

Do Capital Flows Fuel Asset Bubbles in China?

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Abstract: Hot money inflows in China accelerated after the Global Financial Crisis. We investigate the relation between capital inflows and asset prices. Empirical results show that the effect of hot money on both stock price and housing price is insignificant, and the key factor to fuel asset bubbles is the monetary aggregate. However, hot money inflows became an important contribution to foreign reserve increase in recent years, which lowers the effectiveness of money policy. We suggest several policy alternatives to alleviate the negative effects of hot money inflows, including macroeconomic policies, exchange rate policy, prudential regulation and capital control.

Key words: hot money, asset price, capital control

1. The surge of hot money into China since the Global Financial Crisis

Short-term capital inflows into China increased rapidly in the last decade, especially after the Global Financial Crisis. Though China remains adopt capital control policy, capital account liberalization made some progresses in the past few years, providing a legal channel for short-term capital inflows. Meanwhile, a large amount of short-term capital flowed into China through kinds of illegal channel. We focus our eyes on short-term capital inflows in this paper, which is also called “hot money”. Firstly, we give a brief review of the issue how to measure hot money.

1.1 The measure approaches of hot money

Though China keep to adopt capital control policy, a large part of short-term capital movements moves in and out illegally, and are not recorded in the balance of payments. So, it is difficult to measure their magnitude precisely. Researchers designed kinds of methods to try to calculate the size of short-term capital. The most commonly used methods in literature are including the following three ways: residual measure, hot money measure and trade mis-invoicing measure (see Cheung and Qian, 2010; Boyrie et al., 2005). The World Bank residual method defines capital inflows as: increases of international reserves minus current account surpluses, net inflows of foreign direct investment and increases of external debts. The hot money method calculates private capital flows by taking the errors and omissions and non-bank private short-term capital accounts from the balance of payments (Cuddington, 1986; Conesa, 1987). The trade mis-invoicing measure defined short-term capital flows as an illegal transaction via the falsification of trade documents. Most of other short-term capital flows measures are variants of one of these three measures. National Bureau of Statistics of China (2006) render a simple variant of residual method to calculate China’s short-term capital inflows. It defines hot money equals to changes of foreign exchange reserves minus trade surpluses and increases of foreign direct investment. China’s State Administration of Foreign Exchange (SAFE) (2011a) refines this definition as hot money equals to changes of foreign exchange reserves minus four items: trade surpluses, net inflows of foreign direct investment, investment profit from abroad, and funds financed from foreign stock markets.

In this paper, we make two adjustments of the CSAFE method. The first adjustment is using changes of the position for foreign exchange purchase substitute changes of foreign exchange reserves. The second adjustment is using net income in the current account substitute investment profit from abroad. Our reason of the first adjustment is that changes of the position for foreign exchange purchase can more precisely to reflect the total inflows of capital than changes of foreign exchange reserves, because the latter does not considering the changes of private holding of foreign exchange, especially commercial bank's holding. And foreign exchange reserves also include interest earning, which should be excluded in the calculation. The position of foreign exchange purchase has not this type of problem. Our reason of the second adjustment is that outflows of investment profit will diminish the size of foreign exchange holding of one country, and so does the revenue and payment of labor income. Only investment profit from abroad cannot reflect these factors, and the net income is a better deduction.

1.2 Main features of the hot money surge over the past years.

Our calculation shows that inflows of the hot money accelerated after the Crisis (see Figure 1). Hot money flowed into China begin 2003, which is consistent with many estimations (CSAFE, 2011; Prasad and Wei, 2005). The aggregate size of the hot money from 2003 to the first quarter of 2011 is \$1.1 trillion. The average size between 2003 and 2007 is \$86 billion. Hot money surged after the Crisis, and the average size between 2008 and 2010 is \$178 billion, more than twice before the Crisis. The size of the hot money flows into China in 2010 arrived \$224 billion, amount to 3.8% of GDP. The update data shows that \$146 billion of hot money swarmed into China in the first quarter in 2011, amount to 8.8% of GDP, indicating a more rapidly inflows situation recently. This calculation is significantly higher than the result of CSAFE method. Total inflow of hot money of our estimation in 2008-2010 is \$398 billion higher than that of CSAFE estimation. Underestimation of CSAFE method is mainly attributed that foreign exchange reserve does not include all capital inflows, because not all foreign exchange brought by capital inflows is converted into foreign exchange reserve. There is a great deal of foreign exchange held by private sector.

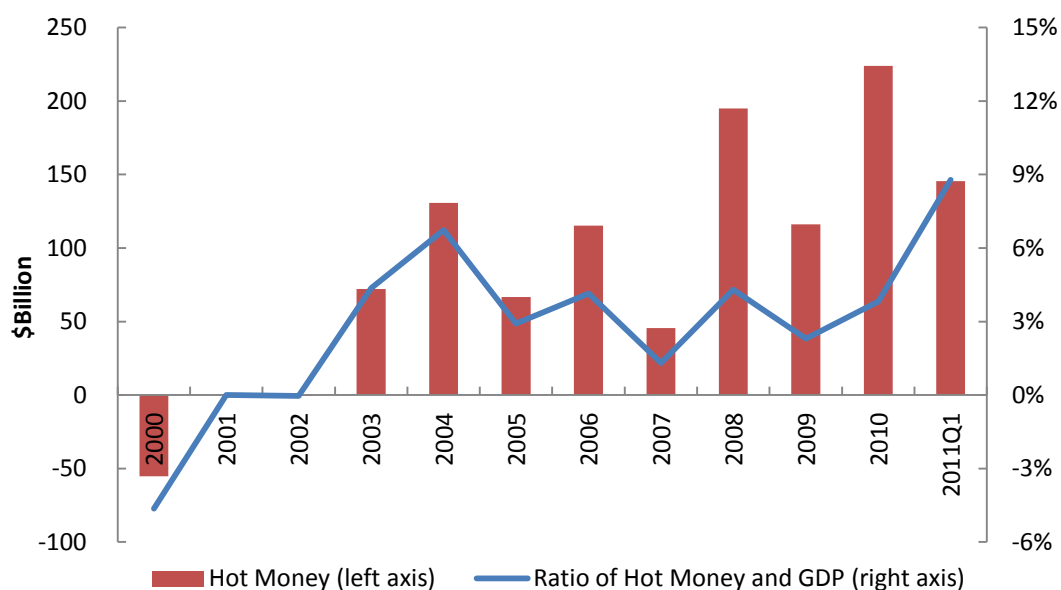


Figure 1: Hot money inflows into China

Note: hot money equals changes of the position for foreign exchange purchase minus four items: trade surplus, net inflows of foreign direct investment, net income in the current account, and funds financed from foreign stock markets.

1.3 The main channels of the capital inflows

Under the capital control policy, only a small part of short term capital flows into China legally through the Qualified Foreign Institutional Investors (QFII) channel. The main part of short term capital flows into China by kinds of illegal channels. The main illegal channels including:

Channel 1: Mis-invoice in trade transaction.

Hot money can flow into China by mis-invoice in trade transaction. Trade firms use fake trade contracts, lower import prices and raising export prices to remit capital inward. There are many estimations of this type of capital inflows, and the size is huge. Li (2008) reports that the fake trade surplus is about \$60-63 billion in 2005, \$123-131 billion in 2006, and \$194-206 billion in 2007. The ratios of fake trade surplus to the total reach to 60%, 72% and 76% in the three years. Su and Zhang (2010)'s estimation is closed to Li (2008). They report that hot money inflows by mis-invoice trade is \$115 billion in 2005, \$112 billion in 2006, and \$132 billion in 2007.

Channel 2: Abnormal short-term borrowing.

Short-term borrowing is a debt of domestic residents, firms (including FDI firms) and institutions borrowed from abroad. The growth rate of short-term borrowing related normal trade and direct investment is relative stable. So, abnormal fluctuation of short-term borrowing mainly reflects hot money flows. This abnormal flows rose after the Crisis. The growth rate of short-term borrowing jumped up to 45%, increasing \$116 billion in 2010.

Channel 3: Capital inclusion and Abjuration of FDI's profit repatriation.

Loose FDI policy of China gives chance to hot money. Some hot money was camouflaged in FDI, and turned to speculative capital after it entered into China. Su and Zhang (2010)'s estimation implies that the average magnitude of capital inclusion from 2000 to 2008 is \$343 billion, account to 61% of total inward direct investment. Another type of hot money is the FDI's profit and depreciation fund. Tang and Liang (2007) calculation shows that outward remittance of revenue by FDI firms was smaller than their total profit after 2002, which means a large amount of capital stayed in China. Their estimate shows FDI firms earned \$52 billion of profit in 2005, and only \$28 billion remitted, so 45% profit retained in China. FDI firms can decelerate depreciation to decrease profit. Depreciation funds can stay in China to speculate (Tang and Liang, 2007).

Channel 4: Individual remittance.

The restriction on settlement of exchange for individual has loosened from 2007; the maximum sum of settlement of exchange for each individual raises \$50000 per year. Each person can exchange foreign currency by telegraphic transfer in Hong Kong's banks; the maximum sun is 80000 yuan RMB. These two channels permit individuals remit capital inward under the limitation. Capital inflows by individuals usually use the following accounts: individual trade, individual

trade commission, remuneration for personal services, and family maintenance remittance. The character of this type of capital inflows is high frequency, small quantity of each transaction, and difficult monitor. Therefore, there has not effective estimation of this capital flows. A general judgment is that the magnitude of capital inflows through individual remittance is relative small.

Channel 5: Illegal banks transfer.

Many illegal banks in China engaged in capital flows business. Illegal banks became an important channel of capital flows. There is a great deal of illegal banks scatter in eastern coastal areas of China, especially in the Yangtze River Delta and Pearl River Delta. However, this underground exchange is difficult to monitor, and no precise data to measure this capital flows. But the operation was very active, observing from many financial justice cases.

2. Capital inflows and the asset bubble in China

2.1 The asset bubble in China

China’s capital market has been intensified largely in size, breadth and depth in the past decade. Two markets mainly concerned are stock market and housing market. The variation of asset prices was striking in recent year. SSE Composite Index increased more than three times in the bull market of 2005 to 2007. The stock price bubbles cracked rapidly during the Crisis; the Index dropped 65% in 2008. The stock prices rebounded in 2009 under the stimulated polices after the Crisis. Stock prices vibrated up and down from the middle of 2009. A obvious characteristic is that the variation of stock price became high in the last 5 years.

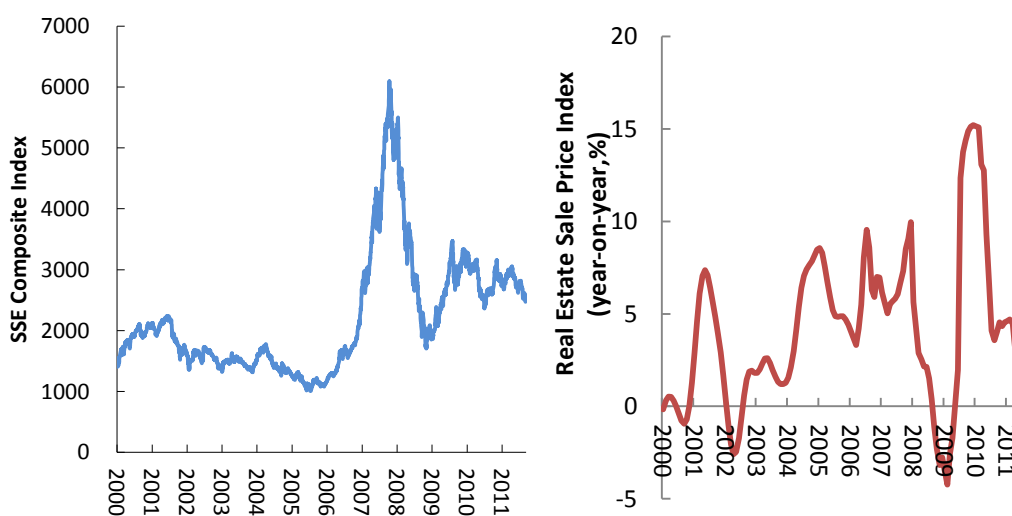


Figure 2: SSE Composite Index (Closed prices of each day) and Real Estate Sale Price Index

The housing price of China increased fast from 2004, and price bubbles became clearly in recently. The average increase of the Real Estate Sale Price Index is 5.6% per year, and the average housing price increased 11.3% per year from 2004 to 2010. The dynamics of the housing price indicates that housing price increased rapidly during 2004 to 2007, suffered a stop during the Crisis in 2008, and increased even faster from 2009. The speed was suppressed by the strict housing policy at the end of 2010. It is significant for housing price that price variation became high.

Both stock prices and housing prices experienced fast increase and high fluctuation in the last decade, especially in the recent years, exhibiting rising and breaking of asset bubble phenomenon. This phenomenon is mainly attributed to monetary factor. Asset prices will rise in an easy monetary background, and decrease in a tight monetary background. China's asset prices in the past decade obeyed this law strictly. Figure 5 shows that both stock price and housing price are positive related with M1. The correlation coefficient is 0.33 between changes of stock price and M1 growth rate, and 0.50 between changes of housing price and M1 growth rate.

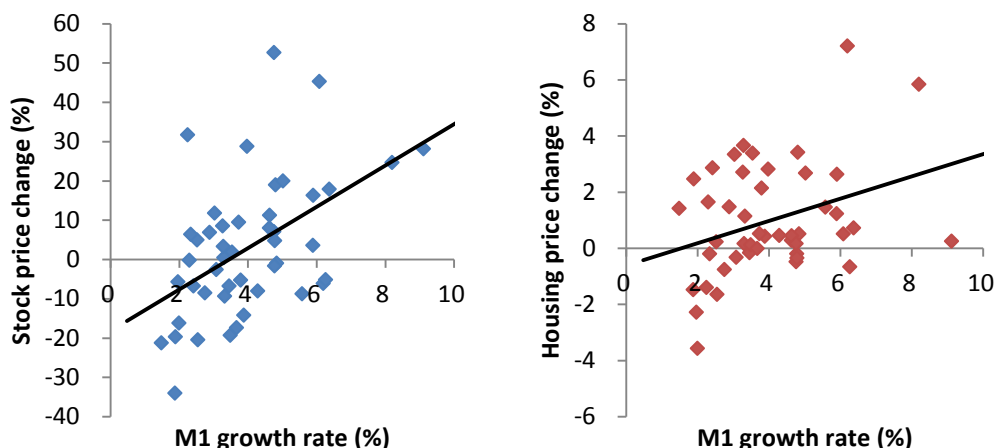


Figure 5: The relation between China's asset price change and M1 growth rate

Apart from monetary factor, the fundamental is also an important reason for asset prices changes in theoretical. High economic growth brings high income of household, so the demand of house increases, and pulls asset prices up. Unfortunately, this effect is not significant in China (Figure 6). It might be existed other factor to diminish this effect.

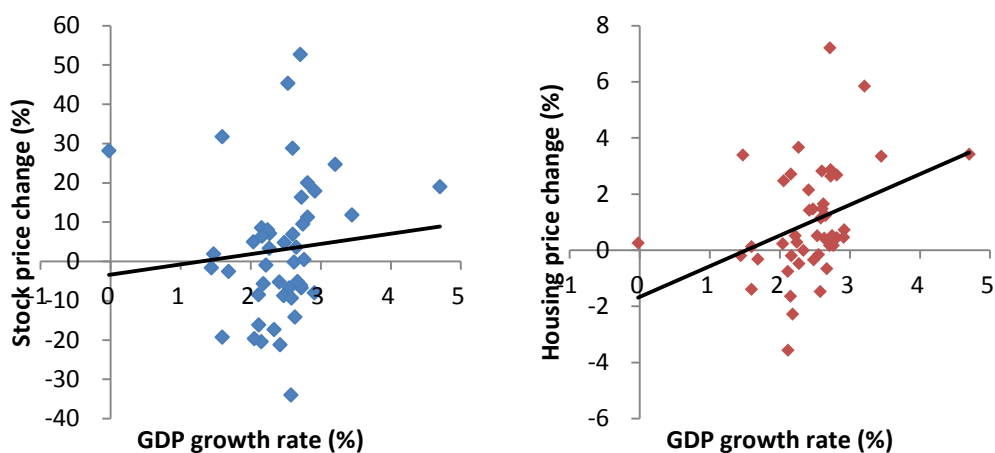


Figure 6: The relation between China's asset price change and GDP growth rate

Hot money inflows usually have effects on asset prices. A key character of hot money is short term, which means it will rush in and out of a country rapidly. This property brings shock for financial market through affecting the asset demand side. The important question is whether the

surge of capital inflows in China engenders significant impact on asset prices. Figure 6 shows that there does not exist significant relationship between hot money inflows and asset price changes. This simple analysis might not reflect their relationship. We will take a serious study in the following.

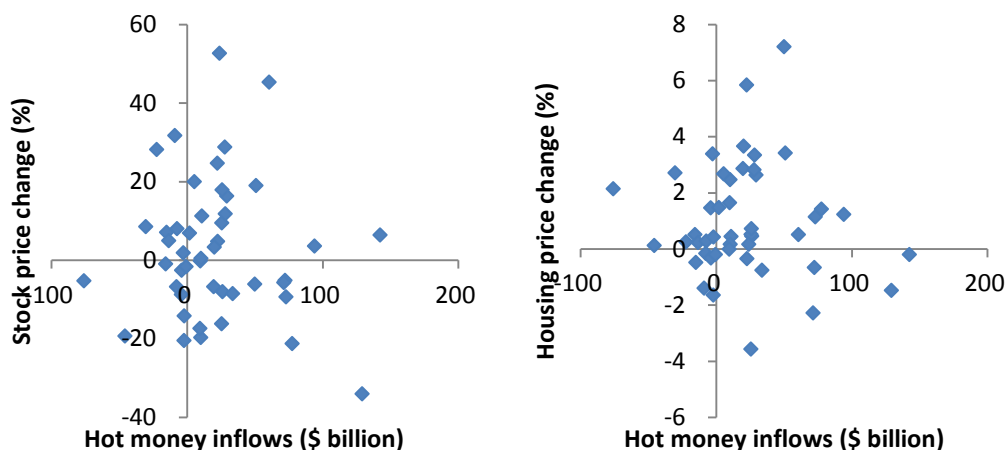


Figure 6: The relation between China’s asset price change and hot money inflows

2.2 Hot money and asset bubble: an empirical investigation

The above analysis shows that asset prices are affected by three types of factors: monetary factor, fundamental factor and hot money. We use econometric approach to specify their relationship. The data is from the first quarter of 2000 to the second quarter of 2011. The monetary variable we used is M1 growth rate (quarter-on-quarter). We adopt GDP growth rate (quarter-on-quarter) to donate fundamental factor. These two variables are seasonal adjusted to diminish the seasonal effect. Table 1 shows the statistics of these variables. The variation of stock price is very high; its standard deviation is 17.51%. The variation of housing price is relative low; its standard deviation is 1.99%. Hot money also have a high variation, arrived \$41.07 billion. All variables are first difference type of data, so the unit root test shows that all variables are stationary.

Table 1: Statistics of data

<i>Variable</i>	<i>Mean</i>	<i>Std.</i>	<i>Unit root test</i>
Hot money inflows (DHM, \$ billion)	20.53	41.07	-4.99***
Housing price changes (DHP, %)	0.98	1.99	-5.00***
Stock price changes (DSP, %)	2.95	17.51	-5.08***
M1 growth rate (DM1, %)	4.01	1.67	-3.69***
GDP growth rate (DY, %)	2.41	0.65	-5.65***
Interest rate changes (DIR, %)	0.00	0.34	-5.36***

Note: *** is 1% significant level; ** is 5% significant level; * is 10% significant level.

Firstly, we use the Granger causality test to check the relations of hot money, fundamental factor, monetary factors and asset prices. The test shows that all four variables are not Granger cause of stock price (Table 2). This means that there has not new information in hot money,

fundamental factor, monetary factors to predict stock price. While the test shows that stock price is the Granger cause of GDP growth rate and interest rate. This result reflects that stock price is a predictor to GDP growth rate and interest rate. This is intuitive. Stock price reflect the expected future profits of companies. A high stock price means higher expected future profits, and so higher GDP growth rate. Increase of stock price tells that the economy might be overheated, which need to raise interest rate by monetary policy.

Table 2: Granger causality test

<i>Null Hypothesis</i>	<i>F-Statistic</i>	<i>Probability</i>
The Granger causality of stock price, M1 growth and hot money		
DHM does not Granger Cause DSP	0.62	0.65
DSP does not Granger Cause DHM	1.17	0.34
DM1 does not Granger Cause DSP	0.89	0.48
DSP does not Granger Cause DM1	0.94	0.45
DIR does not Granger Cause DSP	1.00	0.42
DSP does not Granger Cause DIR	3.29	0.02
DY does not Granger Cause DSP	1.18	0.34
DSP does not Granger Cause DY	3.45	0.02
The Granger causality of housing price, M1 growth and hot money		
DHM does not Granger Cause DHP	3.49	0.02
DHP does not Granger Cause DHM	1.65	0.19
DM1 does not Granger Cause DHP	3.65	0.01
DHP does not Granger Cause DM1	0.95	0.45
DIR does not Granger Cause DHP	3.05	0.03
DHP does not Granger Cause DIR	4.06	0.01
DY does not Granger Cause DHP	1.55	0.21
DHP does not Granger Cause DY	1.85	0.14

The Grange causality test indicates that hot money and monetary factor are Grange causes of housing price, but there has no causality relationship between GDP growth rate and housing price. A further investigation shows that the relation between hot money and housing price is negative. This is not consistent with intuition. The monetary factors have positive relation with housing price.

Both Granger causality tests tell us that there has no clearly relationship between hot money and asset prices. Stock price cannot be predicted by monetary factors, fundamental factor and hot money, and housing price is Grange caused by monetary factors, but has no clear relation with hot money and GDP growth rate. We investigate these relationships below by other regression methods.

Table 3 shows the three regression results of stock price. The full variables regression (Model I in Table 3) shows that both monetary factors are significant, but GDP growth rate and hot money are insignificant. Model II and Model III do regression only by monetary factors with OLS and GMM methods. The results show that monetary factors have important explanations to stock price changes, and these results have robust characteristic. It shows that when growth rate of M1 raises

1%, stock price will increase 4.59% in GMM results, and when interest rate raises 1%, stock price will increase 9.95%. It is confuse that stock price is positive related with interest rate. Economic logical tells that rising of interest rate will bring stock price down, because a high interest rate implies high opportunity cost of investment in stock. This abnormal might be stemmed from that the high inertia of interest rate adjustment in China's monetary policy. An inertia interest rate policy made the real interest rate is pro-cycle. When the economy is overheated, a higher nominal interest rate is needed to raise the real interest rate, but the inertia makes this adjustment slowly, and the real interest rate is lowered actually. This policy compromises with cycles, so a high nominal interest rate always goes with high GDP growth rate and high stock prices.

Table 3: Regression results of stock price

<i>Dependent Variable:</i> <i>Stock price</i>	<i>Model I (OLS)</i>	<i>Model II (OLS)</i>	<i>Model III (GMM)</i>
Lag of stock price	-0.06 (0.10)		
M1 growth rate	5.34*** (1.38)	4.77*** (1.43)	4.59*** (1.02)
Changes of interest rate	15.12*** (5.40)	13.83*** (4.35)	9.95*** (3.19)
GDP growth rate	3.66 (2.93)		
Hot money	-0.06 (0.06)		
Constant	-26.83*** (9.55)	-16.28** (6.28)	-17.02*** (5.07)
R ²	0.41	0.32	0.37

Note: *** is 1% significant level; ** is 5% significant level; * is 10% significant level.

Regressions in Table 4 show that hot money has not significant effect on housing price either. Full variables regression (Model I in Table 4) implies that only M1 growth rate and GDP growth rate have significant effects on housing price. When M1 growth rate increases 1%, housing price will raise 0.28% in GMM estimation, and when GDP growth rate increases 1%, housing price will raise 1.02%.

Table 4: Regression results of housing price

<i>Dependent Variable:</i> <i>Housing price</i>	<i>Model I (OLS)</i>	<i>Model II (OLS)</i>	<i>Model III (GMM)</i>
Lag of house price	-0.24 (0.16)		
M1 growth rate	0.32* (0.17)	0.39** (0.16)	0.28*** (0.09)
Changes of interest rate	-0.21 (0.96)		

GDP growth rate	1.19** (0.44)	1.08** (0.41)	1.02*** (0.19)
Hot money	-0.01 (0.007)		
Constant	-3.16** (1.33)	-3.21** (1.19)	-2.91*** (0.71)
R ²	0.29	0.24	0.18

Note: *** is 1% significant level; ** is 5% significant level; * is 10% significant level.

2.4 Discussion

The above results show that hot money has not significant effect on both stock price and housing price. This result is not consistent with current opinion. A popular opinion believes that the surge of capital inflows into China is an important contributor of China's asset bubbles. Though, our empirical results do not support this opinion, there are remain some aspects need to be concerned.

The first reason why hot money is unrelated with asset prices is the effective sterilization. China government took many tools to sterilize the external surpluses, and keep the money aggregate in controlled growth rates. The sterilization brought stabilized financial market liquidity. Asset prices are mainly connected with the aggregate liquidity, as the empirical results shows, and have little relation with the structure of the liquidity.

The second reason why the empirical does not review the relation between hot money and asset prices is that increment of hot money is not a dominated factor in the relation. Basically, the aggregate of hot money, whenever it flowed in, has effect the current asset prices. Increment of hot money usually accounts for a small part of the total, so the relation of asset prices and changes of increment cannot significant. As for this aspect, further empirical study is needed.

The important aspect is the issue of "sudden stop" of capital inflows. Hot money usually flows into a country gradually. So it has not shock effect at the inflows stage. However, hot money will rush out immediately when some negative event happened, and sometimes it rushes out without any significant fundamental deterioration, like the case of the East Asian Crisis. As we calculated, the magnitude of hot money inflows is \$1.1 trillion from 2003 to the first quarter of 2011, which account to 19% of GDP in 2010. Some policy is needed to diminish the probability of this damage.

Though there has not any evident support that hot money causes China's asset price bubbles, the external surpluses related with hot money indeed has actual effects on asset prices through impacting on monetary aggregates. The increase of international financial assets is almost the unique channel to issue money for People's Bank of China (PBC). Except 2010, increase of the PBC's foreign asset in each year is larger than increases of reserve money from 2003. The ratio of reserve money increase and foreign asset increase is 0.72 in 2010. So if the surge of hot money inflows weakens the controllability of monetary aggregate, it will push asset prices up. The hot money of our calculation accounts for 42% of increase of foreign reserve on average from 2003 to 2010. It is 73% in the first quarter of 2011 (Figure 7). The share of PBC's foreign reserve increase due to hot money increased steadily after the Crisis.

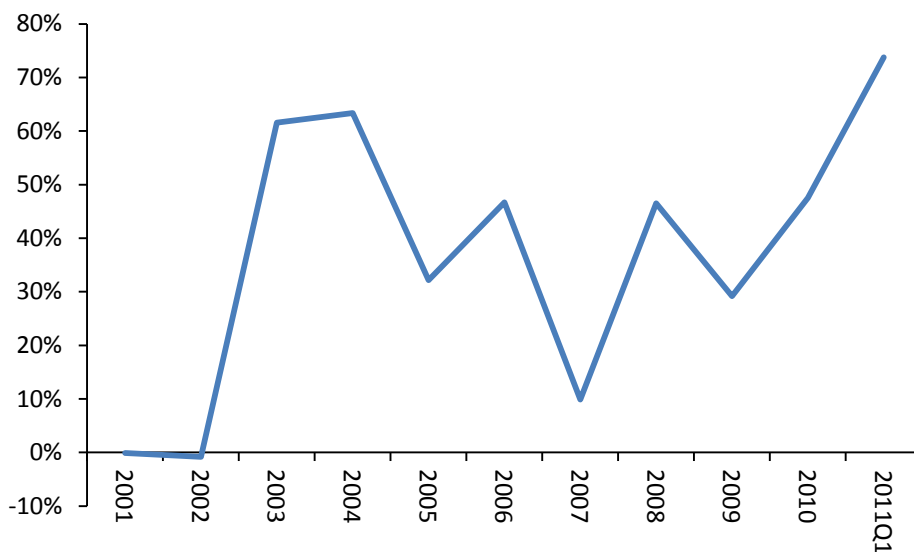


Figure 7: The ratio of hot money increase and PBC's foreign asset increase

3. Policy instruments and their effectiveness

Though the surge of hot money inflows has not affected China's asset prices significantly, threats of sudden stop and losing controllability of monetary aggregate alarms the PBC. There are four types of tools available for PBC to diminish the negative effects of hot money inflows: macroeconomic policies, exchange rate of RMB, prudent supervision, and capital control.

3.1 Macroeconomic policies

Monetary policy is a key tool to diminish the negative shocks of hot money. There are two functions of monetary policy, one is lower the incentive of hot money inflows, and the other is sterilizing money supply. The former type tool is interest rate, and the latter type tools include sterilization by open market operation and reserve ratio.

3.1.1 Interest rate adjustment and its room

Interest rate policy faces a dilemma in prevent hot money inflows and reduce asset prices' hike. Rising interest rate is necessary for current domestic situation, because China has experiencing inflation and too fast increase of housing price. However, a high interest rate enhances the incentive of hot money inflows. Though hot money inflows in current level have not significant effect on asset prices, but a more large size of hot money might have straightforward impact on asset prices. Whether a high interest rate reduce asset prices depend which channel dominates. We find a pessimistic evident that the sensitivity of hot money to interest rate rose after the Crisis. The adjustment room of interest rate is narrow currently, because several big countries sustained a very low interest rate after the Crisis. The Federal funds interest rate is 0-0.25% nowadays. The Fed alleged this policy would be maintained at least to the middle of 2013. The interest rate difference between China and US was positive after the Crisis and has widened gradually. Under this international background, the PBC has hesitated to raise interest rate. This inertia interest rate policy, though, helps alleviating hot money inflows; it fostered asset bubbles, because the real interest rate became negative.

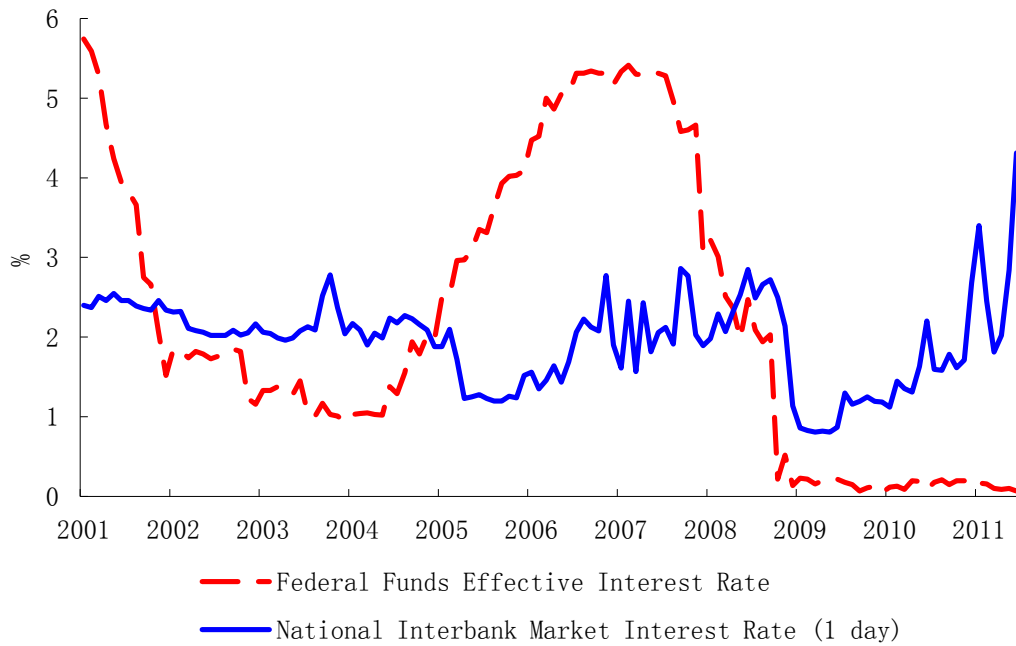


Figure 8: Interest rate difference between China and US

3.1.2 Sterilization and its costs

The tool was heavily deepened to sterilize money issue from foreign reserve increases is central bank notes, which initially issued in 2002. The issuing of the notes increased rapidly to control money supply under huge external surpluses background (Figure 9). The size of the notes was arrived to historical summit, 4749 billion RMB yuan in Jul. 2010, accounting for 25% of the PBC's foreign asset. The notes were an effective sterilization tool in the past decade. However, the problem is the notes brought high interest cost. The PBC needed to pay 100 billion RMB yuan interest per year after the Crisis. In one hand, interest payment as new money issue increased the burden of sterilization; in the other hand, interest payment deteriorated the balance sheet of the PBC, which threatens the effectiveness of monetary policy.

This threat makes the PBC start to reduce the notes. The PBC slowed down the issue of the notes from Aug. 2010. The outstanding size of the notes was lower to 2623 billion RMB yuan in Jul. 2011. To counteract this change on monetary aggregate, the PBC raised the reserve requirement, as below shows.

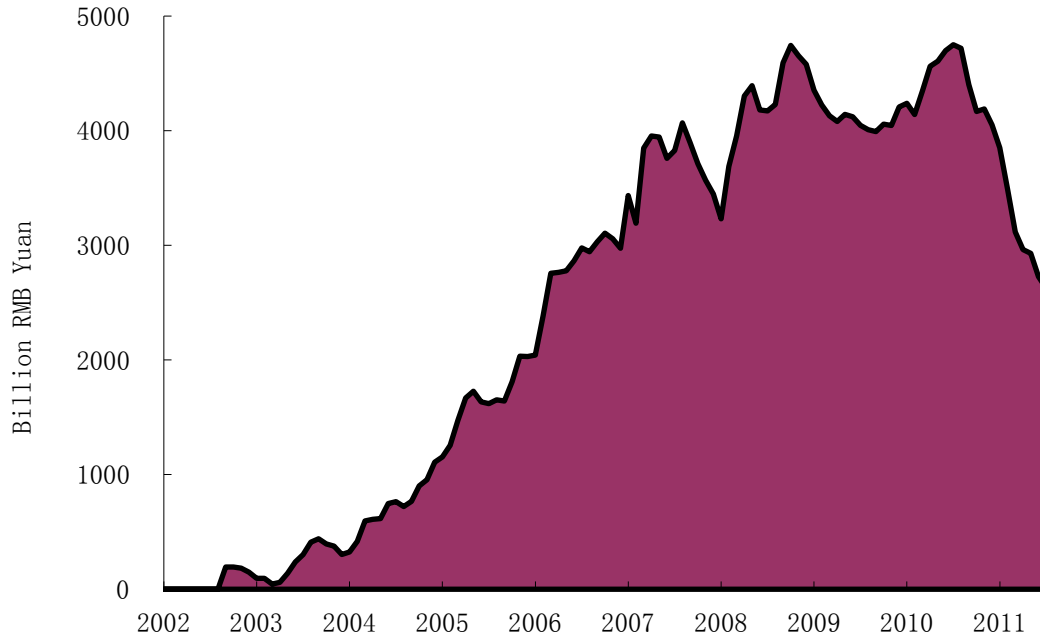


Figure 9: Outstanding of central bank notes issued by PBC

3.1.3 Raising reserve ratio and its costs

Another important sterilization tool is the reserve ratio which the PBC intensively used (37 times adjustment) in the last decade, especially from the middle of 2006. The ratio rose quickly in 2007-08 inflation period (Figure 10). It was lowered during the Crisis in the end of 2008, and again rose quickly from 2010 to control money supply. The ratio is 21.5% for large scale banks and 18% for middle and small scale banks currently.

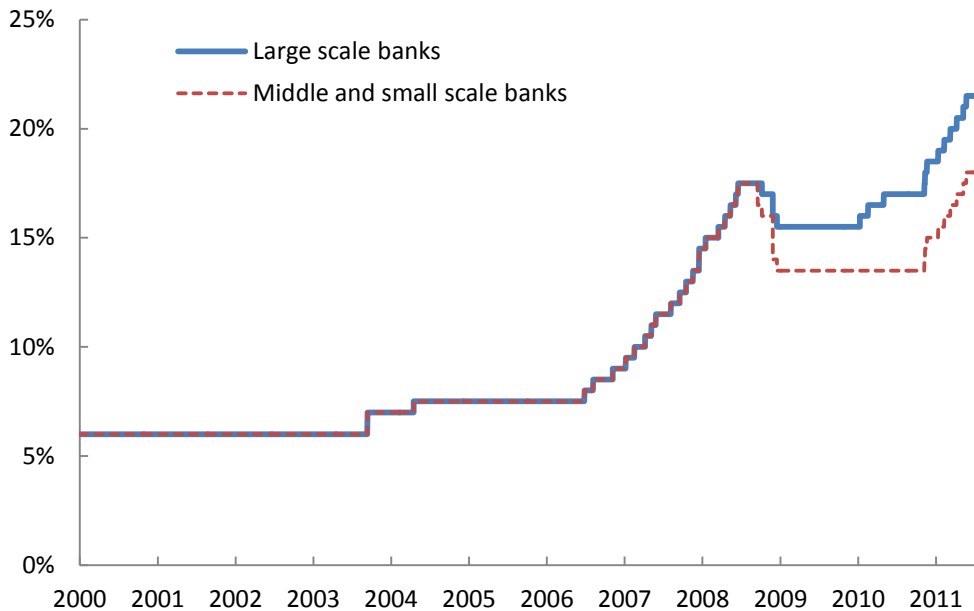


Figure 10: Reserve ratio

Reserve ratio policy, though, is effective to control money supply; it brings difficult for

commercial banks. Firstly, rising reserve ratio is equivalence to impose tax on commercial banks. The interest rate difference between reserve funds and loan is a direct loss for commercial banks. The current interest rate for required reserve is 1.62%, while the interest rate for one year loan is 6.56%. Secondly, frequently adjustment of reserve ratio disturbs the management of commercial banks. Banks need to prepare a large size of high liquidity assets to satisfy potential rising of reserve ratio, which lowers the profitable of total assets. Thirdly, reserve ratio adjustment has asymmetrical effects on difference banks. Raising the ratio has larger effect on banks with small international business (inward banks) than on banks with large international business (outward banks). The current money issue mechanism is that the PBC purchases foreign exchange from commercial banks. So new issued money flows into outward banks first, and inward banks can share this benefit only through sorbing new increase of deposit. This mechanism makes outward banks proposes higher liquidity than inward banks. Then, raising reserve ratio has little effect on outward banks, but it will tighten up the liquidity of inward banks. Therefore, different banks face unequal competition situation. Large banks are more outward than middle and small banks in China. Hence, raising reserve ratio will enlarge the disparity for difference size of banks.

3.2 Revaluation of Renminbi and the reform of exchange regime

One important reason of the surge of hot money inflows is the expected appreciation of RMB, so exchange rate of RMB is an effective tool to limit hot money inflows. Large external surpluses require appreciation of RMB, but the RMB exchange rate regime is sticky. To diminish the appreciation pressure, Chinese government allowed RMB appreciation from Jul.2005. The bilateral exchange rate of RMB to USD appreciated 23% in the past six years, but external imbalance has not reversed yet. The current account surplus remains 5% of GDP in 2010. A great deal of literature finds that RMB is significant undervalued in the last decade (Tung and Baker, 2004; Shi and Yu, 2005, Lu, 2006; etc.). Unfortunately, the appreciation was adopted a slow and gradual approach. Under this process, the expectation of RMB exchange rate is uniquely, and all investors expect that RMB will appreciate. This unique expectation gives a large incentive for hot money inflows. To manage RMB exchange rate in desired levels, the PBC have to purchase foreign exchange continually, which adds difficulties of monetary policy.

Revaluation of RMB is necessary to alleviate hot money surge. In one hand, the PBC should reduce its intervention in foreign exchange markets, and permit the RMB exchange rate converge to its equilibrium level. In the other hand, the RMB exchange rate should be allowed a wide fluctuation band. A relative high variation raises the risk of hot money, and discourages its inflows. Therefore, the first step should increase the floating band of RMB, and then let RMB converges to its long run equilibrium level.

3.3 Prudent financial supervision and management

Prudential regulation of the domestic banking system, such as capital requirement and limits on foreign exchange lending to unhedged borrowers, have effects on hot money inflows. For example, unremunerated reserve requirements on foreign exchange debt can be used to reduce external foreign exchange borrowing, because zero profit of a part of fund reduces the total yield. Inflow taxes on short-term debt also hold hot money back, and induce longer maturities. Financial transaction taxes also can increase the cost of short-term investments and may deter such flows. Minimum-stay requirement are a direct method of lengthening the maturity of liabilities. These

tools seems effective in logical, however, some of them are difficult to implement, for a large deal of hot money is out of supervision. In this aspect, a necessary step is strengthening supervision, and makes capital flows under monitor as much as possible.

4.4 Strengthening capital control and its effectiveness

The most direct approach to hold back hot money is strengthening capital control. China's State Administration of Foreign Exchange (SAFE) carried out several policies on capital flows in 2011, including strengthen management of following operations: bank's synthetic positions in settlement and sale, on-line inspection of export foreign exchange settlement, short-term foreign debts and foreign guaranty balance index of financial institutions, foreign direct invest on domestic enterprises, authenticity verification of foreign exchange settlement of overseas listing enterprises, domestic set up overseas special purpose companies by institutions and individuals, entrepot trade foreign exchange. In addition, the SAFE strengthened the punishment of illegal use of foreign exchange. SAFE (2011b) shows that 1875 cases of illegal foreign exchange settlement were found out and punished at the first half year of 2011, the amount of foreign exchange involved arrived \$16 billion. The main means of illegal foreign exchange use in financial institutions are exceed short-term foreign exchange debts, violating rules of foreign exchange settlement, and illegal foreign exchange settlement in capital account. The main means of illegal foreign exchange use in enterprises are changing the purpose of foreign exchange, violating rules of foreign exchange debts, and illegal foreign exchange settlement.

In the short-run, capital control can prevent hot money inflows, at least partly, because China's capital account is not liberalization until now. Restriction on capital inflows in many aspects is effective. However, there are existed several channels for capital inflows as mentioned above. Stop all hot money inflows are obviously impossible. The data after the Crisis gives evidences. In front of current international background, strengthening capital control is necessary for China in short-run.

However, capital account liberalization for China is a long run trend. As many research shows, capital account liberalization can bring a great deal of benefit for China (Chen, 2005). And many historical evidences tell that capital control does little function in preventing speculation (Dooley, 1996). In the other hand, researchers have not reached a consistent agreement on the speed of China's capital account liberalization. Though recognizing benefit in the liberalization, some researchers believe that some necessary conditions are not possessed currently, especially sound domestic financial environment (Miller and Zhang, 2000; Takagi and Shi, 2005; Hu et al., 2009).

Capital account liberalization is a gradual process. It is not good for a country to open capital account too quick. Usually, the liberalization has an order for different businesses, according increasing order of riskiness, with long-term instruments less risky than short-term ones with each category: (1) foreign direct investment, (2) portfolio equity investment, (3) local-currency debt, (4) consumer-price-indexed local currency debt, and (5) foreign-currency debt (Ostry, et al., 2010). For China, the first item is liberalized completely almost. The second item is under the process. The Qualified Foreign Institutional Investors (QFII) rule started to allow some foreign institutional investors invest China's security market under some restrictions. Therefore, there has a long way to go in capital account liberalization of China.

4. Conclusion

It is a fact that hot money swarmed into China after the Crisis, but whether these capital inflows have an significant effect on China's asset prices is not consistent with people's belief. Our empirical investigation on hot money and asset prices, both stock price and housing price, demonstrates that the relation between hot money and asset prices is not significant. The variation of asset prices is mainly attributed to monetary factor, especially money aggregate. However, the threat of hot money inflows is remain existed, because hot money inflows have turned into the important contribution of China's foreign reserve increase. Monetary policy is challenged by continuing increases of hot money inflows.

We analysis the function and difficulties of four categories of policies to alleviate hot money shocks, including macroeconomic policies, exchange rate policy, prudential regulation and capital control. We believe that monetary policy faces some difficulties, such as the dilemma of interest rate adjustment, raising cost of sterilization, negative effects of reserve ratio on banking system. We suggest that RMB exchange rate need to be more flexible. On one hand, the floating band should be extended; on the other hand, the exchange rate should be converged to its long-run equilibrium level. In prudential regulation aspect, it is necessary to increase transparency of capital flows first, and then some requirements and restrictions are need to add on foreign exchange, such as reserve requirement, inflow taxes, financial transaction taxes, etc. As for capital control, short-term strengthen is necessary, considering current unsound international background. But these policies should not be permanent. Capital account liberalization should be gradually promoted in long-run.

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