

# Implications of Deposit Rate Deregulation of U.S. to China

Junwei Chen\*

## ABSTRACT

This paper uses both VAR and VECM to analyze the impacts of deposit rate liberalization in U.S., showing that it would increase mortgage rate and decrease GDP growth rate for some time, but in the long run, there will be a decline in mortgage rate and real house price, and an increasing GDP growth rate. These conclusions and the similarities of reform background between China and U.S. have suggested that it is appropriate for China to follow a similar phased manner, together with the improvement of its supplementary system, such as deposit insurance and strengthening the market and banking supervision.

## 1 INTRODUCTION

Interest rate liberalization seems to be the inevitable course that every country would take. In July 2013, the Chinese government has announced the deregulation of loan rate, and undoubtedly the corresponding part of deposit rate continues to become an extremely heated topic this year.

In fact, since 1960s the world has already gone through 3 waves of interest rate liberalization. The one in 1960s came as a response to the large-scale capital outflow in some developed economies like Germany and France. The second one in 1970s was triggered by the consistent hyperinflation and capital disintermediation<sup>1</sup> in counties like U.S. and U.K., following the two oil crises. And in 1990s, the top-down interest rate reforms conducted by the government appeared in emerging economies. The experience of these countries illustrates clearly that interest rate liberalization is indeed a double-edged sword. There are many conditions needed to be considered carefully when conducting such a reform. Fortunately, history often exhibits astonishing parallels.

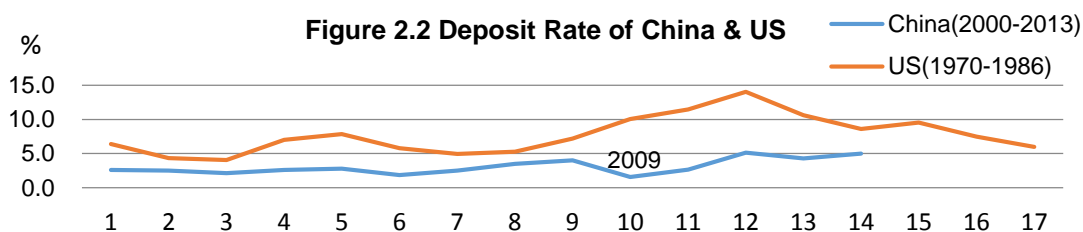
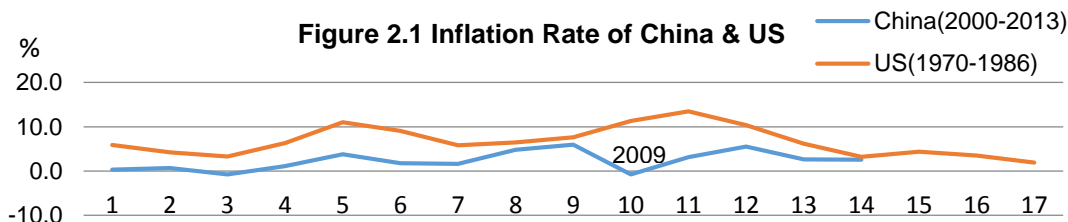
The United States is one of the forerunners that started this reform and completed it successfully in a phased manner. Deposit rate ceiling in U.S. was set by Regulation Q in the Banking Act of 1933 to prevent a recurrence of widespread bank failure and to lower the capital costs of banks, when the federal deposit insurance was also established. However, since 1970s, under the pressure of high inflation, various financial institutions and derivatives were developed in correspondence to investors' needs, such as the Money Market Fund (MMF). These MMFs developed quite rapidly as there was no deposit reserve requirements and no restrictions on their return. And finally, motivated by both the consistent outflow of

---

\* Ph.D. Candidate, Department of Economics, Graduate School of Arts and Sciences, Fordham University, Email: jchen122@fordham.edu, junwei20082009@gmail.com

deposits from commercial banks to MMFs, and financial disintermediation, Regulation Q was abolished in 1986.

China is viewed to face a similar situation now, from the comparison of inflation rate and deposit rate between China from 2000 to 2013 and US from 1970 to 1986, which was its reform period. Even though China officially started its deregulation of interest rate market in 1996, it soon came across a deflation afterwards due to the Asian financial crisis. Thus I think it would be better to compare the two rates after China got out of deflation. Here I used Consumer Price Index to calculate the inflation rate and the yield of 3-month treasury bill to represent the deposit rate, which are all in annual terms.



From the graphs above, it is apparent that the trends of both inflation rate and deposit rate are basically the same between China and US, only except the abrupt downturn at 2009. If there was no such a severe financial crisis at that time, we would expect a similar increasing path for the two indexes in China. This important macroeconomic background has clearly demonstrated that China has come to the point to make changes as U.S. did in the past.

On the other hand, the boom of the so-called "Baby Legion" represented by Yu'E Bao<sup>2</sup> in China, has also substantially increased the cost of banks to absorb deposits and even caused the movement of capital stock of banks, which is similar to MMFs in US, both resulted from a low level of deposit rate and from the pursuit of investors for higher return. The only thing needed is to change the commercial papers into large deposits of banks, but the logic is still the same. Moreover, the rapid development of Internet Finance in China also began to divert the inflows of banks. All of these non-bank financial products, which are also called shadow banks, are continuously draining stocks of banks, while the competitiveness of banks are still restricted by the deposit rate ceilings.

Driven by both the obstacles in direct financing system and the expansion of shadow banks, China is indeed going through almost the same situation as U.S. faced in 1970s. Therefore, it would be very

meaningful to study the U.S. case and get policy implications to avoid possible problems. In this paper, I will firstly review the related research of U.S., and then combine a VAR model with a VECM to discuss the mutual effects among deposit rate, mortgage loan rate, real wage, GDP growth rate and house price, as well as their policy implications for the Chinese reform.

## 2 LITERATURE REVIEW

The existing literature has provided lots of discussion about the deregulation of deposit rate in U.S.. The theoretical foundation originated from the theory of financial repressing & financial deepening introduced by Mckinnon and Shaw (1973). They pointed out that the regulation of interest rate would keep it at the level lower than that in equilibrium, harming the efficiency of capital and inhibiting deposits, investment and economic development. Hence they proposed financial liberalization to cure the problems of financial repressing, especially the deregulation of interest rate and exchange rate.

Keeton (1984) combined the analysis with deposit insurance and showed that the removal of deposit rate ceilings would bid up the interest rates on insured deposits, exacerbating the distortion in bank risk-taking behaviors resulted from the moral hazard problem. Meanwhile, Gilbert and Holland (1984) stated that the substantial increase in mortgage loan rate in U.S. since 1970s was not caused by the deregulation of deposit rate, but by the variability of interest rates and economic downturn.

Afterwards, Keeton (1986) continued to testify that by giving rise to availability effects of bank credits, the deposit deregulation would reduce availability effects but not enough to significantly weaken monetary policy. Moreover, Bernanke and Gertler (1995) also found that the balance-sheet effects in the credit channel of monetary policy transmission had not been eliminated in the era of deregulation and innovation, such as the impact of mortgage burden on housing demand.

Considering other countries, Kwan (2002) examines the case of Hong Kong, suggesting that banks earned rents from deposit rate rules and deregulation would lower these rents and hence bank market values. A publication from the Economic Times (2011) predicts that the deregulation of savings bank deposit interest rates announced by the Reserve Bank of India (RBI) are likely to increase the costs both for banks and borrowers and hence push up loan rate. Additionally, a report from RBI (2011) itself claims that there is no evidence of unhealthy competition among bank immediately after the deregulation and a market-based interest rate may be beneficial to savers.

As for China, a working paper from IMF (2009) using case studies and model-based simulations, finds that China already meets several preconditions for deposit rate deregulation and it will likely lead to higher interest rate, improved effectiveness of monetary transmission, and enhance the financial access of underserved sectors. More recently, Song, Storesletten and Zilibotti (2013) explores the effects of capital controls and policies regulating interest rates and exchange rate in a model of economic transition applied

to China, and shows the activist interest rate policy would benefits entrepreneurs during the transition and future works with higher wages.

Overall, as a rapidly developing country, China may also complete such a reform more quickly than some developed economies. But valuable experience tells us an orderly progressive reform with complete supporting system and relatively stable macroeconomic background are particularly crucial.

### 3 DESCRIPTION OF DATA AND MODELS

The data selected for this model is quarterly data of the United States from 1979 to 2013, covering the period of the world-wide financial crisis. All the data are collected from Federal Reserve Economic Data and Bureau of Labor Statistics. Table 3a below shows the descriptions for the original data I collected.

**Table 3a Original Variables Used in Regression**

Variable	Description
dr	Deposit interest rate, represented by the second market rate of 3-month treasury bill.
mr	Mortgage rate, represented by 30-year conventional mortgage rate.
w	The median usual weekly earnings of all workers except incorporated self employed, in current dollars, from the Current Population Survey.
gdpr	GDP growth rate of U.S..
hp	All-transactions house price index for the United States with Index 1980 Q1=100.
p	Consumer Price Index for all urban consumers of all items.

Specifically, during the first stage of interest rate liberalization from 1979 to 1981, the deposit rate showed an acceleration of increase, and then began to peak off. After 1982, capital was allocated more efficiently under the guidance of market price, decreasing the deposit rate. Recently, with the extremely weak economy and a threat of deflation, the Federal Reserve lowered short-term interest rate and brought them essentially to zero in December 2008.

Before putting them into the model, I divide the weekly wage by price to get the real wage "*rw*", as the real wage explains more about the workers' welfare than the nominal ones. Similarly, I also transform the house price into the real level of house price "*rhp*".

#### 3.1 VECTOR AUTOREGRESSION (VAR)

Firstly, the stationarity of each series should be checked by augmented Dickey-Fuller (ADF) unit roots test. Here I applied the ADF test with constant and trend, and found that only the series of GDP growth rate is always stationary. So I continue to test the order of integration on their first differences and find that all the five series are integrated of order one.

After testing the VAR estimation with different lags, according to both AIC (Akaike information criterion) and SIC (Schwarz information criterion), VAR with lag of 4 period is optimal and stationary. So now I can

analyze the results of this VAR estimation step by step. Also note that I am using triangular factorization and the variables are orders as [dr mr rw gdpr rhp].

**Table 3b: Granger-Causality Tests**

<i>Regressor</i>	<i>Dependent Variable in Regression</i>				
	dr	Mr	rw	gdpr	rhp
dr	0.00	0.00	0.50	0.00	0.01
mr	0.39	0.00	0.92	0.21	0.13
rw	0.32	0.11	0.00	0.89	0.43
gdpr	0.00	0.02	0.45	0.00	0.80
rhp	0.95	0.54	0.06	0.18	0.00

The results of Granger-Causality test show that the deposit rate can help predict mortgage loan rate, GDP growth rate and real house price at the 1% significance level. But the test does not provide any evidence that deposit rate granger-causes real wage. On the other hand, GDP growth rate is the only one that can help predict deposit rate at 1% significance level and real house price can granger-cause real wage by at a 10% significance level. Moreover, GDP growth rate granger-causes mortgage loan rate at 5% significance level.

The impulse responses, with a horizon of 50 quarters, show clearly the direction and magnitude of changes in variables to a shock on deposit rate, such as an announcement of the relaxation in regulations. In response to a 1% increase in deposit rate, the mortgage loan rate first increases for 8 quarters and then gradually declines. Meanwhile, real wage reacts negatively to the increase in deposit rate, and its absolute magnitude starts to decrease after 7 quarters. GDP growth rate originally responds positively but immediately drops sharply to negative, and oscillates around 0. Until 11 quarters later, it returns to stay positive. Besides, the magnitude of negative impulse response of real house price keeps growing and does not fall until 15 quarters later.

Last but not least, the results of variance decomposition confirmed the relationship suggested by Granger-Causality tests. Interestingly, real wage takes the largest percentage in explaining all the other variables almost all along the 50 horizons, and deposit rate next. About half of the variance of mortgage loan rate is originally explained by deposit rate and itself, but only for 2 quarters, real wage becomes dominant. GDP growth rate has a very similar variance decomposition with mortgage rate. However, the case of real house price is a little different. As horizon extends, the part explained by itself first increases and then declines, while at least 80% is still explained by real wage and the contribution of deposit rate finally reaches about 6.5%. On the other hand, deposit rate is the only one that may have some influence on the variance of real wage, although 99% is still explained by itself.

### 3.2 VECTOR ERROR-CORRECTION MODEL (VECM)

After examining the mutual effects among these variables, it is also important to check whether there exists a long-run equilibrium relationship. As the variables in VECM are the first difference of original ones, the optimal lag selection should be 3. Before that, I used the Johansen tests to verify the existence of cointegration and the results indicate that the five variables are cointegrated and the rank is 1. So that I can derive the following VECM and part of the estimation output is shown below.

$$\mathbf{Z}_t = \mathbf{A}' \mathbf{y}_t$$

$$\Delta \mathbf{y}_t = \delta_0 + \delta_1 \Delta \mathbf{y}_{t-1} + \delta_2 \Delta \mathbf{y}_{t-2} + \dots + \delta_{p-1} \Delta \mathbf{y}_{t-p+1} - \mathbf{BZ}_{t-1} + \boldsymbol{\mu}_t, \text{ where } \mathbf{Z}_t \text{ is a stationary } 1 \times 1 \text{ vector}$$

$$\mathbf{y}'_{t-i} = [\mathbf{dr}_{t-i} \quad \mathbf{mr}_{t-i} \quad \mathbf{rw}_{t-i} \quad \mathbf{gdpr}_{t-i} \quad \mathbf{rhp}_{t-i}], i=1, \dots, p-1$$

**Table 3c: Estimation Result of VECM (Selected Part)**

Variables	dr	mr	rw	gdpr	rhp
L._ce1	0.0402001*** (3.87)	0.0253783*** (3.84)	-0.0009732 (-1.55)	-0.0269485** (-2.81)	0.0002356 (0.97)
LD.dr	0.0772634 (0.437)	0.1799935** (2.84)	-0.0008939 (-0.15)	0.2096301* (2.28)	-0.0050553* (-2.18)
L2D.dr	-0.5239565*** (-5.11)	-0.1327983* (-2.04)	-0.0052615 (-0.85)	-0.3160056*** (-3.34)	0.0021099 (0.88)

Note: t statistics in parentheses, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001.

In summary, there are five variables and rank(1) specified to estimate one equilibrium relationship. The speed of adjustment in the first equations is about 0.04, implying the speed of deposit rate at which it adjusts to the error correction term. And other speeds work in the same way. The long-run equilibrium relationship is

$$\mathbf{dr} - 2.536456\mathbf{mr} + 19.95425\mathbf{rw} + 13.93706\mathbf{gdpr} - 3.771821\mathbf{rhp} - 63.57376$$

This suggests that variables are all linked to deposit rate with the expected signs. But only the coefficients of mortgage rate and GDP growth rate are statistically significant at 99% confidence level. As showed above, the short-run adjustment parameter of deposit rate with lag one is 0.077 and that with lag two is -0.524, but only the latter is statistically significant. This result demonstrates that even though deposit rate adjusts most quickly among the five variables, it will still go through some oscillation before it reaches the long-run equilibrium, but not simply in a monotone adjustment path.

### 4 DISCUSSION OF RESULTS AND POLICY IMPLICATIONS

After going through the two models, their results are basically in accordance with the economic theory and the previous expectations. Next I will discuss their policy implications in detail.

#### **4.1 DEPOSIT RATE & MORTGAGE LOAN RATE**

The results above, especially the result that GDP growth rate granger-causes mortgage rate also confirms the conclusions of Gilbert and Holland (1984) that the increase of mortgage rate in 1970s was indeed caused by the variability of interest rates and economic downturn. On the other hand, it also verifies that the deregulation would increase the risk-taking behaviors of banks by providing more long-term credits and more mortgage lending, which can be concluded from economic theory in either a competitive national market or a market where each depository institution has some power.

Therefore, timing of deposit rate liberalization matters and it is important to keep monitoring the market fluctuations. Generally speaking, it would be more appropriate to deregulate deposit rate in an easy monetary environment with relatively high liquidity. It also reminds policymakers that a phased manner is more appropriate as it will give the government enough time to adjust other supplementary policies. Otherwise, an activist deregulation may lead to sharp swings or even a crisis.

Nevertheless, this conclusion is really important for China whose potential economic growth is still at medium or high speed and economic activities remain sensitive to interest rate changes. Moreover, experiences of many developing countries have proved that there are large sum of mid- and low-end customers in great demand of different kinds of financial services in rural areas. But the cost of providing such services is much higher than that to key accounts. Thus the fact that a deregulation of deposit rate would finally lead to a decline in mortgage loan rate will provide more advantages for development of rural finance, which has become the vein of contemporary economy in China.

#### **4.2 DEPOSIT RATE, REAL WAGE & REAL HOUSE PRICE**

Real wage seems to be uncorrelated with the other four variables. Although the long-run equilibrium relationship and the impulse response suggests that it would experience a little decline for some time, the coefficient still lacks enough significance. But it may be due to the problem of the data. It could be more meaningful if separating the labor force by occupation and check the effects of deposit rate liberalization on the real wage of each groups.

The results of the real house price is definitely a good news for Chinese government who has tried several ways to control the continuous increase and possible bubbles in housing market in China, such as house purchase quota policy. And in my model, the decrease of real house price would in turn strengthen the public purchasing power in the housing market.

Therefore, even though the results in this paper cannot clarify the effects of deposit rate liberalization on real wage, it still confirms that there will be real effects on people's benefits, helping improve some aspects of their living standards.

### **4.3 Deposit Rate & GDP Growth Rate**

China once kept an astonishing GDP growth rate for over ten years, which recently goes down to 7.4%. The number sounds fine, but the growth rate of final demands sharply declined to only 7.0% for the first quarter in 2014. The macroeconomic statistics in August also hit a new low boundary.

Even though strong stimulations to keep steady growth such as lowering interest rate would be only temporarily effective and may lead to larger problems in the future, under such a falling economic growth rate and the boom of shadow banks, people may say deregulation of deposit rate should be postponed. However, this deregulation is not equal to an increase in deposit rate. Especially for China, where the influence of high interest rate has already been partly released due to shadow banks and other non-bank financial products, it would not necessarily deteriorate the financing environment for many enterprises and further the economic growth.

As showed above, GDP growth rate is the only one that can help predict deposit rate. From this perspective, GDP growth rate would not only become a valid index to check the achievements of interest rate liberalization, but also a good market detector signaling possible problems in the interest rate market.

## **5 CONCLUSION**

This paper uses both VAR and VECM to examine the effects of deposit rate liberalization on mortgage loan rate, real wage, GDP growth rate and house price, showing that the deregulation of deposit rate would increase mortgage rate and decrease GDP growth rate for some time, but in the long run, it will lead to a decline in mortgage rate and house price, and also take GDP growth rate to an increasing path. But this paper cannot verify the relationship between deposit rate and real wage.

These conclusions and the similarities of reform background between China and the United States have provided much confidence in the Chinese version of deposit rate liberalization. It is appropriate for China to follow a similar phased manner with US as "long-term first, short-term later; large-scale first, small-scale later". For instance, it may be beneficial to first allow banks to increase the current floating ceilings on deposit rate from 10% to 30% or even 50%. More importantly, however, is the improvement of short boards in the supplementary system, especially when China is facing the dual pressure from the declining economic growth rate and competition with shadow banks. Deposit insurance is one of the most contributive elements in the success of U.S.. Besides, strengthening the market and banking supervision, including adjusting the balance sheet structure of commercial banks also matters, in order to avoid ruinous competition among banks and possible financial turbulence. Meanwhile, reforms of state-owned enterprises should be pushed forward to separate government power from the financing process, and the exit mechanism of financial institutions should be further improved to protect investors better and avoid the possibility of moral hazard and vicious bank runs.



In a word, deposit rate liberalization is like stepping stones, but not just simply removing its ceiling, but should be a natural accomplishment resulting from improvements of the comprehensive economic, political and operational systems. After all, practice is the only way to test the truth.

#### ENDNOTES

1. Disintermediation is the removal of intermediaries from a process, supply chain or market. In capital market, a common example is that by selling securities, a borrower can borrow directly from investors, bypassing banks.
2. An online investment fund which became popular in China since 2013 by offering investors better liquidity and higher rates of return.

#### REFERENCES

- Zheng Song, Kjetil Storesletten, Fabrizio Zilibotti. 2013. "Growing (with Capital Controls) Like China", *IMF Economic Review*.
- Ben S. Bernanke and Mark Gertler. 1995. "Inside the Black Box: The Credit Channel of Monetary Policy Transmission", *The Journal of Economic Perspectives*, 9(4): 27-48.
- William R. Keeton. 1984. "Deposit Insurance and the Deregulation of Deposit Rates", *Federal Reserve Bank of Kansas City Economic Review (April)*: 28-46.
- William R. Keeton. 1986. "Deposit Deregulation, Credit Availability, and Monetary Policy", *Federal Reserve Bank of Kansas City Economic Review (June)*: 26-42.
- Usha Thorat, Kishori J. Udeshi and S. S. Tarapore. 2011. "Deregulation of Savings Banks' Deposit Interest Rates", *Forum of Free Enterprise*.
- R. Alton Gilbert and A. Steven Holland. 1984. "Has the Deregulation of Deposit Interest Rates Raised Mortgage Rates?", *Federal Reserve Bank of St. Louis Review (May)*: 5-15.
- Simon H. Kwan. 2003. "Impact of Deposit Rate Deregulation in Hong Kong on the Market Value of Commercial Banks", *Journal of Banking and Finance*, 27(12): 2231-2248.
- Reserve Bank of India. 2011. "Deregulation of Savings Bank Deposit Interest Rate: A Discussion Paper".
- Uluc Aysun and Ralf Hepp. 2011. "Securitization and the Balance Sheet Channel of Monetary Transmission", *Journal of Banking and Finance*, 35(8): 2111-2122.
- Jing Cao and Junli Zhi. 2013. "On Financial Repression in China", *China Opening Journal*, No.1, Total No.166.
- Barry Bosworth and George L. Perry. 1994. "Productivity and Real Wages: Is There a Puzzle?", Washington, D.C.: Brookings Institution.
- Ronald I. Mckinnon. 1973. "Money and Capital in Economic Development", Washington, D.C.: Brookings Institution.

Edward Shaw. 1973. "Financial Deepening in Economic Development", New York: Oxford University Press.

Vikas Agarwal. 2011. "Deregulation of Savings Bank Deposit Interest Rates Likely to Push Loan Rates Up", *The Economic Times Bureau*.