-4. Effects of “Double Down” shock on money and bond markets

Source: The author’s calculation.

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