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Impact of the US Credit Crunch and Housing Market Crisis on China

by

Shujie Yao, Dan Luo and Stephen Morgan

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The Authors

Shujie Yao is a Professor, Internal Fellow and Programme Coordinator of the China and the World Economy Programme in GEP and Head of the School of Contemporary Chinese Studies, University of Nottingham; Dan Luo is a Ph.D candidate, and Stephen Morgan an Associate Professor, School of Contemporary Chinese Studies, University of Nottingham.

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Abstract:
There are many similarities between the US, the UK and the Chinese housing markets, including the movements of interest rates and house prices. Some Chinese banks, especially the Bank of China, have been exposed to the US mortgage securitization market. These have triggered a serious concern as to whether the US credit crunch and housing market crisis may be replicated in China. This paper shows that there are some significant differences between China and the West, especially the US and the UK. Compared with the US and other western industrialized economies, the booming house market in China has been supported by fast economic growth, rapid urbanization and high domestic savings. In addition, Chinese banks are less exposed to mortgage defaults than their western counterparts because house buyers are mainly urban and high income residents who are required to have high down payments. These Sino-Western economic and social differences suggest that the US credit crunch and housing market crisis may have some negative impacts on Chinese commercial banks and the overall economy but are unlikely to cause a similar financial and housing crisis in China despite the current struggling Chinese stock markets and a slowdown of house price growth.

JEL classification: G24, G28, E51

Key words: US credit crunch, housing market crisis, China

Outline:

1. *1. Introduction*
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Non-Technical Summary

The US sub-prime mortgage crisis which started from August 2007 has been transformed into a worldwide financial turmoil. Not only were the US banks suffered, nearly all financial institutions around the world were affected because of their investments in the US Mortgage Backed Securities (MBS). Between June 2007 and March 2008, more than $430 billion was wiped off the combined market value of the top ten US investment banks, while the losses for the mortgage lenders was about $162 billion (Stamp, 2008). Both the US Reserve and the European Central Bank (ECB) acted swiftly and unprecedentedly to rescue the market.

The most dramatic action taken by the US government was the takeover of Fannie Mae and Freddie Mac, two of the most powerful mortgage companies in the US, announced by the Bush administration on 8 September 2008. This move is designed to forestall a collapse in house prices that could plunge America into a new Great Depression and trigger chaos on the world's financial markets (The Independence, 8 September 2008). Fannie Mae and Freddie Mac together are responsible for half for the US mortgage market which is worth over $10 trillion. The seizure of these two companies puts a federal guarantee behind a $5 trillion of outstanding mortgage debt.

In contrast to the rather nervous reaction in the US, the UK and other G7 economies have taken a rather cautious approach by keeping the interest rates more or less unchanged in fear of inflation pressure caused by high oil and food prices. China's response has been relatively calm; although Chinese share prices have plummeted by more than 50% in eight months from the end of 2007.

There are many similarities between the US, the UK and the Chinese housing markets, including the movements of interest rates, bank lending activities, and slumping house prices. Some Chinese banks, especially the Bank of China, have been exposed to the US mortgage securitization market. These have triggered a serious concern as to whether the US credit crunch and housing market crisis may be replicated in China.

This paper shows that there are some significant differences between China and the West, especially the US and the UK. Compared with the US, the prosperity of the Chinese real-estate market is neither simply triggered by low interest rate nor by attractive mortgage products. It has been developed in accordance with the fast expanding Chinese economy. Raising household income increased the housing demand and consequently led to a prolonged booming real-estate market in China. In addition, Chinese banks are less exposed to mortgage defaults than their western counterparts because house buyers are mainly urban and high income residents who are required to have high down payments. All these Sino-Western economic and social differences suggest that the US credit crunch and housing market crisis may have some negative impacts on Chinese commercial banks and the overall economy but are unlikely to cause a similar financial and housing crisis in China despite the current struggling Chinese stock markets and a slowdown of house price growth.

1. Introduction

The US sub-prime mortgage crisis which started from August 2007 has been transformed into a worldwide financial turmoil. The slump in housing prices increased the default on mortgages, the negative effect further amplified by asset securitization. Not only were the US banks suffered, nearly all financial institutions around the world were affected because of their investments in Mortgage Backed Securities (MBS). The US Federal Reserves responded swiftly to rescue the market through cutting interest rates and extending financial support to house buyers and mortgage lenders.

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In contrast to the rather nervous reaction in the US, the UK and other G7 economies have taken a rather cautious approach by keeping the interest rates more or less unchanged in fear of inflation pressure caused by high oil and food prices. China's response has been relatively calm; although Chinese share prices have plummeted by more than 50% in eight months from the end of 2007.[1]

[1] China's stock market bubble is not directly caused by the economic slowdown in the world. Rather, it is caused by irrational behavior of speculative investors and lack of experiences of key market players, including policy

According to Goldman Sachs, the Bank of China (BOC) was widely exposed to the US sub-prime securities which might generate huge losses (Chen, 2007). However, BOC's annual reports have showed impressive improvement in its profits. As China's financial sector becomes more integrated into the world economy, there is increasingly interest in understanding the influence of the US housing crisis on the Chinese banks and its wider economy. To what extent is the Chinese banking sector exposed to the US sub-prime mortgage market? Might such an exposure spillover into China's financial sector? With the rapid growth in the market for domestic mortgages, is it possible for China to experience a similar housing mortgage crisis in the future?

This paper aims to answer these questions. The rest of this paper is organized as follows. Section 2 will outline the background of the US sub-prime mortgage crisis and its impact on the US and the world economy. Section 3 will focus on China, analyzing its banks' exposure to the US sub-prime securities and discuss how such an exposure may affect its economy. Section 4 will assess the possibility of whether China might experience such a crisis. Sections 5 will draw conclusions and discuss policy implications.

2. Background of the US Sub-prime Crisis and Its Impact

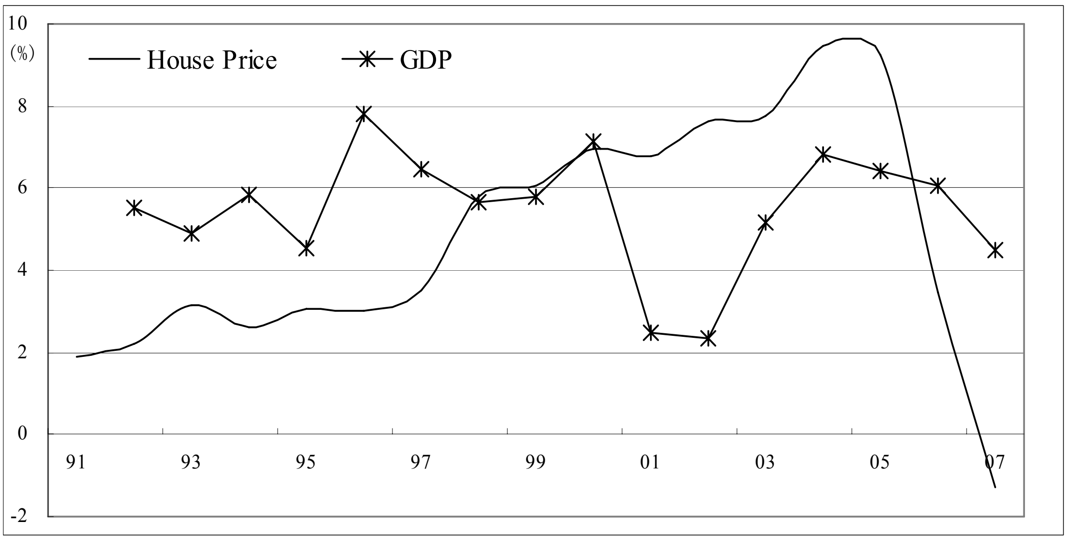
2.1 Sub-prime lending and the housing crisis

MBS represents a debt obligation whose cash flows are backed by the principal and interest payments of a pool of mortgage loans, most commonly on residential property. It originated from the US in the 1970s and was regarded as one of the most important financial innovations in the past three decades. However, such a financial instrument based on risk management can make lenders vulnerable to losses and liquidity stress

makers (Yao and Luo, 2008).

during an economic downturn, as exemplified by the current US sub-prime crisis from August 2007.

After many years' steady improvement, the US economy was hit by the burst of the "*dotcom bubble*"[2] in 2001. The real gross domestic product (GDP) grew by 1.2% in 2001, compared to 4.1% one year earlier (Country Report, USA, 2002). In order to revive the economy, the Federal Reserves cut the interest rate 11 times continuously from 5.5% in January 2001 to 1% in June 2003. Reduced interest rate directly relieved the mortgage payment in the housing market. During the same period, mortgage interest rate dropped by more than 20% from 7.01% in the first quarter of 2001 to just 5.52% in the second quarter of 2003 (PD&R, 2004). Cheaper credit led to a renewed prosperity in the housing market. The US housing price index more than doubled between 2000 and July 2006, when reached its highest level of 206.52 (January 2000=100). In particular, the US house prices increased faster than its GDP growth from December 2001 up to 2005 (Figure 1).



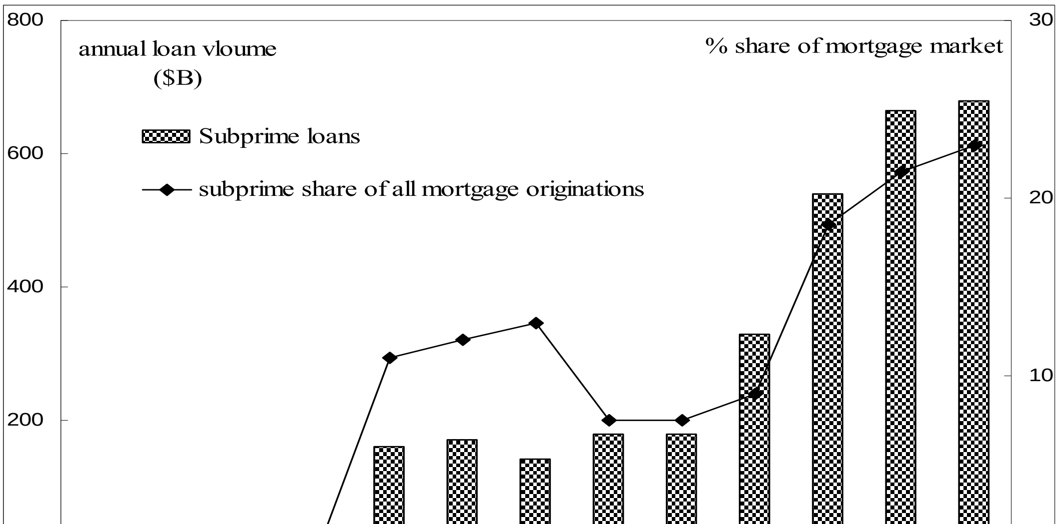
Source: Country Report, United States, 1996-2008.

Figure 1 US real home prices vs. real GDP

[2] Also is referred as "I.T bubble". It was a speculative bubble starting roughly from 1995 and peaked in 2000. During this period, the value of the stock markets in Western nations increased rapidly because of the growth in the new Internet sector. Many companies dismissed standard business models, purely focusing on increasing market share at the expense of the bottom line. When the bubble burst, many dotcoms ran out of capital and were acquired or liquidated, representing the beginning of a period of mild recession in the developed world.

Meanwhile, various personal mortgage products were pushed into the market aimed at people with poor or impaired credit history, such as adjustable-rate mortgage (ARMs), interest-only ARMs and negative amortization loans[3]. From 1999 to 2006, total mortgages grew from $4 trillion to nearly $10 trillion, representing an increase of 14% per annum (Authorite Des Marches Financiers, 2007). Within these newly created home mortgages, sub-prime lending in particular has increased tremendously and played an important role in increasing homeownership rate and creating a 'wealth effect'[4] (The Economists, 2006). From 2004 through 2006, about 21% of the mortgages issued were sub-prime, up from 9% from 1996 through 2004 (Waggoner, 2007). Till the end of 2006, sub-prime mortgages totaled $665 billion (Figure 2), accounting for 23% of the US home loan market (Bernanke, 2008).

Figure 2 Sub-prime mortgage growth and its share in the total mortgage market



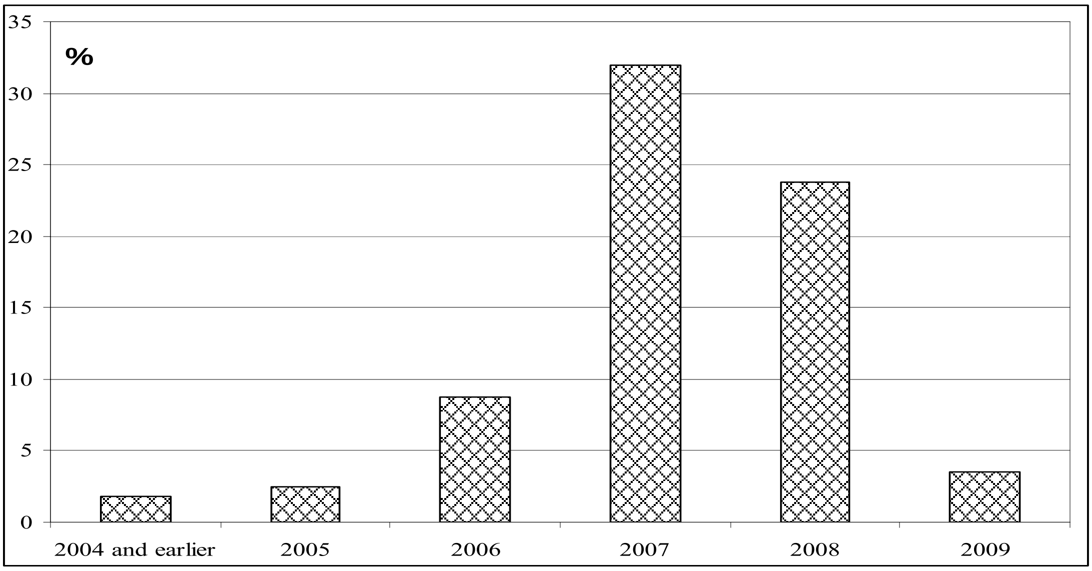
Source: Schloemer, et al. (2006).

[3] These three types of loans are quite typical in the US mortgage market. Adjustable rate mortgage (ARM) is a mortgage loan which adjusts the interest rate on the note periodically based on a variety of indices, such as 1-year constant-maturity Treasury (CMT) securities and London Interbank Offered Rate (LIBOR). An interest-only ARM is a loan in which for a set term the borrower pays only the interest on the principal balance, leaving the principal balance unchanged. At the end of the term, the borrowers may choose to enter an interest-only mortgage, pay the principal, or convert the loan to a principal and interest payment loan at their own option. The negative amortization loan means that based on some pro-agreed terms, the loan payment for a period can be less than the interest charge over that period and this shorted amount is then added to the total amount owned to the lender. From an international perspective, all these three mortgage types belong to *Variable Rate Mortgage* or *Floating Rate Mortgage* whose interest rate fluctuates to reflect market conditions.

[4] People are more prepared to borrow if they believe they have become richer as a result of the upswing house prices.

After the US economy recovered, its predominant problem became how to control inflation. From June 2004, the Federal Reserves raised the interest rate 17 times consecutively to 5.25% by 29 June 2006. Increased interest rate imposed significant pressure on home owners, leading to foreclosures and a sharp drop in house price. This problem worsened after the second half of 2007 when most of the adjustable-rate or interest-only mortgages entered their resetting period (Figure 3). Up 79% from 2006, nearly 1.3 million US housing properties were subject to foreclosure activity in 2007 (RealtyTrac, 2008). After the first two years' low initial offering rate period expired, the revised interest rate increased as much as 30-50%. Accompanied by the banks' tightened lending activities, housing demand was further reduced, which caused more price drops and defaults.

Figure 3 First reset date as % of sub-prime outstanding



Source: FitchRatings, Loan Performance, http://www.fitchrating.com.

During the previous downturn in the early 1990s, the US average house price fell by 2.8% according to the S&P/Case-Shiller Home Price Index (Corkery and Hagerty, 2008). However, the price slide this time was substantially steeper and has lasted much longer. By November 2007, average US house prices had dropped approximately 8% from its peak reached in the second quarter of 2006 and by May 2008, they had fallen 18.4% (Case Shiller Data File, 2008). When home owners find that the house values are significantly less than their outstanding mortgages (negative equity), they may be inclined to default rather than struggle with mortgage payments.

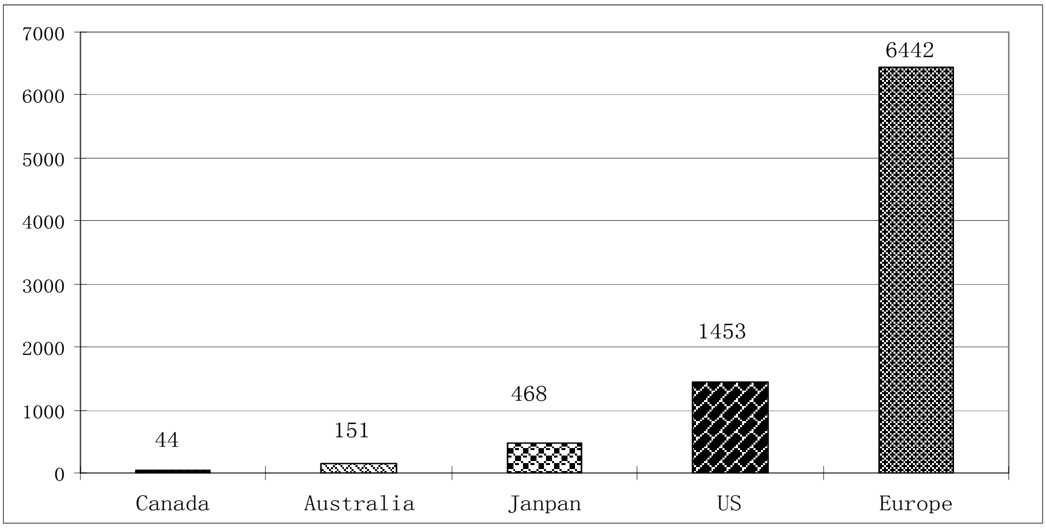
2.2 Impact of the credit crunch on the US and world economy

On 9 August 2007, when BNP Paribas froze three of its investment funds, owing to a "*complete evaporation of liquidity*" in the market, the US sub-prime mortgage crisis broke out (Jones, 2007). Two credit rating agencies, Moody and Standard & Poor's, downgraded the ratings of 399 and 612 sub-prime related mortgage backed securities (RMBS) respectively soon afterwards (England, 2007). Heightened levels of fear in the credit market soon transformed the original residential mortgage default problem into a financial turmoil. Investors lost confidence in the US housing market and its economy, causing the collapse of its stock market. The US S&P 500 Index slumped to 1280 on 30 June 2008, almost losing all the gains from the second half of 2006.

Turbulence of the financial market also generated substantial negative impacts on the US real economy. The US GDP growth rate slowed substantially to 2.2% in 2007 and further weakened to 1% in the first quarter of 2008 (EIU, 2008). Bearing the risk of higher inflation, the US Federal Reserves slashed interest rate six times consecutively to 2% by April 2008 to stimulate consumption and generate relief for borrowers. However, it also accelerated the speed of the US dollar depreciation. Huge amount of foreign investments was withdrawn from the US market, making capital financing more difficult. Meanwhile, these "hot money" imposed greater pressure on the Euro and other currencies, generating turbulences in the worldwide financial markets.

Stock and housing markets around the world plummeted and the threat of the sub-prime crisis nowadays has gone well beyond the borrowers with poor credit to include prime borrowers (Guerrera and Scholtes, 2008; Chen, 2008). Both the US Reserve and the European Central Bank (ECB) acted swiftly and unprecedentedly. However, it was the ECB which pumped the largest amount of money to rescue the market. Figure 4 depicts the capital injection from central banks of different nations by 31 August 2007.

Figure 4 Capital injections from central banks ($100 million)



Source: "US Sub-prime Crisis and the Worldwide Financial Storm", http://focus.jrj.com.cn/special/home/2007mcjzqqjrwj.html

On 9 August 2007, the central banks of the US, Japan and the EU pumped $24 billion, $8.4 billion and €94.8 billion respectively into the banking system to prevent a financial meltdown. The support from the ECB this time had exceeded its capital injection after the "9.11" event and it further appeased the market by announcing that the bank would try to satisfy all the financing requirements of financial institutions (The Economist, 2007). As European banks have a larger exposure to financial derivatives, the risks they faced are even larger than their US counterparts (Tett, 2008; Tang, 2008). Later on 11 March 2008, the US and European Central Banks jointly injected another $200 billion to appease the worsening situation.

All the Wall Street giants suffered tremendous losses. Between June 2007 and March 2008, more than $430 billion was wiped off the combined market value of the top ten US investment banks, while the losses for the mortgage lenders was about $162 billion (Stamp, 2008). On top of the list was Citigroup, which suffered $40.7 billions losses on their sub-prime related investments; Swiss banking giant UBS and US bank Merrill Lynch also unveiled huge losses of $38 and $31.7 billion respectively

(Murphy and Simonian, 2008). Goldman Sachs (2008) estimated that total losses could reach $400 billion while the OECD has set the upper limit on the damage of $420 billion. However, if aggregated by other failed mortgage loans, devalued MBS and other bad debts, the International Monetary Fund said the potential losses could as high as $1 trillion (Guha, 2008).

Apart from the western banks, Goldman Sachs disclosed that one of the biggest Chinese commercial banks, BOC, had also invested heavily into the US sub-prime market and may face substantial losses. As China’s financial sector becomes more integrated into the world economy, people are increasingly interested in understanding the influence of the US housing crisis on the Chinese banks and its economy.

To what extent has the Chinese commercial banks been exposed to the US sub-prime mortgage sector? Will the US housing crisis be replicated in China? These are two important questions that need to be addressed so as to get a better understanding of the current Chinese housing and stock markets close to and after the 2008 Beijing Olympic Games.

3. US Credit Crunch and Its Impact on the Chinese Economy

3.1 Chinese commercial banks exposure to the US sub-prime mortgage

The Capital Weekly (2007), a Chinese journal, reported that Chinese financial institutions invested $107.5 billion into the US sub-prime sector in the year ending 30 June 2006. This figure was almost doubled the previous year. It further estimated the possible losses of six listed Chinese commercial banks based on 2006 data and information released by the US Treasury (Table 1).

Table 1 Chinese banks exposure to US sub-prime mortgage securities (mil RMB)

Bank	US Securities Investment	ABS (%)	SPL Lending (%)	Value of SPL	Estimated Loss of SPL	Compared with PBT of 2007 (%)
BOC	590,766	37.4	0.51	29,641	3,853	4.5
CCB	306,685	10.8	0.07	4,433	576	0.7
ICBC	199,870	3.5	0.01	930	120	0.1
BCOM	27,583	52.5	0.1	1,941	252	1.2
CMB	34,272	17.3	0.07	794	103	0.7
CITIC	24,052	4.8	0.02	154	19	0.2

Notes: ABS: Asset Backed Securities; SPL: Sub-prime Loans; PBT: Profit before Tax. PBT in 2007 is estimated. BOC = Bank of China, CCB = China Construction bank, ICBC = Industry and Commercial Bank of China, BCOM = Bank of Communication, CMB = China Merchant Bank, CITIC = China International Trust and Investment Corporation.
Source: *Capital Weekly*, 11 August 2007, http://focus.jrj.com.cn.

The disclosure of these losses generated huge turmoil in the Chinese financial market. BOC clarified immediately that their exposure was not so large as reported. CCB and ICBC confirmed that they only had limited holding of US sub-prime related investments, while the joint-equity banks, CITIC and BCOM, simply denied the possession. CMB announced that all its sub-prime securities had already been settled in August 2006 in a favorable condition.

On 25 March 2008, the BOC released its 2007 annual report. The net profit of the group was up 31% to 56.2 billion RMB, but far inferior to the other commercial banks, such as ICBC, whose net profit rose 65% (Leow, 2008). Meanwhile, it disclosed all the information related to its sub-prime mortgage investment for the first time. By the end of 2007, the bank had already settled most of its MBS and entire Collateralized

Debt Obligations (CDO)[5]. The remaining balance was $4.99 billion (36.4 billion RMB) MBS and $2.47 billion (18.04 billion RMB) Alt-A[6], accounting for 2.13% and 1.1% of the group's total securities investment. BOC provided $1.3 billion (9.5 billion RMB) and $0.3 billion (2.1 billion RMB) loan loss provisions for its MBS and Alt-A respectively in 2007 (Hou, 2008). However, Moody estimated that the actual losses for the MBS alone could reach $2.1 billion (14 billion RMB) after reassessing the associated risks. If the value of BOC's US security investment dropped by 5% on average, the total loss could be as high as 19.8 billion RMB in 2008, wiping off 18.7% of the group's expected profit (Huang, 2008). There is little doubt that BOC's 2008 performance will be heavily impaired.

3.2 US credit crunch and its impact on the China's economy

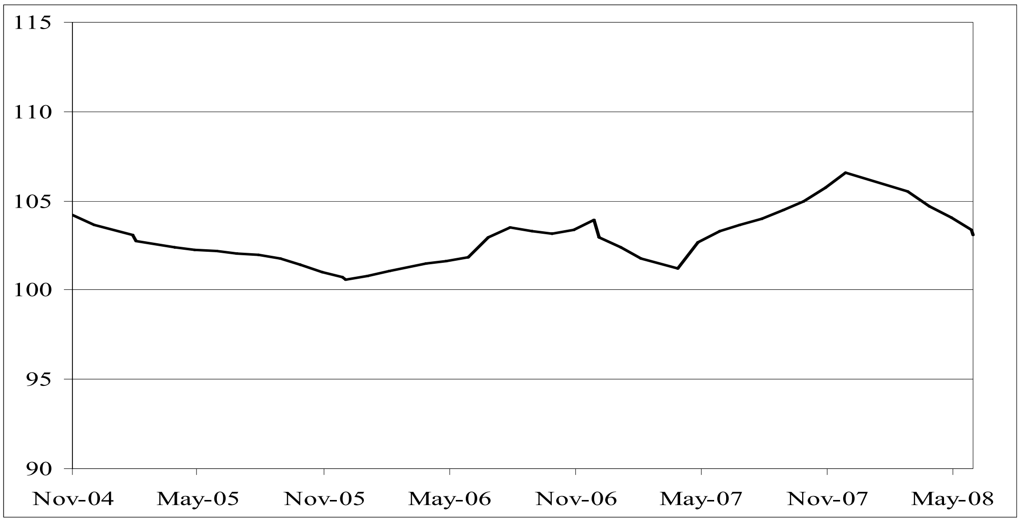
The US credit crunch directly drags down the Chinese housing market. Figure 5 depicts the movement of the "Chinese Housing Prosperity Index"[7] (CHPI, March 1995=100).

[5] CDO is an unregulated type of asset-back security and structured credit product. It is constructed from a portfolio of fixed-income assets which are divided by the ratings firms that assess their value into different trenches. It is an important funding vehicle for fixed-income assets. On 30 June 2007, the balances of BOC's MBS and CDO were USD 8.965 and 0.682 billion. On 31 March 2008, the balances of BOC's MBS and Alt-A were $4.43 billion and 2.21 billion respectively.

[6] An Alt-A mortgage is a type of US mortgage which is risker than "prime" but safer than "sub-prime" mortgage. Its interest rate is therefore in between those of prime and sub-prime house loans.

[7] CHPI has been designed to capture the overall development environment of the Chinese real-estate industry. It is a composite index calculated based on eight categorical indices, such as real-estate investment, financing, land transfer income, etc. This data is issued monthly by the government using March 199. 5 as the base point.

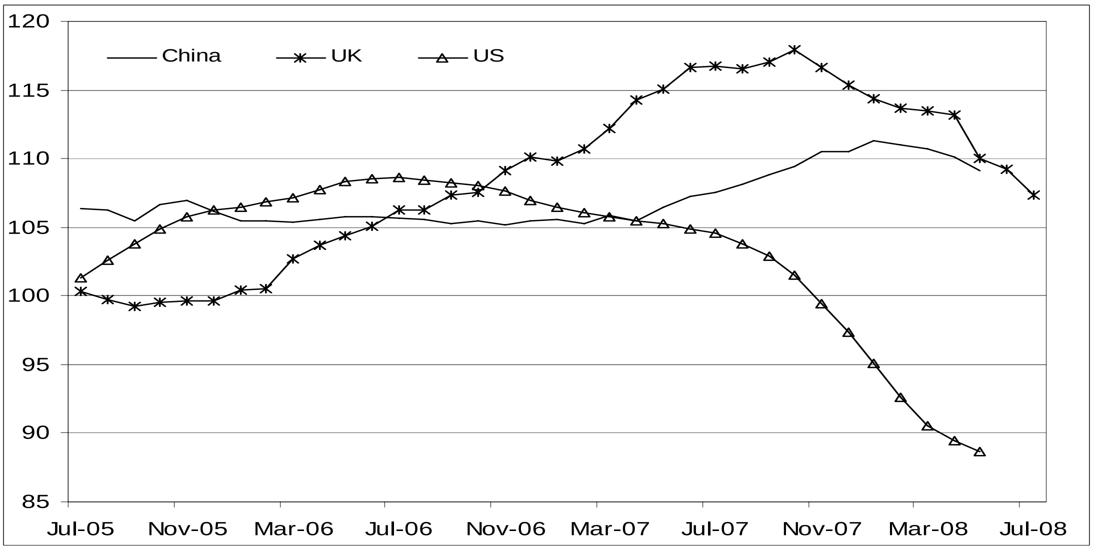
Figure 5 Chinese housing prosperity index (CHPI): November 2004-March 2008



Source: National Development and reform Commission Monthly Statistic 04-08.

CHPI has been designed to reflect the development and the prosperity of the Chinese real-estate market. In May 2008, it dropped six months in a row, reaching 103.34 points. Another indictor, "House Price Index of 70 Large- and Medium-sized Cities in China" showed a similar picture. Figure 6 compares the house price index movements of China, the US and the UK (July 2005=100).

Figure 6 House price indexes: China, the US and the UK, (July 2005-July 2008)



Source: US Composite-20 SPCS20R, Standard & Poor's, http://www2.standardandpoors.com/portal/site/sp/en/us/page.topic/indices_csmahp/0,0,0,0,0,0,0,0,0,1,1,0,0,0,0,0.html; UK Nationwide House prices, http://www.nationwide.co.uk/hpi/historical.htm, China 70 large- and Medium-cities house price index, National Development and Reform Commission, monthly statistic, 2005-08.

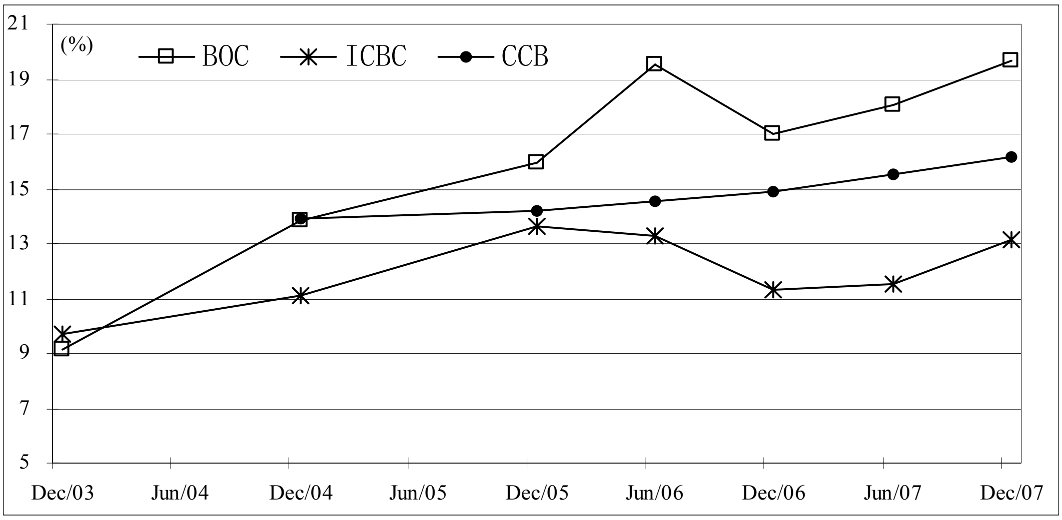
The Chinese house price index went up by 9.2% year-on-year in May, 2008. However, compared with April, it only increased by 0.1%, 0.9 percentage points lower than the previous month. Figure 6 shows that the variations of the Chinese, the US and the UK house prices are closely related[8], with the Chinese market a bit lagging behind those two developed nations. The current situation in China is similar to the US market from July 2006 to March 2007, when the soaring house price began to slow down. After this relatively stable period, a sharp downturn of the market is likely to occur.

The slowdown in the Chinese house market has imposed huge pressure on bank operation and profitability. During the past five years, the proportion of home mortgages to total loans increased from 9.2% to about 15% and became an important revenue generation part of banks operation (Figure 7). However, the banks could no longer rely on expanding mortgage lending business to boost profit this year. In the first quarter of 2008, the balance of personal residential mortgages increased by 9.5 billion RMB, or 20% lower than the increase during the same period in 2007. On the other hand, the default rate and prepayment risk increased substantially. For example, the Guangdong branch of the China Merchant Bank (CMB) reported that in the first quarter of 2008, 0.6 billion RMB personal loans[9] were repaid to the bank, of which more than 80% belonged to mortgage prepayment (Shihua Financial Report, 2008).

[8] We tested the correlation coefficient among the UK, the US and China house price indices. The correlation coefficient between UK and China, US and China and UK and US are 0.59, -0.86 and -0.39 respectively, which indicate that house prices of these three nations are correlated. We then run the following regression using house indices of the three countries, China = $\alpha + \beta_1$US+ β_2UK. We found that both of β_1 and β_2 are highly significant at 1% and R^2=0.81, which further confirmed that China's house price index is highly influenced by the indices of UK and US.

[9] Personal loans includes: personal residential mortgage loans, credit card loans and other loans, in which personal residential mortgage loans account for around 80% of the total personal loans.

Figure 7 Percentage of housing mortgage to total loans, 2003-07



Note: CCB's 06, 07 interim reports are unavailable, so these two figures are estimated based on the annual reports.

Source: Annual and interim report of CCB, ICBC and BOC, 2003-07.

Meanwhile, Chinese banking stocks slumped. BOC's share price dropped continuously for eight months, from 7.48 RMB to 4.05 RMB on 30 June 2008. Poor performance in the banking stocks has seriously affected the performance of the entire stock market in China. The Shanghai Stock Exchange Composite Index declined more than 55% to 2,736 by the end of June 2008. Yao and Chen (2008) argue that such a sharp downturn might have been associated with by the US credit crunch, but a more recent study by Yao and Luo (2008) attributes the Chinese stock market crash to some specific psychological factors of Chinese investors.

Moreover, the weakened US dollar and the contraction in US consumer spending hit China's exports hard. Export to the US have slowed significantly since the beginning of 2007, dropping from a 20.4% year-on-year rise in the first quarter to 12.4% in the third quarter (Anderlini, 2007). As exports accounts for more than a third of China's economic growth and 10% of overall GDP, and the US is the second largest recipient of all Chinese exports, a gloomy US economy might trigger a "turning point" for China's rapid economic growth (Anderlini, 2007). China's central banks estimates that if the US's GDP growth declines by 1 percentage point, Chinese exports to the

US will drop by 6%, cutting about 2% from the Chinese GDP growth (Anderlini, 2007; Wang and Fan, 2008). Therefore, it seems that China is unable to completely decouple itself from the rest of the world and keep its double digit GDP growth rate this year. In addition, it has to cope with increased pressure from “idle fund” betting on RMB’s appreciation.

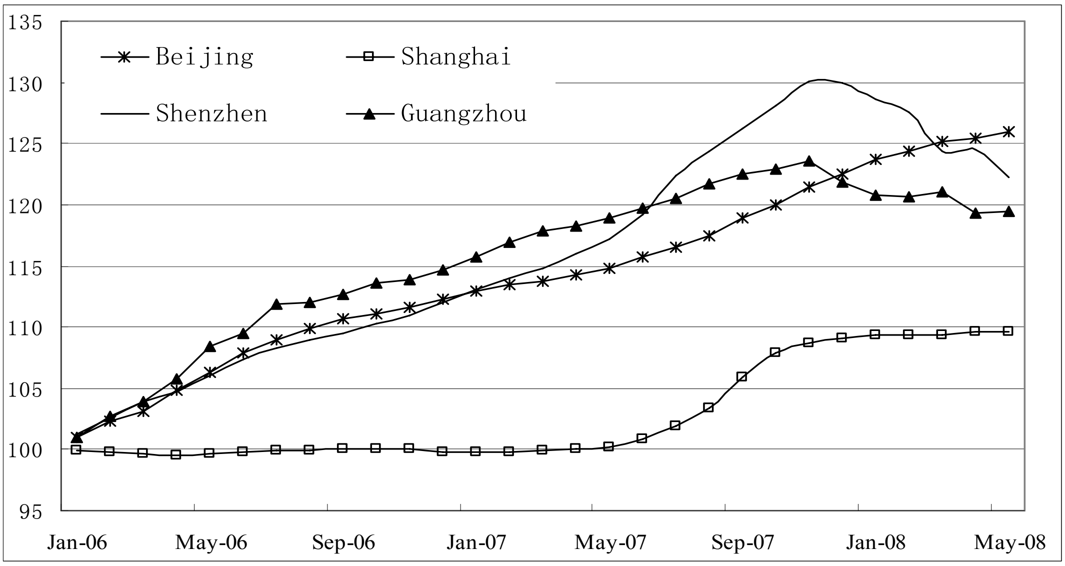
4. Will the US credit crunch and housing market crisis replicate in China?

4.1 Threats to the Chinese financial market

Housing boom

House prices in China increased sharply and even doubled during the past two years in some fast developed cities. The Chinese National Development and Reform Commission showed that the “House Price Index of 70 Large- and Medium-sized Cities in China” rose 7.6% in 2007, 2.6% higher than the previous year. However, the global housing and credit crises have caused the soaring Chinese housing market to cool down as well. Figure 8 presents the house price indexes of China’s four major cities, Beijing, Shanghai, Shenzhen and Guangzhou from June 2006 to May 2008 (December 2005=100).

Figure 8 Housing price index of four cities, June 2006 — May 2008



Source: National Development and Reform Commission Monthly Statistic 06-08.

After a steady growth from the second half of 2007, the rise of house prices slowed down in 2008. In Shenzhen and Guangzhou, house prices even declined sharply. If the current trend continues, the Chinese housing market bubble will burst throughout the country. Most Chinese banks have tightened their lending policies, requesting new home buyers to put down more deposits and restrict lending to multi-home buyers. The biggest concern of the Chinese government is that the house market downturn following a stock market crash may lead to a potential financial crisis in the country. As a result, interest rates have been raised seven times from 2.25% in June 2006 to 4.14% by the end of 2007 to cool down the housing market in order to avoid a hard landing as seen in the US. Whether the current policies will work may need more time to prove, but there is a clear sign of a soft landing taking place in many Chinese cities.

Irresponsible lending activities of the banks

If the sub-prime crisis in the US was due to irresponsible lending activities of those banking and non-banking mortgage originators, then Chinese banks must have made the same mistake as their US counterparts. Rising house prices made mortgage lending lucrative and attractive to banks and other financial institutions. On one hand, loans secured on residential property are classified as high quality assets when the house market is booming, normally with a bad debt ratio of less than 1%. On the other hand, the 'Basel Accord Ⅱ' specified that the risk weight of such assets is only 35%, much lower than some other assets (Basel Committee on Banking Supervision, 2006; Li and Lin, 2007). Therefore, banks have strong incentives to reduce their loan application requirements to attract more and more borrowers. Table 2 summarizes the investment of Chinese banks to the housing market. The total loans committed to the housing market increased from 7.36 trillion RMB in December 2006 to 9.6 trillion RMB in December 2007. Over the same period, commercial housing loans rose by 30.8%, mortgage loans 33.6% and real-estate development loans 25.7%.

Table 2 Bank loans in the housing market 2006-07 (RMB trillion)

Category		Dec-06	Dec-07
Commercial Housing Loan	Balance	3.7	4.8
	Growth (%)	22.1	30.8
Personal Mortgage Loan	Balance	2.3	3.0
	Growth (%)	19.0	33.6
Real-estate Development Loan	Balance	1.4	1.8
	Growth (%)	22.1	25.7

Notes: Growth rate = annual growth from the previous year, Commercial housing loan= Personal mortgage loan + Real-estate development loan
Sources: China Banking Regulatory Commission, Statistic Yearbook 2006-07.

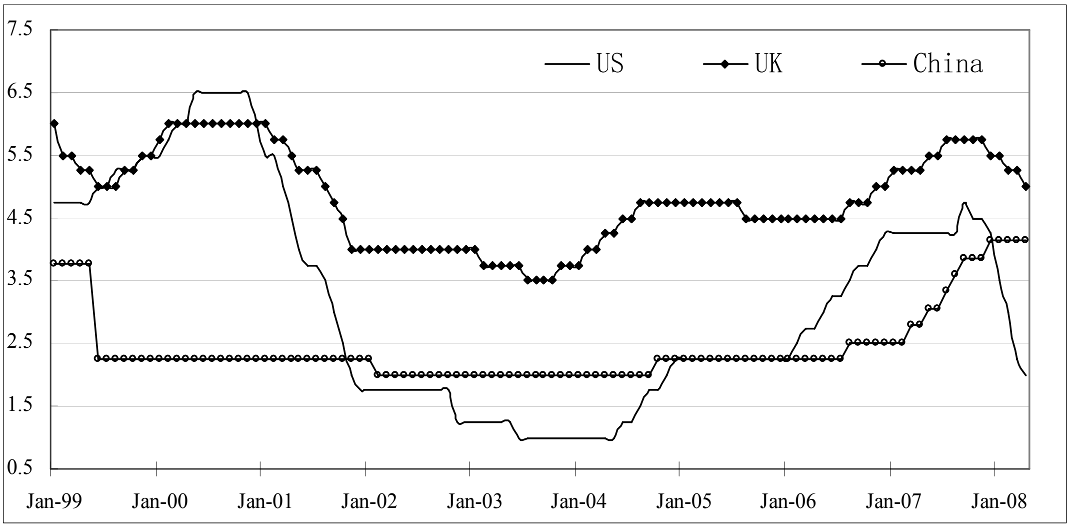
Rapid growth in mortgage and estate development loans heated up the already boiling housing market in China. Although Chinese banks are unable to offer deals to their borrowers with zero down payments like their US counterparts, loose loan granting requirements and numerous faked documents provided by borrowers rendered the banks to unpredictable risks. This problem is particularly serious in China as credit history of a single borrower is hardly available. People can obtain exaggerated payment evidence easily from some private companies which can be ten times higher than the salary they actually earned in order to secure a mortgage (Guo, 2007). When the market is good, this is not an issue as banks could recover their lending anyway by selling the collateralized estate if the customer defaults. However, in reality, even before the market deteriorates, complicated procedures associated with asset disposal make such Utopian thought easier to say than do.

Commercial banks in China are more fragile because of the underdeveloped financial market. US banks could spread their high risks related to sub-prime mortgage by asset securitization. Thereby, if the borrower defaults, bank is not the sole entity which bears the loss. Such a financial instrument originated in the US from the 1970s but it appeared in the Chinese market only from December 2005 when the Construction Bank of China (CCB) launched the first mortgage-backed securities (MBS)—"Jianyuan 2005-1 MBS". As a result, when there is a housing market downturn, commercial banks in China will be the only losers who pay the bill for those irresponsible borrowers.

Interest rate cycle

Interest rate adjustment is widely used as a monetary instrument by most central banks to manage their national economies.

Figure 9 Interest rate movements of US, UK and China: 99-08



Source: US Federal Reserve, Bank of England and People's Bank of China Statistic data.

From January 2001 to 2003, the US Federal Reserves cut the interest rate 12 times consecutively from 6.5% to 1% to boost the US economy (Figure 9). Cheap credit overheated the US housing market quickly. Consequently, the Federal Reserves started to raise interest rate 14 consecutive times from 0.75% to 4.75% since June 2004 to cool the market down. This U-turn of interest rate policy produced a sudden crash in the house market, which started from 2006 and has lasted up to today.

The trend of the UK interest rate looks similar to the US pattern but the former has been significantly less volatile. The UK house market had enjoyed more than a decade of rising prices to the end of 2007, but started to decline steeply in 2008. In order to restore financial market stability and resume consumer confidence, both the US and UK have cut their interest rates in recent months with the US's interest rate coming down much more sharply. The Bank of England has been far more cautious to reduce interest rate in fear of fueling domestic inflation, which has been largely induced by higher food prices, higher utility bills and petrol price.

Before 2006, the interest rate was kept low in China. However, the overheated economy and housing market have triggered a sharp rise in interest rate over the last two years. Mortgage borrowers began to suffer from higher interest payments from

January 2008, when the one year loan interest rate had up swung by almost 1 percentage point to 7.26%. On average, the monthly payments have increased by hundreds or even thousands of RMB, causing many homeowners to default on their mortgage payments. However, as China's Consumer Price Index (CPI) is rising and the real interest rate of savings is negative, there is pressure on the Central Bank to raise the interest rate even further. High interest rate, declining house prices and defaults on mortgage payments can run into a vicious circle, which may force the Chinese housing market to collapse. However, whether the Chinese housing market will crash in the same way as in the US is too early to say as China has a number of social, economic and cultural differences from the US. Hence, what has happened in the US may not be totally replicated in China.

4.2 Different nature of the Chinese economy and culture

Fast development of China's economy

Different from the US, the prosperity of the Chinese real-estate market is neither simply triggered by low interest rate nor by attractive mortgage products. It has been developed in accordance with the fast expanding Chinese economy. Table 3 compares the GDP growth rates of China, the US, the UK and some other developed countries.

Table 3 GDP growth in China, the UK, the US, Japan and Germany (%)

Year	UK	US	Japan	Germany	China
2001	2.2	1.2	-0.4	0.6	7.3
2002	1.8	2.4	0.3	0.2	8.0
2003	2.7	2.5	-0.2	-0.1	10.0
2004	3.3	3.6	1.6	0.1	10.1
2005	1.9	3.1	0.6	1.7	10.4
2006	2.7	2.9	2.4	4.0	11.1
2007	3.1	2.2	2.3	2.5	11.4

Source: Country profile: UK, US, Japan, Germany and China, 2001-07.

China achieved much higher economic growth than the four largest industrialized economies in the world, especially after its accession to the World Trade Organization (WTO) in December 2001. By the end of 2007, its trading volume reached $2.2 trillion, generating a surplus of $262 billion, a rise of 24% and 47% respectively from the previous year (Yao and Chen, 2008). In addition, a large and increasing amount of foreign capital flowed into China during recent years due to an expected appreciation of the RMB. Therefore, it is not surprising that the stock and the housing markets were soaring. Although the "house price index of 70 large- and medium-sized cities in China" increased by 7.6% last year, it was still far below the GDP growth rate and thereby reasonable. As long as such a favorable trading condition remains changed, the turning point of the housing market may not occur.

China's fast growing economy gives more space for income growth. On average, the incomes of China's urban and rural residents increased by 17.2% and 15.4% respectively in 2007. Excluding inflation, the real urban and rural incomes grew by 13% and 9.5%, respectively, which were higher than the growth of house prices. As a result, demand for housing is increasing, leading to a prolonged booming real-estate market.

China's specific social and cultural characteristics

China's huge population, diversified housing requirements, and people's specific savings and consumption habit are distinctly different from the other countries. From the demand side, the US has only one-fourth of China's population, although the territorial areas of the two countries are almost the same. Therefore, there is no doubt that their housing needs are far less than that of China. On the other hand, China's urbanization process has been another factor pushing up house prices. More and more rural people are migrating into cities, but the urban areas that can be used for real estate development are limited (Zhao and Lv, 2007). As a result, the cost of land has increased exponentially in China over the last 15 years.

In the US and other western countries, such social transformation process is relatively moderate and bidirectional. Some people rush to urban cities while some others prefer the quiet and peaceful life in the countryside. However, in China, the process of urbanization has been accelerating rapidly in a relatively shorter period of time.

Chinese people's consumption and savings habits are also more conservative than the westerners'. Table 4 shows the house buying intention of different income classes in "China seven biggest cities" in the first quarter of 2008 and compares with three months earlier[10].

Table 4 Potential buyers of different income classes (Q4 2007 & Q1 2008, %)

Monthly Income per head (RMB)	<500	500-1000	1000-2000	2000-5000	5000-10000	10000-20000	20000-50000	>50000
Q42007	9.3	9.9	12.7	15.5	18.7	21.8	28.4	33.1
Q12008	8.8	8.8	10.9	14.2	17.8	19.5	26.3	29.9
Change (+-)	-0.5	-1.1	-1.8	-1.3	-0.9	-2.3	-2.1	-3.2

Source: Chinese real-estate information statistic, http://www.crei.cn/.

More than 80% of potential home buyers are those with a monthly income of 10,000 RMB or more. For these people, mortgage payment accounts for a rather small proportion of their incomes. Chinese house buyers are also rather risk-averse. Owning a house for most people is an important way of savings and Chinese people have a much higher propensity of savings than their western counterparts. The saving and investment behavior with fast growing incomes is key factor to sustain China's housing boom. Comparing the figures in the first quarter of 2008 with those in the last quarter of 2007, there are signs that few people were intending to buy houses, especially the high income households. However, the decline was not as dramatic as has been in the US or the UK house markets. In the UK, figures from the Bank of England disclosed that the number of mortgage approval slumped from 58,000 in

[10] The survey had been carried out by the People's Banks of China. "China seven biggest cities" includes Beijing, Shanghai, Chongqing, Xi'an, Tianjin, Wuhan and Guangzhou.

April to 42,000 in May 2008, 28% lower than one month earlier and 64% lower than the same month in 2007 (Strauss, 2008). The house market in China is also different from that in the US where banks lent loans to all kinds of people, especially the low income households. In China, much of the home loans are highly concentrated on the well-off urban middle and high income households. As a result, even if there is a house market meltdown, relatively few Chinese will be unable to afford their mortgages.

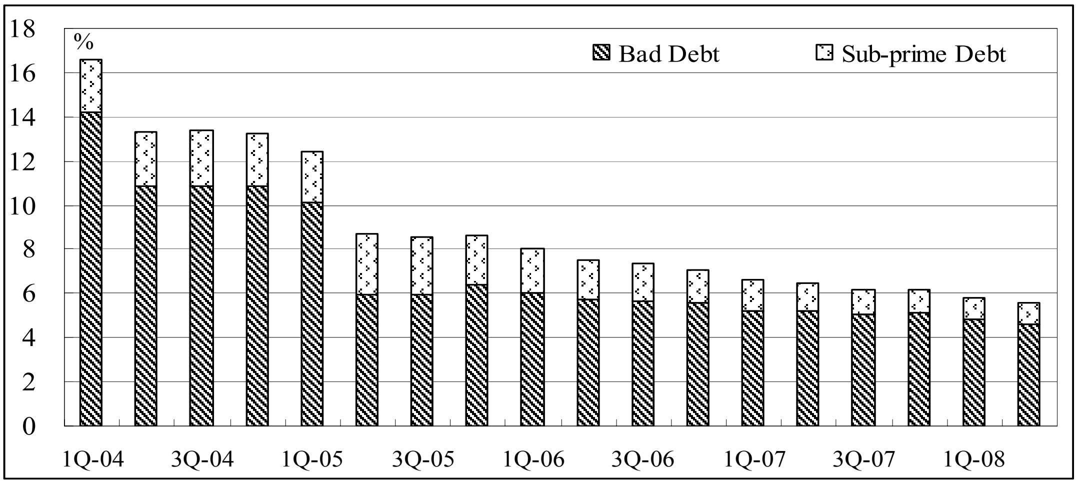
Different nature of Chinese commercial banks operation

First of all, Chinese banks require much higher down payments than the US banks. In order to reduce the operational risk to a controllable level, the Chinese Banking Regulation Commission CBRC) requires at least 30% of the total value of the property as deposit, while 100% mortgages were available in the US and the UK. Under the pressure of recent housing boom, CBRC and the People’s Bank of China further request that multi-home buyers have to stake a minimum 40% down payment from 27 September 2007. Such a policy aims to provide the banks more protection. As long as house prices do not fall more than 30%, banks are unlikely to incur massive losses from liquidating properties repossessed.

Secondly, the proportion of “Personal Loans” of Chinese banks is much smaller than their US counterparts. Although these have increased a lot during recent years, the percentage of personal loans to total loans of BOC, ICBC and CCB are only 25%, 18% and 22% respectively by the end of 2007. For other joint equity banks, this figure is much smaller as they are more conservative and their lending generally focuses on corporation entities. Therefore, in aggregate, personal loans only account for around 20% of the total lending in China while this ratio in the US is normally 30-50%. Residential mortgages account for the largest share of personal loans, typically at 70-80%. However, multiplied by the ratio of personal loans to total loans, even in the state-owned banks, home mortgages only accounts for 15% of their total lending. Therefore, the impact of a house market downturn on Chinese banks will be limited if the rest of the economy does not deteriorate at the same time

Finally, Chinese commercial banks' improved asset quality gives them more flexibility to deal with unexpected risks. Both the impaired loan ratio and composition of bed debts look quite healthy recently. Figure 10 sketches the bad debt ratio and the percentage of sub-prime debt to total bad debt of all the Chinese commercial banks from 2004 to 2008. Figure 11 draws a clearer picture of the above two ratios for three state-owned banks.

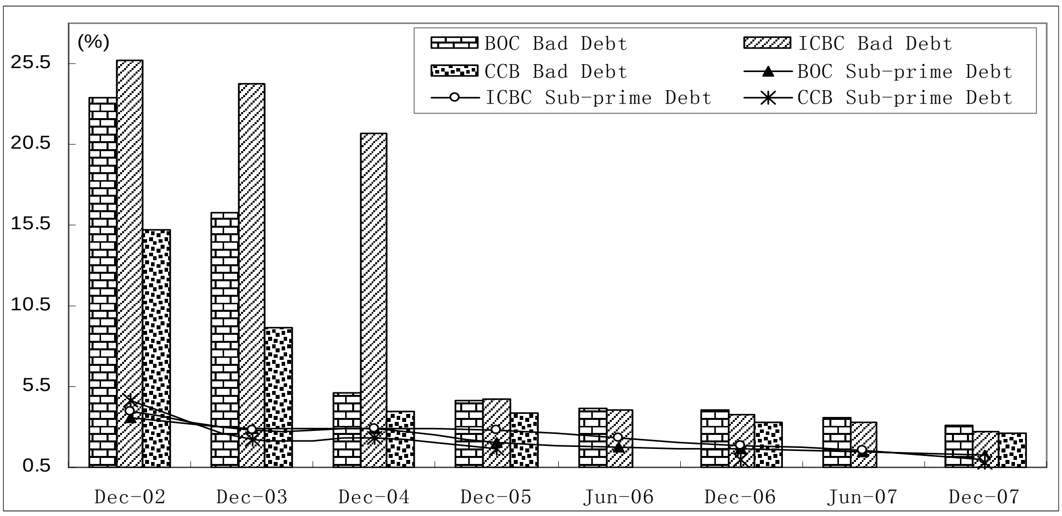
Figure 10 Bad debt and sub-prime debt of Chinese commercial banks: 2004-08



Note: Total bad debt of the Chinese commercial banks equals to Bad debt plus sub-prime debt.

Source: China Banking Regulatory Commission, Statistic yearbook 2004, 07.

Figure 11 Bad debt and sub-prime debt of BOC, ICBC and CCB: 2002-07



Source: Annual Report of CCB, ICBC and BOC, 2002-07.

After a series of bank reforms, the problems related to state-owned banks non-performing loans (bad debts) have been solved by and large. The bad debts and sub-prime loans have been small and have decreased over the years. Moreover, as the securitization market in China is in its infancy, the negative effect of sub-prime loan defaults can hardly spread to the whole financial system.

These three points discussed above lead us to believe that the gloomy atmosphere in the US and the rest of the industrialized world may not seriously affect China's economic performance in the near future even though the financial market conditions of these two nations are quite similar recently. The conservative nature of the banks operation and the risk-averse attitude of the Chinese people enable the Chinese commercial banks to survive from the turmoil of the western financial market.

5. Conclusion and Policy Implications

The US sub-prime mortgage crisis violated the stability of the worldwide economy. By May 2008, the S&P/Case-Shiller Home Price Index had fallen 18.4% from its peak in the second quarter of 2006. Slumping house prices led to more foreclosures as homebuyers had endured difficulty in refinancing their mortgages or selling their houses. Banks tightened lending at a time when home values were sinking and defaults rising, crimping housing demand and causing more price falls and defaults. The house market crash directly hit the US financial system and its real economy. Worse still, sub-prime mortgage securitization transmitted the US woes to all the countries involved and soon led to a worldwide financial turmoil.

As China's financial sector becomes more integrated into the world economy, people are interested in finding out the influence of the US housing crisis to the Chinese banks and its wider economy. Banks' annual reports disclosed that their exposure to the US sub-prime mortgage was quite limited. However, as the Chinese and the US housing and financial markets shared some similarities recently, it has been argued that another round of financial turbulence originated from the Chinese house market is coming soon.

Three reasons, aggressive interest rate adjustments, irresponsible lending activities of the banking and non-banking mortgage originators, and asset securitization were regarded as the fuse for the US sub-prime crisis. China possesses two of the above conditions. From 2006, China also began raising interest to control its overheated economy. Increased pressure on borrowers directly triggered the default rate to rise. On the other hand, although Chinese commercial banks did not provide all kinds of innovative mortgage products to potential buyers during the housing boom, the lack of a credit history system made it difficult for banks to evaluate the credibility of home buyers effectively. Not to mention some of the banks even helped borrowers prepare faked documents to facilitate their applications. As the Chinese economic performance had been impaired by the US credit crunch and its housing market became stagnant, the apparently high quality bank lending could turn bad overnight. By the time, not only the financial sector, but also the whole society will be under threat.

However, given the specific nature of the Chinese economy and culture, it had also been argued that what happened in the US today would hardly occur in China in the same way. Different from the US, the prosperity of the Chinese real-estate market has been developed in accordance with its fast expanding economy. None of the other nations could match China's pace of economic growth, especially after its accession to the WTO in December 2001. Large amount of trade surplus increased market liquidity and stimulated the stock and housing markets in China. The fast growing economy also boosted household incomes, so rising house prices have been supported by real market demand. In addition, the consumption and saving habits of Chinese people and their risk-averse tradition mean that Chinese mortgage borrowers are less likely to default bank loans compared to their western counterparts. Without the additional negative effects of asset securitization, the worst situation for Chinese commercial banks lies in the risk associated with prepayment, which is unlikely to cause large scale bankruptcy as it has been witnessed in the US and other western economies.

In the first half of 2008, China's GDP continued to grow at a double-digit rate (10.4%), despite a few severe natural disasters that hit many parts of country really hard, including the snow-storms in south China in January and the Sichuan earthquake in May 2008. Therefore, it can be concluded that irrespective of the economic slowdown in the rest of the world, China is still able to propel its own economic growth and trade at a rather ambitious pace. Thanks to limited exposure to US sub-prime mortgage, the performance of most Chinese commercial banks will not be critically impaired. However, several recent developments, such as rising consumer prices, energy shortage, a struggling stock market and a cooler housing market imply that China, especially its commercial banks, cannot be complacent about a potential house market crash and wider financial crisis. To prevent such a crisis, Chinese banks need to strengthen their performance and adhere strictly to the lending criteria set by the People's Bank of China.

First of all, facing stiff competition, Chinese banks need to tighten up the procedures in the mortgage services and cooperate with other institutions to establish a credit history system for home owners and potential buyers. When evaluating a bank's performance, not only the amount of loans generated, but also the quality --- how much of these loans can be recovered needs to be critically assessed. Learning from the US, this kind of assets may turn out to be risky when the market condition changes. When assessing a person's ability to pay mortgage, the banks should always consider this person's income, cash flow and credibility in the first hand rather than simply relying on the current value of the collateralized assets.

In addition, under the pressure of further globalization, Chinese commercial banks should keep learning from western banks on risk management. Although the US housing crisis is extremely serious, banks are able to transfer the risks associated with sub-prime mortgage into the whole financial system via asset securitization. How to use these new financial mechanisms and amplify their positive effects is crucial for the Chinese commercial banks further development.

On the other hand, the US sub-prime crisis provides an excellent opportunity for Chinese enterprises to refine their investment portfolios and to attract those elites working in the Wall Street coming to China. For example, China Minsheng Bank acquired 9.9% of the San Francisco-based UCB Holdings for more than $200 million and became the first mainland institution to invest in a US bank in October 2007 (Tucker, 2007). As the value of many western financial institutions was undervalued because of the turbulent financial market, the Chinese government should encourage Chinese companies to acquire major world-renown firms more aggressively.

Finally, in order to avoid any further risks associated with the US securities, Chinese government should adjust the weight of the US investment assets in its whole foreign reserves. Currently, around $130-150 billion Chinese foreign reserves are invested in the US mortgage securities. If the crisis becomes worse, this will directly result in $10-12 billion loss within the next three years (Wang and Fan, 2008). Additionally, after several interest rate cuts, the yield on US government bonds dropped significantly. Under such circumstances, if the Chinese government could swap part of the US government bonds with some highly undervalued but yet good quality MBS and redeem them back when the crisis is over, higher investment proceeds can be generated. This could also have some positive effects on appeasing the fluctuation of the international financial market.

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