Capital flows, money supply and property prices: The case of China

Taguchi, Hiroyuki and Tian, Lina

Saitama University

July 2017

Capital Flows, Money Supply and Property Prices: The Case of China

Hiroyuki Taguchi, Saitama University
255 Shim o-Okubo, Sakura-ku, Saitama, Japan, 338-8570,
Tel: +81-48-858-3324, Fax: +81-48-858-3696, E-mail tagusaya0710@s3.wh.qit.ne.jp

Lina Tian, Saitama University
255 Shim o-Okubo, Sakura-ku, Saitama, Japan, 338-8570,
Tel: +81-48-858-3324, Fax: +81-48-858-3696

Abstract

This article examines the interaction among capital flows, money supply and property prices with a focus of Chinese economy by using a vector auto-regression (VAR) estimation as an analytical framework. The key research questions were, first, whether money supply has been determined independently from capital flows, and then which factor, capital flows or money supply, has given a dominant effect on property prices. The contributions of this study are to investigate the impacts on property prices jointly from capital flows as an external factor and from money supply as a domestic factor, and to count on the differences in the trends in property prices of seventy regional cities in China. The main findings through the VAR estimations were as follows. First, domestic money supply has been determined exclusively from external capital flows through the authority's perfect sterilization of foreign-exchange-market intervention. Second, the main contributor to property prices' movement has been domestic money supply rather than external capital flows. Third, some deviations of property prices from the trend in money supply were found in big cities and/or coastal advanced cities.

Keyword: Capital flows, Money supply, Property prices, China, Seventy reginal cities, Vector auto-regression estimation

JEL Classification Codes: E51; F32; O53

1. Introduction

Asset prices have become a serious target of macroeconomic policies in emerging market economies as well as advanced economies.[1] In particular, it has been a critical concern for policy makers and academic circles to prevent and address the boom-bust cycle of asset bubbles. The 2008 global financial crisis was a typical example of the product of asset bubbles in the United States. China is not an exception to care about asset prices since Chinese economy has also experienced some large fluctuations in its property prices and stock prices since the 2000s.

When it comes to the issue on the determinants of asset prices, it is often pointed out that massive capital flows in the global financial markets have accelerated the fluctuation of asset prices, particularly, in emerging market economies. Large capital inflows, for instance, may lead to excessive foreign borrowing, possibly fueling domestic credit booms and asset bubbles. Once capital flows reverse suddenly, however, a boom stage of credit expansion and asset price hikes may be turned into a bust stage, and the economies may finally suffer from serious financial and economic crisis.

The monetary authorities in emerging market economies, facing capital flows, usually intervenes in the foreign exchange market regardless of their currency regimes to avoid their currency fluctuations. Whether the authority sterilizes the intervention for shutting off the impacts of capital flows on domestic monetary market leads to different stories on the influenced asset prices. In case that the intervention is not fully sterilized, it accommodates an increase in money supply, which affects asset prices as an indirect impact of capital flows. When the authority sterilizes the intervention perfectly, the money supply managed by the authority could be a factor independent from capital flows to influence asset prices.

It would be significant, therefore, to investigate the channel in which asset prices are affected by capital flows and/or money supply. In this context, China could be a good analytical example, since her economy has experienced the fluctuations of asset prices and capital flows, which have required sophisticated management of money supply by the authority.

This article examines the interaction among capital flows, money supply and property prices with a focus of Chinese economy by using a vector auto-regression (VAR) estimation as an analytical framework. Our research questions are: whether the

[1] For instance, Blanchard et al. (2010) argued in their conclusion that policymakers have to watch many targets, including the composition of output, the behavior of asset prices, and the leverage of different agents.

sterilization of the intervention has been conducted for shutting off the impacts of capital flows on domestic money supply, and which factor, capital flows or money supply, has given a dominant effect on property prices. The contributions of this study are that the determinants of asset prices are investigated jointly from capital flows as an external factor and from money supply as a domestic factor, whereas the determinant was usually examined separately in most of the literature. Another contribution is that the study focuses on property prices as a representative of asset prices and takes into account the differences in the trends in property prices of seventy regional cities in China.

The rest of the paper is structured as follows. Section 2 clarifies a theoretical framework on the interaction among capital flows, money supply and asset prices. Section 3 describes the literature review focusing mainly on the determinants of asset prices in the case of Chinese economy. Section 4 conducts a VAR estimation on the interaction among capital flows, money supply and property prices targeting seventy regional cities in China. The section proceeds with the descriptions of data, methodologies and estimation outcomes with its interpretation. The last section summarizes and concludes.

2. Theoretical Framework

This section clarifies a theoretical framework on the interaction among capital flows, money supply and asset prices. We suppose that asset prices are affected by capital flows as an external factor and by money supply as a domestic factor.

Regarding the impacts of capital flows on asset prices, Caballero and Krishnamurthy (2006) provided theoretical insights on the nexus between capital inflows and asset bubbles in emerging market economies. They argued that emerging market economies present a fertile macroeconomic environment for the emergence of asset bubbles dynamics, since a shortage of stores of value, i.e. dynamic inefficiency, caused by the "financial repression" in their financial systems tends to create a space for bubbles on unproductive assets to arise.

As Kim and Yang (2009) and Taguchi et al. (2005) described, there are two kinds of channels in which asset prices are affected by capital flows. One channel is that capital flows can directly affect the demand for assets, which can thus influence asset prices. For example, capital inflows to the stock market increase the demand for stocks, thereby causing the stock price hike. Another channel is an indirect one through a change in money supply. Whether this channel works or not, however, depends on the degree of monetary autonomy of the authority facing capital flows. The authority with full autonomy can manage money supply independently from any capital flows.

In general, an economy cannot avoid the constraint of "impossible trinity" trinity": an economy should pursue two of three options – fixed exchange rates, independent monetary policy and free capital flows (see Diagram 1). Thus, an economy has to give up fixed exchange rate or capital mobility to secure monetary autonomy. When we focus on currency regime, an economy with perfect "floating" regime does not intervene in its foreign exchange market. Even if the economy faces capital flows, therefore, nothing happens in its domestic money supply. On the contrary, a monetary authority with "pegged" regime under free capital flows cannot help intervening in its foreign exchange market, resulting in a change in foreign reserves and money supply. Thus, capital flows would affect asset prices through a change in money supply as an indirect channel.

<Diagram 1>

The monetary authority in emerging market and developing economies usually intervenes in their foreign exchange market to a greater or less extent to avoid their currency-value fluctuations, since they are basically facing the problem of "fear of floating" suggested by Calvo and Reinhart (2002). Then the key question in their economies is whether the authority "sterilizes" the intervention in foreign exchange market to regain its monetary autonomy. If the economies allow some changes in their currency value (e.g. under "managed floating" regime) and/or adopt "capital control", monetary autonomy would be guaranteed by the sterilization in a greater or less degree. In this case, capital flows do not always affect money supply, and an indirect channel from capital flows to asset prices does not necessarily work.

When we focus on the case of China, its economy may have some monetary autonomy for the following reasons. First, foreign capital flows have been still regulated to a greater extent in China. According to the Chinn-Ito index (KAOPEN) [2], an index measuring a country's degree of capital account openness, China ranked 158th out of 174 countries in 2014. Thus, the strict capital control might have guaranteed independent monetary policy in China. Second, China has reformed its currency regime into a managed floating one since July in 2005, and under this regime, the value of renminbi has appreciated by around thirty percent from 2005 to 2015. This increasing flexibility of exchange rate might also have allowed monetary autonomy in China.

In this context, the research questions on the interaction among capital flows, money supply and asset (property) prices in China are, first, whether the money supply has been

[2] See the website: http://web.pdx.edu/~ito/Chinn-Ito_website.htm. As for the data source, refer to Chinn and Ito (2006).

determined independently from capital flows, in other words, whether the sterilization of foreign-exchange-market intervention has worked fully enough to cut off the impacts of capital flows on money supply. In case that money supply and capital flows have an exclusive relationship, there comes the second question: which factor, capital flows through a direct channel or money supply that is domestically determined, has had a major impact on asset (property) prices.

3. Literature Review and Contribution

This section reviews the literature focusing mainly on the determinants of asset prices in the case of Asian emerging market and Chinese economy.

Regarding the studies targeting Asian emerging market economies, Kim and Yang (2011) investigated the effects of capital inflows on stock and land prices by employing a panel VAR model with the samples of South Korea, Malaysia, Indonesia, the Philippines, and Thailand. Their empirical results suggested that capital inflows indeed contributed to the asset price appreciation in this region, although capital inflow shocks explained a relatively small part of asset price fluctuations. Tillmann (2012) also estimated the impacts of capital inflows on house prices and equity prices by a panel VAR model with the samples of Korea, Hong Kong, Malaysia, Thailand and Taiwan. The study found that capital inflow shocks pushed up house and stock prices in general, and at the same time identified cross-country differences in asset price responses to capital flow shocks. The key finding in this study was that the differences in the asset price responses were mainly due to the differences in the monetary policy responses to the capital flow shocks.

There have also been limited but several studies on the interaction among capital flows, money supply and asset prices in the case of Chinese economy. In the combination between capital flows and asset prices, Deng (2010) verified that the “hot money” flowed into real estate rather than equity market and thus had an effect to push up housing prices. Wang et al. (2007) argued, on the contrary, that foreign money inflow was not the cause of real estate price rising and its price rising caused capital inflows on the contrary based on Granger causality tests, although they identified a long-term equilibrium between both variables through co-integration tests. As for the relationship between monetary policy and asset prices, Koivu (2012) found that a loosening of China’s monetary policy led to higher asset prices through structural vector autoregressive estimation. On the other hand, Yao et al. (2013) pointed out that monetary policies had little immediate effect based on vector autoregressive estimation and attributed the outcome to irrational and speculative behaviors of Chinese investors. In this way, the empirical evidence has been inconclusive

in each of bilateral combination analysis. Xu and Chen (2012) examined jointly the impacts of capital flows and monetary policies on asset prices. They demonstrated that Chinese monetary policy actions were the key driving forces behind the change in real estate price growth in China. They also showed that hot money flow did not have a significant impact on the change in home price growth after controlling for the money supply growth.

This study contributes to enriching empirical evidence on the determinants of asset prices by examining them jointly from capital flows as an external factor and from money supply as a domestic factor, whereas the determinant was usually investigated separately in most of the literature. Another contribution is that the study focuses on property prices as a representative of asset prices and takes into account the heterogeneity in the trends in property prices of seventy regional cities in China, while most of the literature cared only about the nationwide trend in property prices.

4. Empirics

This section conducts the empirics on the interaction among capital flows, money supply and property prices in China through Granger causality test under VAR estimation. We first examine the combination between capital flows and money supply in Subsection 4.1, i.e., whether the money supply has been determined independently from capital flows. Then we next investigate which factor, capital flows or money supply, has had a major impact on property prices in Subsection 4.2. The causalities are examined on property prices for each of individual regional cities and for total panel of all cities. Through the subsections, the study samples the period from the first quarter of 2007 to the fourth quarter of 2016 due to the data availability of property prices. All the data are retrieved from National Bureau of Statistics of China (NBSC) and the People's Bank of China (PBC).[3]

4.1 Relationship between Capital Flows and Money Supply

This subsection focuses the relationship between capital flows and money supply in China. We first specify each variable as follows. The capital flows (*cif*) are shown by

[3] The data of money supply are taken from PBC, and the other data are from NBSC. The websites are as follows.
PBC: http://www.pbc.gov.cn/diaochatongjisi/116219/index.html
NBSC: http://data.stats.gov.cn/english

"Liabilities" of "Financial account" in China's balance of payments. This item contains all the liabilities in terms of direct investment, portfolio investment, financial derivatives and other investment (e.g. bank loans). For the estimation, the capital flows are expressed by a percentage of GDP. Money supply (*mon*) is represented by M1, which reflects monetary policy stances of the authority. The money supply is expressed by year-on-year comparison rate to remove its seasonable variation. We add the variable of GDP (*gdp*) as a control variable to extract purely bilateral effects between capital flows and money supply. The GDP is also expressed by year-on-year rate to remove its seasonable variation.

Figure 1 displays the overviews of the relationship between capital flows and money supply. It appears by rough observation that there is no clear correlation between both variables. Since both variables might also be affected by the trend in GDP, the relationship should be statistically tested by a more sophisticated manner, i.e., a VAR estimation, by controlling the third variable of GDP.

<Figure 1>

Before specifying a VAR estimation, we investigate the stationary property of the data for each variable, by employing the Ng-Perron unit root test on the null hypothesis that each variable has a unit root in the test equation including "intercept" and one quarter lag.[4] This test constructs four test statistics: modified forms of Phillips and Perron (1988) statistics (MZa, MZt), the Bhargava (1986) statistic (MSB), and the Point Optimal statistic (MPT). Table 1.1 reports the test results for the data for all three variables, i.e., capital flows (*cif*), money supply (*mon*) and GDP (*gdp*). The test rejected a unit root in all the data at the conventional level of significance by more than 90 percent, thereby their data showing stationary property. Thus their data were justified to be used for a VAR estimation.

We now specify an equation for VAR estimation in the following way.

$$y_t = \mu + V y_{t-1} + \varepsilon_t \tag{1}$$

where y_t is a column vector of the endogenous variables with year *t*, i.e., $y_t = (cif_t\ mon_t)'$; μ is a constant vector; V is a coefficient matrix; y_{t-1} is a vector of the lagged endogenous variables; and ε_t is a vector of the random error terms in the system. The lag length (-1) is selected by the Schwarz information criterion with maximum lag

[4] Ng and Perron (2001) introduced a new unit root test, which used detrended data and a lag selection procedure that improved on previous methods.

being equal to (-2) under the limited number of observations. We also insert GDP (*gdp*) in the equation to control the bilateral correlation between *cif* and *mon*.

Based on the specification above, we conduct the VAR estimation (see Table 1.2) and then examine the Granger causality between capital flows (*cif*) and money supply (*mon*) (see Table 1.3). When we focus on the causality from capital flows to money supply, the causality was identified at the 99-percent significant level, but its sign was negative in the VAR estimation as shown in Table 1.2. This implied that when China has faced capital inflows, the authority has not allowed any monetary expansion, but even reduced money supply. In other words, the impacts of capital flows have been shut off from domestic money supply by more than 100 percent through the authority's sterilization of foreign-exchange-market intervention.

<Table 1>

4.2 Impacts of Capital Flows and/or Money Supply on Property Prices

The previous section suggested that domestic money supply has been determined exclusively from external capital flows in China. However, capital flows may still have an effect on property prices through a direct channel as the theoretical framework in Section 2 presented. Then, which factor, capital flows or money supply, has had a dominant impact on property prices is the next question.

We add a variable of property prices retrieved from NBSC. The property prices sample the data of two kinds: prices of newly constructed commercialized buildings (*nccp*) and prices of second-hand residential buildings (*shrp*); and the data of seventy selected cities in thirty provinces, in terms of year-on-year change rate. It is because the prices of two kinds in seventy cities show highly different movements during sample period form the first quarter of 2007 to the fourth quarter of 2016 in Figure 2. We also replace GDP (*gdp*) with gross regional products, GRP(*grp*), which seventy cities belong to, as a control variable.

<Figure 2>

We investigate the data property for property prices and GRP by the same methodology as the previous section's one. The test results in Table 2 showed that the data were not stationary for some cities' property prices and some provinces' GRP: the prices of newly constructed commercialized buildings in *Juning*, the prices of second-

hand residential buildings in *Bengbu*, *Nanchang*, *Jiujiang*, *Zhanjiang*, *Zunyi* and *Xining*, and the GRP in *Anhui*, *Shandong* and *Guangxi*. Thus we exclude these data from the following VAR estimation.

<Table 2>

We again specify an equation for VAR estimation in the same way as before.

$$y'_t = \mu' + V' y'_{t-1} + \varepsilon'_t \quad (2)$$

where y'_t is a column vector of the endogenous variables with year *t*, i.e., $y_t = (cif_t\ mon_t\ nccp_t)'$ and $(cif_t\ mon_t\ shrp_t)'$; μ' is a constant vector; V' is a coefficient matrix; y'_{t-1} is a vector of the lagged endogenous variables; and ε'_t is a vector of the random error terms in the system. The lag length (-1) is selected by the same methodology as in previous section. We also insert GRP (*grp*) in the equation to control the correlations among capital flows, money supply and property prices.

We then conduct the VAR estimation and examine the Granger causalities from capital flows and money supply to property prices.[5] Table 3 reports the results of causality tests as follows. The tests were conducted on 60 cities for the prices of newly constructed commercialized buildings (*nccp*) and on 55 cities for the prices of second-hand residential buildings (*shrp*), by excluding the cities in which the data with nonstationary property was included out of total 70 cities. Regarding *nccp*, positive causalities from money supply to the property prices were identified at significant levels on 57 cities out of 60 cities, whereas those from capital flows to the property prices were verified only on one city. As for *shrp*, positive causalities from money supply to the property prices were identified at significant levels on 37 cities out of 55 cities, while those from capital flows to the property prices were verified only on 4 cities. These test results, therefore, suggested that the main contributor to property prices' determinant was domestic money supply rather than external capital inflows. This outcome is also consistent with the previous study of Xu and Chen (2012).

It should also be noted that some of cities where their property prices are not affected by money supply as well as capital flows belong to big cities and/or coastal advanced cities, e.g. *Shanghai* and *Shenzhen* in *nccp*; and *Beijing*, *Changchun*, *Shanghai*, *Ningbo*, *Fuzhou*, *Guangzhou*, *Shaoguan* and *Shenzhen* in *shrp*. In these cities, property prices

[5] The results of VAR estimation in individual cities are not reported here to conserve space.

might be subject to investors' speculations. Yao et al. (2013), again, argued that monetary policies had little effect on property prices since Chinese investors might be "irrational" and "speculative" in such a way that investors rushed to buy houses or shares whenever tightening monetary policies were taken. Although the authority is keeping its monetary autonomy, it may have a room to enhance the accountability and transparency of its monetary policies to minimize irrational behaviors of Chinese investors.

<Table 3>

Finally, we herein check the robustness of the individual city's estimation above by conducting a panel VAR estimation. We construct a panel data with total seventy cities for the full sample period from the first quarter of 2007 to the fourth quarter of 2016 in the prices of newly constructed commercialized buildings (*nccp*) and those of second-hand residential buildings (*shrp*). The data property was examined by the Levin, Lin and Chu unit root test developed by Levin et al. (2002), which assumes that the parameters of the series lagged are common across cross sections. The test result in Table 4.1 showed that all the data were stationary at the 99 percent significant level. We then replace the data in the equation (2) and conduct the panel VAR estimation with Granger causality test (see Table 4.2 and Table 4.3). The causality test reported that both of property prices, *nccp* and *shrp*, were caused negatively by capital flows and positively by money supply. From this panel VAR analysis, we could also confirm that the major determinant of property prices were domestic money supply in China.

<Table 4>

5. Concluding Remarks

This article examined the interaction among capital flows, money supply and property prices with a focus of Chinese economy by using a vector auto-regression (VAR) estimation as an analytical framework. Our research questions were, first, whether money supply has been determined independently from capital flows, and then which factor, capital flows or money supply, has given a dominant effect on property prices. The contributions of this study were that the determinants of asset prices were investigated jointly from capital flows as an external factor and from money supply as a domestic factor. Another contribution was that the study focused on property prices as a representative of asset prices and took into account the differences in the trends in

property prices of seventy regional cities in China.

The main findings through the Granger causality tests by the VAR estimations were as follows. First, domestic money supply has been determined exclusively from external capital flows through the authority's perfect sterilization of foreign-exchange-market intervention. Second, the main contributor to property prices' movement has been domestic money supply rather than external capital flows. Third, some deviations of property prices from the trend in money supply were found in big cities and/or coastal advanced cities. The strategic implication of our findings is that although the monetary authority is keeping its autonomy, it may has a room to enhance the accountability and transparency of its monetary policies to minimize irrational behaviors of Chinese investors.

References

Bhargava, A. (1986). On the theory of testing for unit roots in observed time series, Review of Economic Studies, 53, 369–384.

Blanchard, O., Dell'Ariccia, G. and Mauro, P. (2010). Rethinking macroeconomic policy, IMF Staff Position Note, SPN/10/03.

Caballero, R. and Krishnamurthy, A. (2006). Bubbles and capital flow volatility: Causes and risk management, Journal of Monetary Economics, 53, 35–53.

Calvo, G., and Reinhart, C. (2002). Fear of floating, Quarterly Journal of Economics, 117, 2, 379–408.

Chinn, M.D. and Ito, H. (2006). What matters for financial development? Capital controls, institutions, and interactions, Journal of Development Economics, 81, 1, 163-192.

Deng, Y.I. (2010). An empirical study on the influence of "Hot Money" on China's asset prices, Modern Economic Science, 04.

Kim, S., and Yang, D.Y. (2009). Do capital inflows matter to asset prices? The case of Korea, Asian Economic Journal, 23, 3, 323–348.

Kim, S., and Yang, D.Y. (2011). The impact of capital inflows on asset prices in emerging Asian economies: is too much money chasing too little good? Open Economies Review, 22, 2, 293–15.

Koivu, T. (2012). Monetary policy, asset prices and consumption in China, Economic System, 36, 2, 207-325.

Levin, A., Lin, C.F. and Chu, C. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties, Journal of Econometrics, 108, 1–24.

Mankiw, G. (2007). Macroeconomics (sixth edition). Worth Publishers: New York.

Ng, S. and Perron, P. (2001). Lag length selection and the construction of unit root tests with good size and power, Econometrica, 69, 6, 1519–1554.

Phillips, P. and Perron, P. (1988). Testing for unit root in time series regression, Biometrika, 74, 335–346.

Taguchi, H. Sahoo, P. and Nataraj, G. (2015). Capital flows and asset prices: Empirical evidence from emerging and developing economies, International Economics, 141, 1-14.

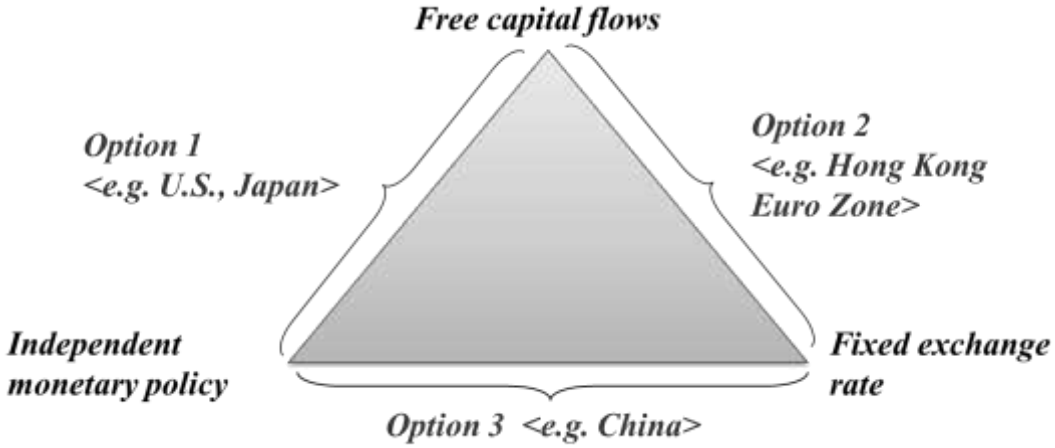
Tillmann, P. (2012). Capital inflows and asset prices: evidence from emerging Asia, IMFS working paper series, 58.

Wang, C., Cui, Y., Wang, Z. and Yin, S. (2007). Empirical research on the relationship between real estate price fluctuation and foreign money inflow, Chinese Business Review, 6, 4, 9-14.

Xu, X.E. and Chen, T. (2012). The effect of monetary policy on real estate price growth in China, Pacific-Basin Finance Journal, 20, 1, 62-77.

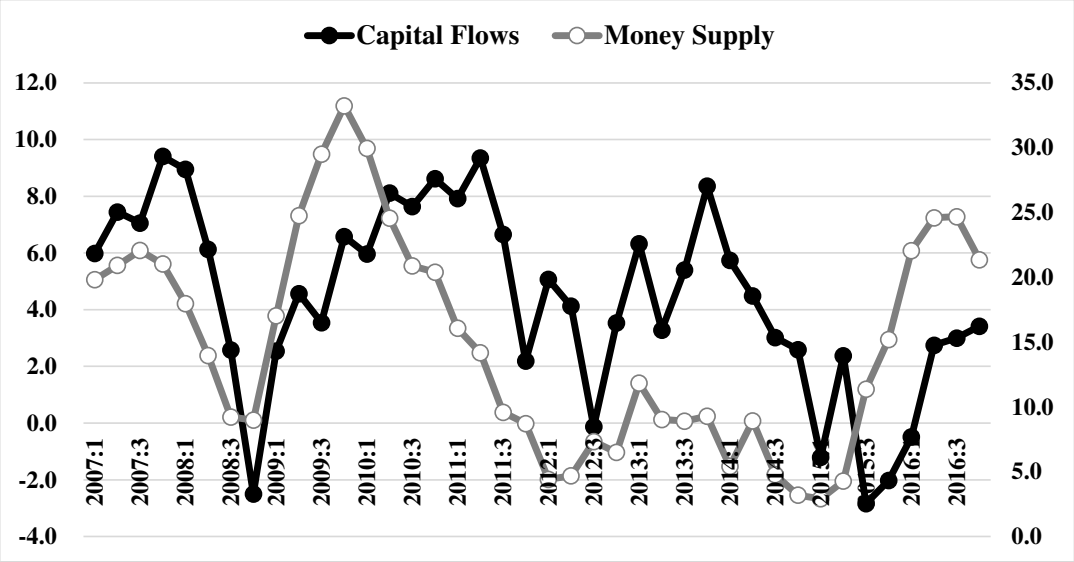
Yao, S. Luo, D. and Loh, L. (2013). On China's monetary policy and asset prices, Applied Financial Economics, 23, 5, 377-392.

Diagram 1 Impossible Trinity



Sources: Author's description based on Mankiw (2007)

Figure 1 Capital Flows and Money Supply



Sources: NBSC and PBC

Table 1 Analysis of Correlation between Capital Flows and Money Supply

Table 1.1 Unit Root Test

		MZa	MZt	MSB	MPT
Capital Inflows	*cif*	-10.37 **	-2.26 **	0.21 **	2.40 **
Money Supply	*mon*	-11.60 **	-2.39 **	0.20 **	2.15 **
GDP	*gdp*	-10.32 *	-2.21 **	0.21 **	2.57 **

Note: **, * denote the rejection of null hypothesis at the 95% and 90% level of significance.
Sources: NBSC and PBC

Table 1.2 VAR Estimation

	cif	*mon*
cif -1	0.392 **	-0.577 **
	[2.382]	[-2.581]
mon -1	0.091 *	1.011 ***
	[1.761]	[14.312]
C	-0.798	3.737 ***
	[-0.832]	[2.869]
gdp	0.159	-0.102
	[1.512]	[-0.714]
adj. R^2	0.530	0.862

Note: ***, **, * denote the rejection of null hypothesis at the 99%, 95% and 90% level of significance, respectively. The figure in parenthesis [ ] indicates t value.
Sources: NBSC and PBC

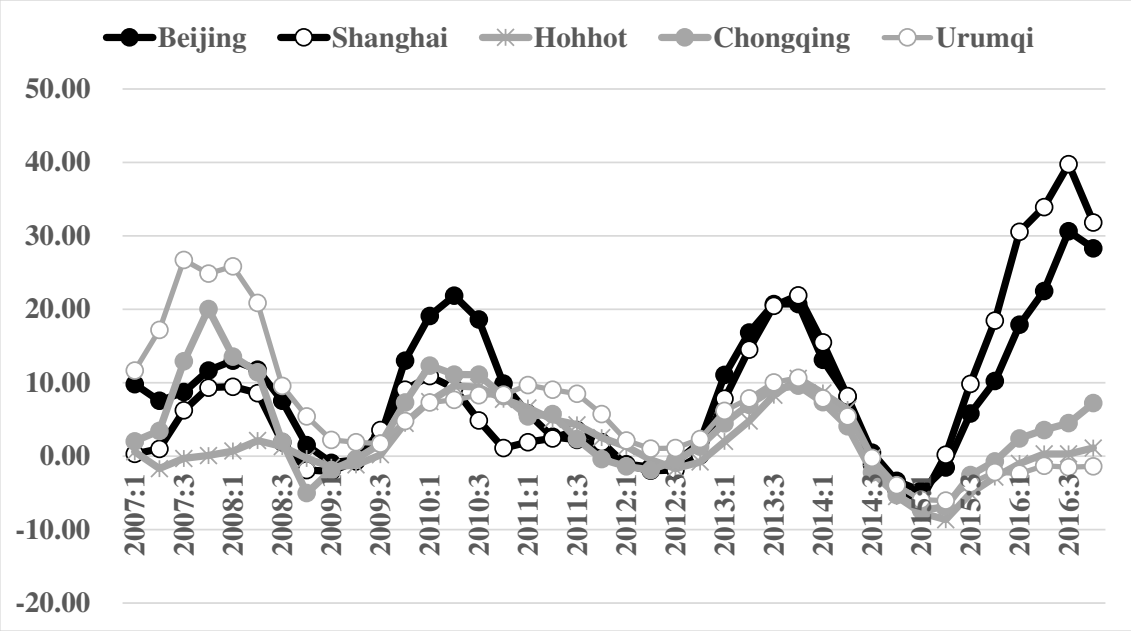
Table 1.3 Granger Causality Test

Null Hypothesis	Lags	Chi-sq
cif does not Granger Cause *mon*	1	6.66 *** (negative)
mon does not Granger Cause *cif*	1	3.10 * (positive)

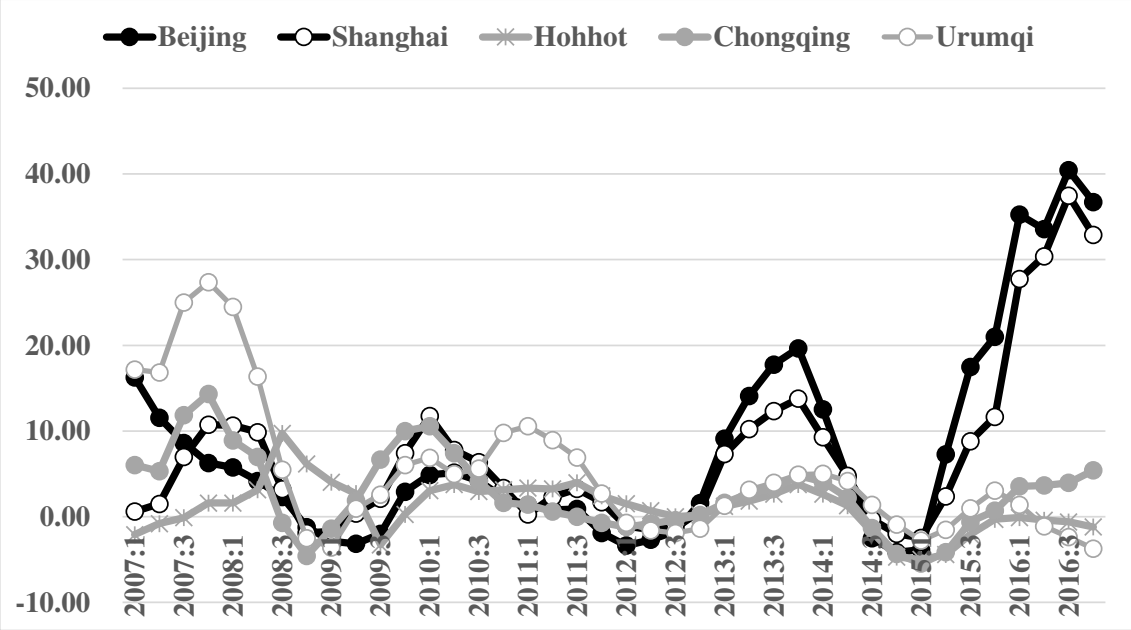
Note: ***, * denote the rejection of null hypothesis at the 99% and 90% level of significance.
Sources: NBSC and PBC

Figure 2 Trends in Property Prices in Selected 5 Cities

[Prices of Newly Constructed Commercialized Buildings]



[Prices of Second-Hand Residential Buildings]



Sources: NBSC

Table 2 Unit Root Test of Property Prices and GRP

[Prices of Newly Constructed Commercialized Buildings]

nccp		MZa	MZt	MSB	MPT
Beijing	*pbei*	-108.78 ***	-7.30 ***	0.06 ***	0.34 ***
Tianjin	*ptia*	-48.53 ***	-4.76 ***	0.09 ***	0.91 ***
Shijiazhuang	*pshi*	-23.34 ***	-3.34 ***	0.14 ***	1.29 ***
Tangshan	*ptan*	-9.02 **	-2.12 **	0.23 *	2.72 **
Qinhuangdao	*pqin*	-48.46 ***	-4.92 ***	0.10 ***	0.51 ***
Taiyuan	*ptai*	-56.36 ***	-5.30 ***	0.09 ***	0.43 ***
Hohhot	*phoh*	-35.56 ***	-4.21 ***	0.11 ***	0.68 ***
Baotou	*pbao*	-14.94 ***	-2.70 ***	0.18 **	1.74 ***
Shenyang	*pshe*	-45.51 ***	-4.76 ***	0.10 ***	0.54 ***
Dalian	*pdal*	-11.35 **	-2.35 **	0.20 **	2.26 **
Dandong	*pdan*	-20.88 ***	-3.22 ***	0.15 ***	1.19 ***
Jinzhou	*pjin*	-15.42 ***	-2.72 ***	0.17 **	1.79 **
Changchun	*pcha*	-11.24 **	-2.37 **	0.21 **	2.18 **
Jilin	*pjil*	-20.43 ***	-3.19 ***	0.15 ***	1.19 ***
Harbin	*phar*	-28.43 ***	-3.76 ***	0.13 ***	0.88 ***
Mudanjiang	*pmud*	-8.78 **	-2.00 **	0.22 **	3.12 **
Shanghai	*psha*	-1,007.55 ***	-22.41 ***	0.02 ***	0.04 ***
Nanjing	*pnan*	-858.13 ***	-20.65 ***	0.02 ***	0.06 ***
Wuxi	*pwux*	-240.84 ***	-10 75 ***	0.04 ***	0.36 ***
Xuzhou	*pxuz*	-35.26 ***	-4.18 ***	0.11 ***	0.74 ***
Yangzhou	*pyan*	-66.64 ***	-5.72 ***	0.08 ***	0.46 ***
Hangzhou	*phan*	-42.80 ***	-4.49 ***	0.10 ***	0.93 ***
Ningbo	*pnin*	-22.87 ***	-3.36 ***	0.14 ***	1.14 ***
Wenzhou	*pwen*	-10.34 **	-2.27 **	0.21 **	2.37 **
Jinhua	*pjih*	-25.50 ***	-3.55 ***	0.13 ***	1.00 ***
Hefei	*phef*	-305.29 ***	-12.17 ***	0.03 ***	0.27 ***
Bengbu	*pben*	-45.18 ***	-4.74 ***	0.10 ***	0.57 ***
Anqing	*panq*	-17.15 ***	-2.92 ***	0.17 ***	1.44 ***
Fuzhou	*pfuz*	-16.12 ***	-2.73 ***	0.16 ***	1.90 **
Xiamen	*pxia*	-55.95 ***	-5.14 ***	0.09 ***	0.79 ***
Quanzhou	*pqua*	-24.40 ***	-3.48 ***	0.14 ***	1.02 ***
Nanchang	*pnac*	-19.63 ***	-3.10 ***	0.15 ***	1.34 ***
Jiujiang	*pjiu*	-19.32 ***	-3.04 ***	0.15 ***	1.49 ***
Ganzhou	*pgan*	-8.65 **	-2.06 **	0.23 *	2.87 **
Ji"Nan	*pjia*	-168.14 ***	-9.02 ***	0.05 ***	0.35 ***

[Continued]

nccp		MZa	MZt	MSB	MPT
Qingdao	*pqig*	-50.23 ***	-4.93 ***	0.09 ***	0.67 ***
Yantai	*pyat*	-8.55 **	-2.05 **	0.23 *	2.92 **
Jining	*pjii*	-4.43	-1.41	0.31	5.64
Zhengzhou	*pzhe*	-57.94 ***	-5.08 ***	0.08 ***	1.10 ***
Luoyang	*pluo*	-29.65 ***	-3.84 ***	0.12 ***	0.83 ***
Pingdingshan	*ppin*	-37.76 ***	-4.34 ***	0.11 ***	0.65 ***
Wuhan	*pwuh*	-142.68 ***	-8.32 ***	0.05 ***	0.36 ***
Yichang	*pyic*	-25.78 ***	-3.59 ***	0.13 ***	0.95 ***
Xiangfan	*pxig*	-10.32 **	-2.26 **	0.21 **	2.39 **
Changsha	*pchn*	-58.92 ***	-5.37 ***	0.09 ***	0.53 ***
Yueyang	*pyue*	-8.74 **	-2.07 **	0.23 *	2.85 **
Changde	*pchg*	-25.02 ***	-3.53 ***	0.14 ***	0.98 ***
Guangzhou	*pgua*	-55.51 ***	-5.21 ***	0.09 ***	0.56 ***
Shaoguan	*psho*	-20.80 ***	-3.20 ***	0.15 ***	1.26 ***
Shenzhen	*pshn*	-30.20 ***	-3.86 ***	0.12 ***	0.87 ***
Zhanjiang	*pzha*	-20.26 ***	-3.18 ***	0.15 ***	1.21 ***
Huizhou	*phui*	-12.37 **	-2.45 **	0.19 **	2.10 **
Nanning	*pnai*	-21.14 ***	-3.24 ***	0.15 ***	1.17 ***
Guilin	*pgui*	-44.27 ***	-4.70 **	0.10 ***	0.55 ***
Beihai	*pbeh*	-7.90 *	-1.95 *	0.24 *	3.22 *
Haikou	*phai*	-17.82 ***	-2.98 ***	0.16 ***	1.37 ***
Sanya	*psan*	-17.63 ***	-2.96 ***	0.16 ***	1.39 ***
Chongqing	*pcho*	-31.34 ***	-3.94 ***	0.12 ***	0.81 ***
Chengdu	*pche*	-32.19 ***	-4.01 ***	0.12 ***	0.76 ***
Luzhou	*pluz*	-10.35 **	-2.27 **	0.21 **	2.38 **
Nanchong	*pnah*	-11.23 **	-2.34 **	0.20 **	2.27 **
Guiyang	*pguy*	-12.19 **	-2.46 **	0.20 **	2.01 **
Zunyi	*pzun*	-22.37 ***	-3.34 ***	0.14 ***	1.09 ***
Kunming	*pkun*	-15.22 ***	-2.75 ***	0.18 **	1.60 **
Dali	*pdai*	-13.72 **	-2.61 ***	0.19 **	1.78 **
Xi"An	*pxin*	-50.99 ***	-5.04 ***	0.09 ***	0.48 ***
Lanzhou	*plan*	-8.67 **	-2.06 **	0.23 *	2.89 **
Xining	*pxii*	-12.63 **	-2.48 **	0.19 **	2.04 **
Yinchuan	*pyin*	-21.90 ***	-3.30 ***	0.15 ***	1.12 ***
Urumqi	*puru*	-11.51 **	-2.33 **	0.20 **	2.36 **

Note: ***, **, * denote the rejection of null hypothesis at the 99%, 95% and 90% level of significance.
Sources: NBSC

[Prices of Second-Hand Residential Buildings]

shrp		MZa	MZt	MSB	MPT
Beijing	*pbei*	-8.85 **	-1.91 *	0.21 **	3.46 *
Tianjin	*ptia*	-23.20 ***	-3.08 ***	0.13 ***	2.09 **
Shijiazhuang	*pshi*	-14.11 ***	-2.50 **	0.17 **	2.31 **
Tangshan	*ptan*	-9.82 **	-2.18 **	0.22 **	2.60 **
Qinhuangdao	*pqin*	-12.84 **	-2.53 **	0.19 **	1.90 **
Taiyuan	*ptai*	-65.49 ***	-5.72 ***	0.08 ***	0.37 ***
Hohhot	*phoh*	-11.91 **	-2.43 **	0.20 **	2.07 **
Baotou	*pbao*	-20.87 ***	-3.22 ***	0.15 ***	1.17 ***
Shenyang	*pshe*	-17.95 ***	-2.97 ***	0.16 ***	1.44 ***
Dalian	*pdal*	-13.27 **	-2.57 **	0.19 **	1.85 **
Dandong	*pdan*	-13.52 **	-2.56 **	0.18 **	1.94 **
Jinzhou	*pjin*	-7.60 *	-1.88 *	0.24 *	3.44 *
Changchun	*pcha*	-15.48 ***	-2.77 ***	0.17 **	1.60 ***
Jilin	*pjil*	-53.53 ***	-5.17 ***	0.09 ***	0.46 ***
Harbin	*phar*	-5.92 *	-1.65 *	0.27	4.33 *
Mudanjiang	*pmud*	-8.64 **	-2.05 **	0.23 *	2.91 **
Shanghai	*psha*	-23.68 ***	-3.15 ***	0.13 ***	1.96 **
Nanjing	*pnan*	-750.59 ***	-19.26 ***	0.02 ***	0.11 ***
Wuxi	*pwux*	-10.67 **	-2 16 **	0.20 **	2.84 **
Xuzhou	*pxuz*	-11.25 **	-2.34 **	0.20 **	2.28 **
Yangzhou	*pyan*	-71.13 ***	-5.94 ***	0.08 ***	0.39 ***
Hangzhou	*phan*	-24.49 ***	-3.33 ***	0.13 ***	1.52 ***
Ningbo	*pnin*	-17.24 ***	-2.90 ***	0.16 ***	1.53 ***
Wenzhou	*pwen*	-11.35 **	-2.38 **	0.20 **	2.15 **
Jinhua	*pjih*	-22.24 ***	-3.32 ***	0.14 ***	1.13 ***
Hefei	*phef*	-170.10 ***	-9.04 ***	0.05 ***	0.39 ***
Bengbu	*pben*	-3.21	-1.24	0.38	7.58
Anqing	*panq*	-16.47 ***	-2.85 ***	0.17 ***	1.52 ***
Fuzhou	*pfuz*	-9.48 **	-2.13 **	0.22 **	2.75 **
Xiamen	*pxia*	-28.24 ***	-3.64 ***	0.12 ***	1.22 ***
Quanzhou	*pqua*	-11.47 **	-2.39 **	0.20 **	2.13 **
Nanchang	*pnac*	-4.91	-1.56	0.31	4.98
Jiujiang	*pjiu*	-3.40	-1.29	0.37	7.18
Ganzhou	*pgan*	-22.91 ***	-3.28 ***	0.14 ***	1.41 ***
Ji"Nan	*pjia*	-63.18 ***	-5.44 ***	0.08 ***	0.79 ***

[Continued]

shrp		MZa	MZt	MSB	MPT
Qingdao	*pqig*	-24.50 ***	-3.44 ***	0.14 ***	1.16 ***
Yantai	*pyat*	-13.19 **	-2.55 **	0.19 **	1.89 **
Jining	*pjii*	-6.59 *	-1.75 *	0.26 *	3.91 *
Zhengzhou	*pzhe*	-10.89 **	-1.92 *	0.17 **	3.72 *
Luoyang	*pluo*	-10.03 **	-2.21 **	0.22 **	2.52 **
Pingdingshan	*ppin*	-18.43 ***	-3.02 ***	0.16 ***	1.37 ***
Wuhan	*pwuh*	-70.61 ***	-5.77 ***	0.08 ***	0.69 ***
Yichang	*pyic*	-8.86 **	-2.09 **	0.23 *	2.80 **
Xiangfan	*pxig*	-12.18 **	-2.43 **	0.20 **	2.12 **
Changsha	*pchn*	-6.76 *	-1.83 *	0.27 *	3.62 *
Yueyang	*pyue*	-5.81 *	-1.65 *	0.28	4.37 *
Changde	*pchg*	-19.65 ***	-3.12 ***	0.15 ***	1.29 ***
Guangzhou	*pgua*	-13.78 **	-2.29 **	0.16 ***	2.96 **
Shaoguan	*psho*	-24.80 ***	-3.52 ***	0.14 ***	0.99 ***
Shenzhen	*pshn*	-22.62 ***	-3.35 ***	0.14 ***	1.12 ***
Zhanjiang	*pzha*	-4.72	-1.47	0.31	5.32
Huizhou	*phui*	-15.40 ***	-2.63 ***	0.17 ***	2.12 **
Nanning	*pnai*	-7.22 *	-1.89 *	0.26 *	3.42 *
Guilin	*pgui*	-15.47 ***	-2.76 ***	0.17 **	1.63 ***
Beihai	*pbeh*	-11.01 **	-2.33 **	0.21 **	2.25 **
Haikou	*phai*	-11.96 **	-2.44 **	0.20 **	2.05 **
Sanya	*psan*	-9.70 **	-2.19 **	0.22 **	2.54 **
Chongqing	*pcho*	-24.91 ***	-3.52 ***	0.14 ***	0.99 ***
Chengdu	*pche*	-8.42 **	-2.05 **	0.24 *	2.91 **
Luzhou	*pluz*	-11.46 **	-2.38 **	0.20 **	2.17 **
Nanchong	*pnah*	-9.28 **	-2.14 **	0.23 **	2.66 **
Guiyang	*pguy*	-13.68 **	-2.61 ***	0.19 **	1.79 **
Zunyi	*pzun*	-3.77	-1.29	0.34	6.52
Kunming	*pkun*	-8.31 **	-2.00 **	0.24 *	3.06 **
Dali	*pdai*	-17.31 ***	-2.94 ***	0.16 ***	1.41 ***
Xi"An	*pxin*	-9.34 **	-2.12 **	0.22 **	2.76 **
Lanzhou	*plan*	-6.21 *	-1.71 *	0.27	4.08 *
Xining	*pxii*	-4.05	-1.22	0.30	6.24
Yinchuan	*pyin*	-40.44 ***	-4.49 ***	0.11 ***	0.61 ***
Urumqi	*puru*	-16.59 ***	-2.79 ***	0.16 ***	1.80 **

Note: ***, **, * denote the rejection of null hypothesis at the 99%, 95% and 90% level of significance.
Sources: NBSC

[Gross Regional Products: GRP]

grp		MZa	MZt	MSB	MPT
Beijing	*gbei*	-16.33 ***	-2.84 ***	0.17 ***	1.56 ***
Tianjin	*gtia*	-13.85 ***	-2.60 ***	0.18 **	1.86 **
Hebei	*gheb*	-10.33 **	-2.26 **	0.21 **	2.41 **
Shanxi	*gsha*	-14.27 ***	-2.64 ***	0.18 **	1.80 **
Inner Mongolia	*gmon*	-6.08 *	-1.62 *	0.26 *	4.40 *
Liaoning	*glia*	-3.60	-0.50	0.13 ***	6.82
Jilin	*gjil*	-8.52 **	-1.95 *	0.22 **	3.27 *
Heilongjiang	*ghei*	-18.37 ***	-2.97 ***	0.16 ***	1.54 ***
Shanghai	*gshn*	-17.96 ***	-2.99 ***	0.16 ***	1.36 ***
Jiangsu	*gjia*	-6.72 *	-1.78 *	0.26 *	3.79 *
Zhejiang	*gzhe*	-7.29 *	-1.86 *	0.25 *	3.52 *
Anhui	*ganh*	-5.50	-1.60	0.29	4.59
Fujian	*gfuj*	-9.07 **	-2.05 **	0.22 **	2.97 **
Jiangxi	*gjin*	-15.55 ***	-2.78 ***	0.17 **	1.58 ***
Shandong	*gshd*	-4.82	-1.41	0.29	5.37
Henan	*ghen*	-5.58	-1.65 *	0.29	4.42 *
Hubei	*ghub*	-8.51 **	-2.04 **	0.24 *	2.93 **
Hunan	*ghun*	-6.62 *	-1.75 *	0.26 *	3.93 *
Guangdong	*ggua*	-11.60 **	-2.39 **	0.20 **	2.17 **
Guangxi	*ggun*	-5.46	-1.58	0.28	4.68
Hainan	*ghai*	-15.50 ***	-2.76 ***	0.17 **	1.64 ***
Chongqing	*gcho*	-15.95 ***	-2.82 ***	0.17 **	1.54 ***
Sichuan	*gsic*	-6.79 *	-1.82 *	0.26 *	3.68 *
Guizhou	*ggui*	-20.16 ***	-3.12 ***	0.15 ***	1.38 ***
Yunnan	*gyun*	-13.84 ***	-2.62 ***	0.18 **	1.81 **
Shaanxi	*gshx*	-8.65 **	-2.04 **	0.23 *	2.95 **
Gansu	*ggan*	-8.65 **	-2.06 **	0.23 *	2.87 **
Qinghai	*gqin*	-13.54 **	-2.55 **	0.18 **	1.97 **
Ningxia	*gnin*	-14.06 ***	-2.64 ***	0.18 **	1.76 ***
Xinjiang	*gxin*	-16.92 ***	-2.87 ***	0.16 ***	1.58 ***

Note: ***, **, * denote the rejection of null hypothesis at the 99%, 95% and 90% level of significance.
Sources: NBSC

Table 3 Granger Causality Test on Property Prices

[Prices of Newly Constructed Commercialized Buildings]

nccp		*grp*	*cif*	*mon*
Beijing	*pbei*	*gbei*	8.64 *** (negative)	6.05 **
Tianjin	*ptia*	*gtia*	7.38 *** (negative)	10.45 ***
Shijiazhuang	*pshi*	*gheb*	0.21	17.56 ***
Tangshan	*ptan*	*gheb*	0.69	8.89 ***
Qinhuangdao	*pqin*	*gheb*	0.35	21.09 ***
Taiyuan	*ptai*	*gsha*	0.66	0.09
Hohhot	*phoh*	*gmon*	0.78	7.64 ***
Baotou	*pbao*	*gmon*	2.09	3.77 *
Shenyang	*pshe*	*glia*	1.88	3.82 *
Dalian	*pdal*	*glia*	0.18	9.04 ***
Dandong	*pdan*	*glia*	1.35	11.00 ***
Jinzhou	*pjin*	*glia*	0.40	3.64 *
Changchun	*pcha*	*gjil*	0.18	9.58 ***
Jilin	*pjil*	*gjil*	4.72 **	7.77 ***
Harbin	*phar*	*ghei*	0.43	6.13 **
Mudanjiang	*pmud*	*ghei*	1.12	14.93 ***
Shanghai	*psha*	*gshn*	7.89 *** (negative)	1.71
Nanjing	*pnan*	*gjia*	7.11 *** (negative)	8.54 ***
Wuxi	*pwux*	*gjia*	2.91 * (negative)	8.13 ***
Xuzhou	*pxuz*	*gjia*	0.66	8.32 ***
Yangzhou	*pyan*	*gjia*	1.61	22.27 ***
Hangzhou	*phan*	*gzhe*	1.50	8.42 ***
Ningbo	*pnin*	*gzhe*	2.09	7.42 ***
Wenzhou	*pwen*	*gzhe*	2.14	14.02 ***
Jinhua	*pjih*	*gzhe*	0.00	15.25 ***
Hefei	*phef*	*ganh*	-	-
Bengbu	*pben*	*ganh*	-	-
Anqing	*panq*	*ganh*	-	-
Fuzhou	*pfuz*	*gfuj*	6.74 *** (negative)	7.81 ***
Xiamen	*pxia*	*gfuj*	6.31 ** (negative)	7.10 ***
Quanzhou	*pqua*	*gfuj*	0.79	7.39 ***
Nanchang	*pnac*	*gjin*	1.17	14.54 ***
Jiujiang	*pjiu*	*gjin*	0.07	21.61 ***
Ganzhou	*pgan*	*gjin*	0.14	17.43 ***
Ji''Nan	*pjia*	*gshd*	-	-

[Continued]

nccp		*grp*	*cif*	*mon*
Qingdao	*pqig*	*gshd*	-	-
Yantai	*pyat*	*gshd*	-	-
Jining	*pjii*	*gshd*	-	-
Zhengzhou	*pzhe*	*ghen*	2.71 * (negative)	10.08 ***
Luoyang	*pluo*	*ghen*	0.33	6.37 **
Pingdingshan	*ppin*	*ghen*	0.54	2.84 *
Wuhan	*pwuh*	*ghub*	3.77 * (negative)	13.40 ***
Yichang	*pyic*	*ghub*	0.45	17.77 ***
Xiangfan	*pxig*	*ghub*	0.02	7.07 ***
Changsha	*pchn*	*ghun*	0.08	16.35 ***
Yueyang	*pyue*	*ghun*	0.21	13.22 ***
Changde	*pchg*	*ghun*	2.21	17.55 ***
Guangzhou	*pgua*	*ggua*	4.05 ** (negative)	4,23 **
Shaoguan	*psho*	*ggua*	0.08	8.99 ***
Shenzhen	*pshn*	*ggua*	6.41 ** (negative)	0.06
Zhanjiang	*pzha*	*ggua*	0.03	18.76 ***
Huizhou	*phui*	*ggua*	4.15 ** (negative)	6.61 **
Nanning	*pnai*	*ggun*	-	-
Guilin	*pgui*	*ggun*	-	-
Beihai	*pbeh*	*ggun*	-	-
Haikou	*phai*	*ghai*	0.86	6.93 ***
Sanya	*psan*	*ghai*	0.53	4.34 **
Chongqing	*pcho*	*gcho*	0.00	9.41 ***
Chengdu	*pche*	*gsic*	0.17	6.96 ***
Luzhou	*pluz*	*gsic*	0.01	3.12 *
Nanchong	*pnah*	*gsic*	1.70	3.28 *
Guiyang	*pguy*	*ggui*	0.25	7.15 ***
Zunyi	*pzun*	*ggui*	0.05	9.22 ***
Kunming	*pkun*	*gyun*	2.68	14.42 ***
Dali	*pdai*	*gyun*	0.45	8.37 ***
Xi"An	*pxin*	*gshx*	0.41	13.08 ***
Lanzhou	*plan*	*ggan*	0.00	5.47 **
Xining	*pxii*	*gqin*	0.04	11.85 ***
Yinchuan	*pyin*	*gnin*	0.00	4.87 **
Urumqi	*puru*	*gxin*	0.59	4,24 **
Contributions in Total			1 / 60	57 / 60

Note: ***, **, * denote the rejection of null hypothesis at the 99%, 95% and 90% level of significance.
Sources: NBSC

[Prices of Second-Hand Residential Buildings]

shrp		*grp*	*cif*	*mon*
Beijing	*pbei*	*gbei*	11.48 *** (negative)	0.07
Tianjin	*ptia*	*gtia*	6.41 ** (negative)	4.34 **
Shijiazhuang	*pshi*	*gheb*	0.54	12.78 ***
Tangshan	*ptan*	*gheb*	1.25	5.78 **
Qinhuangdao	*pqin*	*gheb*	0.00	15.93 ***
Taiyuan	*ptai*	*gsha*	0.14	1.71
Hohhot	*phoh*	*gmon*	0.05	0.04
Baotou	*pbao*	*gmon*	1.34	1.87
Shenyang	*pshe*	*glia*	0.66	5.81 **
Dalian	*pdal*	*glia*	0.19	17.52 ***
Dandong	*pdan*	*glia*	0.08	12.89 ***
Jinzhou	*pjin*	*glia*	0.76	4.76 **
Changchun	*pcha*	*gjil*	0.00	1.01
Jilin	*pjil*	*gjil*	1.70	18.73 ***
Harbin	*phar*	*ghei*	2.33	0.87
Mudanjiang	*pmud*	*ghei*	1.03	6.87 ***
Shanghai	*psha*	*gshn*	8.67 *** (negative)	1.97
Nanjing	*pnan*	*gjia*	2.12	4.18 **
Wuxi	*pwux*	*gjia*	0.03	10.87 ***
Xuzhou	*pxuz*	*gjia*	5.25 ** (negative)	4.71 **
Yangzhou	*pyan*	*gjia*	3.07 *	32.80 ***
Hangzhou	*phan*	*gzhe*	5.48 ** (negative)	11.85 ***
Ningbo	*pnin*	*gzhe*	2.36	1.14
Wenzhou	*pwen*	*gzhe*	5.94 ** (negative)	4.96 **
Jinhua	*pjih*	*gzhe*	0.63	9.54 ***
Hefei	*phef*	*ganh*	-	-
Bengbu	*pben*	*ganh*	-	-
Anqing	*panq*	*ganh*	-	-
Fuzhou	*pfuz*	*gfuj*	5.80 ** (negative)	1.89
Xiamen	*pxia*	*gfuj*	8.98 *** (negative)	7.22 ***
Quanzhou	*pqua*	*gfuj*	0.39	2.86 *
Nanchang	*pnac*	*gjin*	-	-
Jiujiang	*pjiu*	*gjin*	-	-
Ganzhou	*pgan*	*gjin*	1.04	10.17 ***
Ji''Nan	*pjia*	*gshd*	-	-

[Continued]

shrp		*grp*	*cif*	*mon*
Qingdao	*pqig*	*gshd*	-	-
Yantai	*pyat*	*gshd*	-	-
Jining	*pjii*	*gshd*	-	-
Zhengzhou	*pzhe*	*ghen*	1.81	3.53 *
Luoyang	*pluo*	*ghen*	0.91	9.61 ***
Pingdingshan	*ppin*	*ghen*	1.31	0.64
Wuhan	*pwuh*	*ghub*	3.32 * (negative)	14.78 ***
Yichang	*pyic*	*ghub*	1.05	1.46
Xiangfan	*pxig*	*ghub*	1.40	2.18
Changsha	*pchn*	*ghun*	0.98	6.79 ***
Yueyang	*pyue*	*ghun*	0.37	6.73 ***
Changde	*pchg*	*ghun*	0.97	15.52 ***
Guangzhou	*pgua*	*ggua*	7.56 *** (negative)	1.15
Shaoguan	*psho*	*ggua*	0.97	0.79
Shenzhen	*pshn*	*ggua*	4.17 ** (negative)	0.00
Zhanjiang	*pzha*	*ggua*	-	-
Huizhou	*phui*	*ggua*	0.97	6.81 ***
Nanning	*pnai*	*ggun*	-	-
Guilin	*pgui*	*ggun*	-	-
Beihai	*pbeh*	*ggun*	-	-
Haikou	*phai*	*ghai*	0.73	6.81 ***
Sanya	*psan*	*ghai*	1.02	2.60
Chongqing	*pcho*	*gcho*	0.68	5.95 **
Chengdu	*pche*	*gsic*	0.49	5.55 **
Luzhou	*pluz*	*gsic*	0.27	2.85 *
Nanchong	*pnah*	*gsic*	0.00	4.15 **
Guiyang	*pguy*	*ggui*	3.23 *	4.31 **
Zunyi	*pzun*	*ggui*	-	-
Kunming	*pkun*	*gyun*	0.02	1.57
Dali	*pdai*	*gyun*	3.61 *	8.17 ***
Xi"An	*pxin*	*gshx*	0.93	12.22***
Lanzhou	*plan*	*ggan*	0.00	7.09 ***
Xining	*pxii*	*gqin*	-	-
Yinchuan	*pyin*	*gnin*	2.76 *	4.97 **
Urumqi	*puru*	*gxin*	0.56	2.30
Contributions in Total			4 / 55	37 / 55

Note: ***, **, * denote the rejection of null hypothesis at the 99%, 95% and 90% level of significance.
Sources: NBSC

Table 4 VAR Estimation by Panel Data

Table 4.1 Unit Root Test

		Levin, Lin & Chu
Capital Inflows	*cif*	-5.16 ***
Money Supply	*mon*	-10.20 ***
Prices of Newly Constructed Commercialized Buildings	*nccp*	-7.20 ***
Prices of Second-Hand Residential Buildings	*shrp*	-3.15 ***
Gross Reginal Product	*grp*	-4.84 ***

Note: *** denotes the rejection of null hypothesis at the 99% level of significance.
Sources: NBSC and PBC

Table 4.2 VAR Estimation

	cif	*mon*	*nccp*
cif -1	0.506 ***	-0.587 ***	-0.228 ***
	[31.753]	[-27.929]	[-9.067]
mon -1	0.109 ***	1.015 ***	0.179 ***
	[18.840]	[132.206]	[19.450]
nccp -1	0.051 ***	-0.062 ***	0.864 ***
	[7.477]	[-6.985]	[79.659]
C	0.074	3.232 ***	-1.046 ***
	[0.760]	[24.971]	[-6.741]
grp	0.016 ***	-0.042 ***	0.004
	[3.014]	[-5.968]	[0.559]
adj. R^2	0.549	0.875	0.782

	cif	*mon*	*shrp*
cif -1	0.532 ***	-0.617 ***	-0.193 ***
	[34.245]	[-30.160]	[-8.750]
mon -1	0.114 ***	1.011 ***	0.127 ***
	[19.257]	[129.611]	[15.213]
shrp -1	0.029 ***	-0.041 ***	0.848 ***
	[3.899]	[-4.199]	[79.590]
C	0.016	3.289 ***	-0.738 ***
	[0.162]	[25.043]	[-5.215]
grp	0.016 ***	-0.042 ***	0.012
	[2.918]	[-5.844]	[1.546]
adj. R^2	0.542	0.874	0.772

Note: *** denotes the rejection of null hypothesis at the 99% level of significance. The figure in parenthesis [ ] indicates t value.
Sources: NBSC and PBC

Table 4.3 Granger Causality Test

		Lags	*cif*	*mon*
Prices of Newly Constructed Commercialized Buildings	*nccp*	1	82.22 *** (negative)	378.32 ***
Prices of Second-Hand Residential Buildings	*shrp*	1	76 56 *** (negative)	231.46 ***

Note: *** denotes the rejection of null hypothesis at the 99% level of significance.
Sources: NBSC and PBC