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# Monetary Policy and Property Price Bubbles in Hong Kong

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#### Abstract:

Friedrich A. Hayek (1935) argued that the monetary policy would interfere with the allocation of resources over time by forcing interest rates below the level they would otherwise be. Lower interest rates would then translate into higher asset prices, gradually forming the asset bubbles. In light of Hayek's idea, this paper aims to study the relationship between the expansionary monetary policy in the United States and the formation of the property price bubble in Hong Kong in the aftermath of the recent subprime mortgage crisis. We construct a dynamic demand and supply model to illustrate the impact of monetary policy on asset prices. Then we investigate the effect of the US's expansionary monetary policy on the interest rates in Hong Kong. Due to the limitation of the Linked Exchange Rate system, Hong Kong cannot implement the monetary policy of adjusting the interest rates independently. We further argue that, fuelled by the exceptionally low levels of the federal funds rate for an extended period, the unprecedented low real interest rates in Hong Kong, especially the real mortgage interest rate, will continue to contribute largely to the formation and subsequent burst of the property price bubble in Hong Kong.

1. Introduction

In an IMF forum "New Perspectives on Financial Globalization" on 27<sup>th</sup> April 2007, Jeffrey A. Frankel began his remarks to the forum by asking the audience to identify the author of a particular quote. "I am going to show you the quote," he said, "and just yell it out if you want to guess." Frankel then presented the following quote:

"Left alone, market forces will direct too much effort into speculation and too little into the development of new products."<sup>1</sup>

<sup>&</sup>lt;sup>1</sup> Transcript of an IMF Economic Forum: "New Perspectives on Financial Globalization" Washington, D.C., Friday, April 27, 2007

The audience yelled out, "Hayek!" Frankel responded saying, "Hayek could have said it, I suppose...."

Would this be Hayek's idea? Hayek (1935) wrote:

"Hayek argued that in a growing economy, the monetary policy that would stabilize a price index of consumer goods would interfere with the allocation of resources over time. It would do so by forcing interest rates below the level they would otherwise be. The price of long-lived assets, such as capital goods or housing, moves inversely to movements in the relevant interest rates. Lower interest rates translate into higher asset prices, and vice-versa."

O'Driscoll (2009) pointed out that Hayek described something called assets bubble. What is happening to the global economy now is that the artificially low interest rates in western countries push capital to the growing economy of Asian countries. This creates a speculative bubble in the Asian economy. Using Hong Kong as an example, this paper investigates the relationship between monetary policies in the US and the property price bubbles in Hong Kong.

The remainder of this paper is organized as follows: Section 2 defines speculative bubble and provides a review of Hayek's idea of bubble. Section 3 constructs a dynamic demand and supply model to illustrate the impact of monetary policy on asset prices. Section 4 discusses the property price bubbles in Hong Kong. The final section offers conclusions and limitations. 2. Literature Review

In general, speculative bubbles can be defined as self-fulfilling assets price changes that deviate from the market fundamental values. Salge (1997) defined bubbles as a speculative mark-up on asset prices generated by self-sustaining expectations driving up prices that cannot be justified by any fundamental values. Garber (1990) considered speculative bubble as events that cannot be explained by any reasonable economic explanations. No matter which definition is used, the self-sustaining aspect tends to be the most important characteristic for speculative bubble.





Speculative bubbles normally show a regular stylized pattern (See Figure 1). The asset price monotonically deviates from the fundamental value with an accelerating phase and then crashes suddenly. Although everyone knows that the bubble cannot grow forever, still no one knows when a bubble will crash. It is this unpredictable crash that creates harmful effects on the economy.

The stylized bubble pattern is always used to describe particular financial events. For example, the first recorded famous speculative bubble was known as the "Tulip Bubble." In 1630s Holland, prices for tulip bulbs rose "sky high" so that a bulb of rare variety could sell for as much as an expensive house. In 1637, prices stopped going up and the market almost immediately collapsed (See Garber, 1990). Another example is the unpredictable over-valuation of the U.S. dollar that occurred in the period between 1981and 1985, when the dollar appreciated sharply against other major currencies (marks, yen, pounds, and other European currencies). The nominal effective exchange value of the dollar appreciated by 24.5% in the five years from 1980 to 1984. Nearly all economists believe that this over-valuation of the U.S. dollar was a currency bubble (See Frankel and Froot, 1987). In 1999 the NASDAQ composition index rose from 2208 to over 4000, increasing over 87% in just one year. This is the famous "Internet bubble" (IT bubble) of the U.S. stock market. Recently, the burst of the housing bubble in the US caused a global financial crisis (See Eddlem, 2010).

From the point of view of Hayek, bubbles are a phenomenon resulting from overinvestment. According to the overinvestment theory, when the banking sector holds the market interest rate (control by banking sector) below the natural rate (an equilibrium interest rate on capital markets), there will be too much investment and the wrong type of investment (Hayek, 1967, p. 54).

Dick (2009) wrote:

"Hayek viewed the boom and bust of the business cycle as primarily a monetary phenomenon created by governments' artificial inflation of money and credit." Thus from the point of view of Hayek, monetary policy was responsible for the creation and crash of the speculative bubble.

Eddlem, (2010) wrote:

"Hayek was granted a Nobel Prize in Economics (much later, in 1974) for his pre-Depression and Depression-era related work in the study of economics. The Nobel committee explained in a press release about the award: Perhaps, partly due to this more profound analysis, he was one of the few economists who gave warning of the possibility of a major economic crisis before the great crash came in the autumn of 1929. Von Hayek showed how monetary expansion, accompanied by lending which exceeded the rate of voluntary saving, could lead to a misallocation of resources, particularly affecting the structure of capital...."

Schnabl, & Hoffmann (2008) investigated monetary policy and bursting bubbles from the point of view of overinvestment theories, and concluded that it was monetary policy that kept interest rates too low for too long in response to bursting bubbles.

#### 3. Dynamic demand and supply in the assets market

#### 3.1 The model

This section builds a simple dynamic demand and supply model to illustrate the impact of monetary policy on assets prices. Consider the following model:

$$Qs = Qs + \alpha_1 \Delta P \tag{1}$$

$$\Delta Qd = \overline{Qd} - \alpha_2 P - \beta(r_b - r)$$
<sup>(2)</sup>

Equation 1 shows that the supply of assets (Qs) increases over the fundamental supply of assets  $(\overline{Qs})$  as the assets price increases  $(\Delta P)$ . The fundamental supply of assets can be

thought of as the natural capital formation in a growing economy. Equation 2 shows that changes in demand for assets ( $\Delta Qd$ ) is positively related to some natural demand for assets ( $\overline{Qd}$ ). Additionally, the change in asset demand is negatively related to the price of assets. Additionally, the demand for asset is also negatively related to the deviation of the market interest rate ( $r_b$ ) from natural interest rate ( $\overline{r}$ ). The market interest rate captures the impact of monetary policy and innovation of the banking sector to create credit. If the market interest rate is higher than the natural interest rate, funds will leave the assets market. On the other hand, if the market interest rate is lower than the natural interest rate, funds will move into the asset market and cause a boom in the demand for assets. Both  $\alpha_1$  and  $\alpha_2$  capture the sensitivity of supply and demand toward the price level; those symbols represent the supply and demand elasticity. In the long run the equilibrium conditional would be the market clearing condition, in which demand for asset is equal to supply of asset ( $Qs = \overline{Qs} = Qd = Qd_{-1} = \overline{Q}$ ). There will be no change in the asset price ( $\Delta P = 0$ ), nor change in quantity ( $\Delta Q = 0$ ).

#### 3.2 Simulation of asset price under a prolonged expansionary monetary policy

To illustrate the dynamic effect of an impact from an expansionary monetary policy, this section provides four simulated cases, each of which was generated from a different supply and demand elasticity scenario. For every case, it was supposed that the government employed expansionary monetary policy to pull down the market interest rate to below the natural interest rate. The differences between market and natural interest rates widened from -3% to -5% persistently, with  $\beta = 1$ , the impact of the decreased market interest rate, directly transferred to the asset price.



Figure 1: Simulated change in asset price with  $\alpha_1$  and  $\alpha_2$  equal to 1

Figure 1 shows the case in which both supply and demand elasticity were unit elastic. In the long run the asset price increased from \$3 to \$5, a more than 50% increase in the assets price. Additionally, in the adjustment the asset price overshot the long run equilibrium price and reached a maximum price of about \$5.5 at period 5. Thus following Hayek's wisdom, monetary policy generated fluctuation in asset price that was avoidable.

Figure 2: Simulated change in asset price with  $\alpha_1$ =0.05 and  $\alpha_2$  = 4



In the case of figure 2, the supply was highly inelastic while demand was highly elastic. The impact of the monetary expansion caused the asset price to increase to \$5 at period 3. The overshooting was less, but the adjustment speed was faster than the case in Figure 1. Since supply was highly inelastic, the increase in asset price could not stimulate supply. The impact of monetary expansion that stimulated funds to flood into the asset market caused a boom in the demand for assets, thus pushing up the asset price faster than the case in which supply was unit elastic. Additionally, as demand was highly elastic, the increase in asset price quickly cooled down the demand; thus the overshooting is much smaller than in the case in which demand was unit elastic.



Figure 3: Simulated change in asset price with  $\alpha_1$ =4 and  $\alpha_2$  = 0.05

Figure 3 presents the case in which supply was highly elastic while demand was highly inelastic. The asset price followed a cyclical path, increasing slowly and reaching its maximum around period 31, then decreasing slowly to reach the first trough at around period 61. In the long run, the asset price cycle tended to cool down, and the asset price

tended to return the long run equilibrium, \$5. The overshooting was longer and stronger than was the case in figures 1 and 2. Since supply was elastic, increase in asset price stimulated the supply of more assets; for example, in the case where the stock market boomed, more initial public offerings (IPO) appeared. The increase in supply of assets matched the influx of funds, thus reducing the speed of asset price booming, and asset price only increased slowly. On the demand side, price increase did not reduce demand because of the inelastic demand. The impact from expansionary monetary policy tended to be prolonged, thus causing the overshooting to be much stronger than was the case in Figures 1 and 2. The asset price moved up to around \$6.8 in the first peak. However, asset price could not overshoot the long run equilibrium forever; the mismatch of demand and supply caused asset price to fall to around \$3.5 at period 61.

The asset price cycle illustrated by Figure 3 tends to be consistent with the Austrian business cycle wisdom.

Oppers (2002) wrote:

"...the "Austrian" theory of the business cycle [was] first proposed by Friedrich Hayek in the 1920s. His theory claimed that credit creation by monetary authorities would push investment beyond society's long-term willingness to save, creating a mismatch between supply and demand that would inevitably cause recession."

Although asset price paths illustrated in Figures 1 to 3 exhibit certain inertia, the selfsustaining price path did not exhibit any persistent deviation from the demand and supply equilibrium. Indeed, asset price returned to its long run equilibrium.



Figure 4: Simulated change in asset price with  $\alpha_1$ =-0.3 and  $\alpha_2$  = 1

Figure 4 illustrates the case in which supply elasticity was negative while demand retained unit elasticity. One of the purposes of supplying of assets was to obtain funds; as the price of assets increased, more assets would be supplied so as to obtain more funds. However, as the asset price increased to a very high level, less supply was needed to match the required fund. This means that as income effect from supplying assets outweighs the substitution effects, supply curve becomes negative. With a negative supply and demand, the price equilibrium became unstable. Figure 4 illustrates the case in which asset price follows an explosive cyclical path. A series of asset price increase and crash appears with accelerating phases. The self-sustaining growth and crash of the asset price displays the stylized bubble path.

#### 4. Property price bubbles in Hong Kong

4.1 Boom and bust of the property market in Hong Kong

Hong Kong property prices could be considered as very volatile since 1990s. Figure 5 shows the Private Domestic Property Price Index<sup>2</sup> of Hong Kong from 1980 to 2010 (Q1), where it illustrates the bubble burst in 1997 and the recent upward trend.





\*Provisional figure

#### Source: Rating and Valuation Department

The index increased from the lowest of 18.4 in 1980 (Q1) to the all time high of 169.5 in 1997 (Q3). We can further divide this period of time into two. We can find out that it took about the first half to double the index from 18.4 in 1980 (Q1) to 39.4 in 1989 (Q1) and then it surged astonishingly to 169.5 in 1997 (Q3), which increased more than threefold. All of a sudden, the huge bubble burst and the index gravitated to the lowest level of 59.3 in 2003 (Q3), which was about a 65% drop of the property price. Having gone through this unprecedented bubble implosion of such a magnitude and the

 $<sup>^2</sup>$  Private Domestic units are defined as independent dwellings with separate cooking facilities and bathroom. They are sub-divided by reference to increasing floor area from Class A to E. The index here refers to all classes as a whole.

completely loss of confidence of Hong Kong people, the index climbed up again to 140.6 in 2010 (Q1), representing an increase of 137% compared with the trough in 2003 (Q3).

## 4.2 Determinants of property prices in Hong Kong

Over the years, a substantial body of research has been conducted focusing on the determinants of property prices in Hong Kong. Peng (2002) examined the determination of residential property prices in Hong Kong from 1981 to 2002 by using two different empirical models of property prices that combine fundamental variables with the concept of speculative bubbles. The estimates indicate a significant bubble component in the observed property prices in the period before the Asian financial crisis. He concluded that some factors have determined property prices including macroeconomic and monetary conditions, demographic developments, and government housing policies. Gerlach and Peng (2003) further studied the pattern of causality between residential property prices and bank lending in Hong Kong using multivariate cointegration framework. The results suggest that excessive bank lending was not the main cause of the property market bubbles in Hong Kong. In addition, Goodhart and Hofmann (2008) studied the linkages between money, credit, house prices and economic activity using quarterly data for 17 industrialized countries during the period of time from 1970 to 2006. The results show that there is evidence of a significant multidirectional link between house prices and monetary variables and the macroeconomy. They proposed to introduce regulatory ceilings for loan-to-value ratios (LTVs) on mortgage lending as applied in the past in Hong Kong (Goodhart and Hofmann, 2004 & 2007). The LTV-

ceiling could be raised when property market suffered a slump, and lowered during the surge of property prices.

## 4.3 Real interest rates in Hong Kong

Among the various factors affecting the property prices, real interest rates was one of the important driving forces behind the formation and subsequent burst of the property price bubble in Hong Kong. In this subsection, we will discuss the real savings deposit rate and the real mortgage interest rate. Figure 6 shows the real savings deposit rate from 1980 to May 2010.





Source: Census and Statistics Department and Hong Kong Monetary Authority

The real savings deposit rate<sup>3</sup> was -7.1% in January 1980 and prolonged to January 1998 with only a few months being positive in 1985. Besides the relatively high

<sup>&</sup>lt;sup>3</sup> The real savings deposit rate is calculated by subtracting the period average figure of savings deposit rate by the inflation rate using the composite consumer price index except the period from January 1980 to September 1981. Since composite consumer price index was not available in that period, consumer price index (A) was adopted instead.

inflation rate during that period of time, another reason contributed to such a long period of negative values might due to the fact that the deposit interest rates were artificially set by the a few large licensed banks<sup>4</sup>. The large licensed banks were accused by the Consumer Council<sup>5</sup> of acting as a cartel to exploit the benefit of consumers. Due to such a large magnitude of negative real interest rates, which were as high as -8.7% in January 1993, real estate became one of the most attractive investments for Hong Kong people. To protect against inflation, Hong Kong people have a deep-rooted belief that "brick" is the most safe and valuable long-lived asset. Even when facing the downturn of property market, delinquency ratio<sup>6</sup> peaked at a rather low value of 1.43% in April 2001, which could be considered as very low compared with other countries<sup>7</sup>. As a result, the price of long-lived assets like housing climbed up progressively to the peak in 1997 as stated by Hayek (1935), "lower interest rates translate into higher asset prices and vice-versa". From February 1998 to June 2004, the real savings deposit rate turned into positive and reached as high as 9.8% in September 1999. The positive savings deposit rate lasted for about six years and during almost the same period of time, the property prices decreased by 65%. Recently, the negative savings deposit rate has returned again and reached the level as low as -6.3% in July 2008.

<sup>&</sup>lt;sup>4</sup> Before 3 July 2001, interest rates on bank deposits including savings deposit rate have been regulated by the Interest Rate Rules (IRRs) determined by the Hong Kong Association of Banks (HKAB) since 1964. The average real savings deposit rate is now compiled based on the interest rates quoted by leading licensed banks after the IRRs. Best lending rates refers to the rate quoted by the Hongkong and Shanghai Banking Corporation Limited.

<sup>&</sup>lt;sup>5</sup> In 1994, the Consumer Council in Hong Kong released a Report entitled "Are Hong Kong Depositors Fairly Treated?", which was based on a consultancy study to evaluate the impact of banking policies and practices on the consumer.

<sup>&</sup>lt;sup>6</sup> In Hong Kong, delinquency ratio is measured by a ratio of total amount of loans overdue for more than 3 months to total outstanding loans.

<sup>&</sup>lt;sup>7</sup> The delinquency rate rose to 12.3 percent in Florida, United States in the second quarter of 2008. http://www.msnbc.msn.com/id/32450370/ns/business-real\_estate/

Besides the effect of real savings deposit rate, the cost of buying house, which can be measured by using real mortgage interest rates, could also contribute to the understanding of the property price bubbles in Hong Kong. During 1990s, mortgage interest rate was calculated by adding on the best lending rate<sup>8</sup> a certain percentage which could be as high as 2.75%. Starting from March 1999, due to the approaching of the time to deregulate all the deposit rates in July 2001 and the keen competition of the bank lending to the property sector, the banks started to offer their majority of mortgage interest rate the same as the best lending rate. Recently the HIBOR-based mortgage rate has become popular as indicated by the fact that 82.7% of the mortgage interest rates were of this type in May 2010<sup>9</sup>. Figure 7 indicates the trend of the mortgage interest rate<sup>10</sup>, the best lending rate and the 3-month HIBOR.

Figure 7: Mortgage interest rate, the best lending rate and the 3-month HIBOR

<sup>&</sup>lt;sup>8</sup> Best lending rate refers to the rate quoted by the Hongkong and Shanghai Banking Corporation Limited.
<sup>9</sup> The mortgage rate of the HIBOR mortgage plan offered by Citibank in Hong Kong was as low as HIBOR + 0.7% on 29 June 2010.

http://www.citibank.com.hk/global\_docs/loans/english/content/property/hibor/hibor.html?kwid=22276 <sup>10</sup>The HKMA has conducted the Residential Mortgage Survey and provided the data of "interest margin on new loans approved during the month" since December 1996. Out of the various categories provided, the category with highest percentage is chosen as the percentage being added or subtracted by the best lending rate to form the data of mortgage interest rate. For HIBOR-based mortgage plan, 0.7% is added to the 3-month HIBOR to form the mortgage interest rate.

http://www.info.gov.hk/hkma/eng/press/category/resident.htm



Source: HKMA

As indicated in Figure 7, we can notice that the recent trend of the mortgage interest rate does not follow closely to the trend of the best lending rate anymore. It switches to follow closely to the trend of HIBOR instead. Figure 8 shows the real mortgage interest rate incorporating the effect of inflation. The average real mortgage interest rate was 8.1% when the market suffered a slump during the period between 1997 (Q4) to 2003 (Q3). The rate was so high that it could affect adversely on the mortgage lending and thus the property prices. Then the average real mortgage interest rate decreased to 1.8% during the period of between 2003 (Q4) to 2010 (Q1). Since 1997, the real mortgage interest rates have had a positive value for about ten years. Recently it has reached a record low value of -3.8% in July 2008. As a result, the exceptional low cost of buying house would provide the necessary fuel to the surging property prices.

Figure 8: Real mortgage interest rate



Source: HKMA

Table 1 provides a summary of the values of the three variables discussed above, namely the property price index, real savings deposit rate and real mortgage interest rate. The possible scenario for the near future may resemble the period of time from 1980 to 1997 (Q3) provided that the interest rates would be as low as near zero and the inflation rate would increase continuously. This would probably be the case and will be discussed in the next subsection.

 Table 1: A summary of the values of the property price index, real savings deposit rate and real mortgage interest rate.

	1980 (Q1)		1989 (Q1)		1997 (Q3)		2003 (Q3)		2010 (Q1)
Property price index	18.4		39.4		169.5		59.3		140.6
Percentage change during the period		114%		330%		-65%		117%	
Average of real									
savings deposit rate during the period		-3.2%		-5.2%		4.5%		-0.6%	
Average of real									
mortgage interest rate during the period						8.1%		1.8%	

Source: Rating and Valuation Department and Hong Kong Monetary Authority

## 4.4 Linked exchange rate system and interest rates in Hong Kong

Hong Kong's linked exchange rate system, which was established in October 1983, is a rule-based currency board system. The Hong Kong dollar is linked to the US dollar at the rate of 7.8 Hong Kong dollars to one US dollar and the entire monetary base is backed with US dollars. It has served Hong Kong very well for almost three decades, weathering various financial crises including the recent subprime financial crisis in 2007/08. However, one of the limitations of the linked exchange rate system is that interest rates in Hong Kong are largely determined by those in the US. The current arrangement is that the Discount Window Base Rate<sup>11</sup> in Hong Kong is set at 50 basis points above the prevailing US Federal Funds Target Rate<sup>12</sup>. Figure 9 shows the movement of the Discount Window Base Rate (HK) and the Federal Funds Target Rate (US). Both rates move exactly the same direction with only a small difference of 50 basis points. Whenever there is misalignment between US and Hong Kong economic cycles, Hong Kong has to inevitably follow the US interest rates closely. For example, although Hong Kong was facing the high inflation rate of 10.2% in January 1993, the savings deposit rate and the best lending rate had to be kept at a very low level of 1.5% and 6.5% respectively due to the poor economic environment in the US at that time. The very low (negative) real savings deposit rate and low (negative) real mortgage interest rate<sup>13</sup> gradually gathered forces to push the property prices to the all time high in October 2007. After the outbreak of the Asian financial crisis in 1997, the direction of the real interest

<sup>&</sup>lt;sup>11</sup>The Base Rate is the interest rate forming the foundation upon which the Discount Rates for repurchaseagreement transactions through the Discount Window are computed.

<sup>&</sup>lt;sup>12</sup> The HKMA announced this new formula on 8 October 2008 to replace the old formula, which was established in 27 November 1998 having a premium of 150 basis points on the US Federal Funds Target Rate.

http://www.info.gov.hk/hkma/eng/press/2008/20081217e3.htm

http://www.info.gov.hk/hkma/eng/press/1998/981126e.htm

rates reversed. The real savings deposit rate and real mortgage interest rate reached as high as 9.8% and 14.5% respectively in September 1999. The property bubble burst subsequently.

Figure 9: Movement of the Discount Window Base Rate (HK) and the Federal Funds Target Rate (US)



Can monetary policy be adopted to guard against the fluctuations in property prices? The answer is "No". Latter (2002) argued that "A monetary policy framework must be viewed in its entirety, and needs to be clear and enduring. Its success should be judged over the longer term, while accepting that delivers long-term stability may not continuously deliver results to everyone's liking in the short term." In other words, since Hong Kong has chosen to operate a currency board system, Hong Kong cannot implement the monetary policy of adjusting the interest rates independently and must accept the short term unfavourable results. However, we think that the time span of the wide fluctuations of property prices during the past three decades is too long to be considered as "short term".

 $<sup>^{13}</sup>$  The mortgage rate was about 9.25%, which was calculated as the best lending rate plus 2.75%.

Looking ahead, the US interest rates would remain very low as stated in the recent FOMC meeting held on 23 June 2010: "…economic conditions are likely to warrant exceptionally low levels of the federal funds rate for an extended period". Being the cost of maintaining the linked exchange rate system, the interest rates in Hong Kong have to follow closely with that in US. The most recent figures of the real savings deposit rate and the real mortgage interest rate reached negative values of -2.5% in May 2010 and -2.0% in April 2010. Meanwhile, since 2003 (Q3), the property price index has climbed up again to its highest value of 146.6 in 2010 (Q1). The choice of currency stability as Hong Kong's monetary policy objective would force Hong Kong' "interest rates below the level they would otherwise be" due to the current historically low US interest rates will continue to contribute largely to the formation and subsequent burst of the property price bubble in Hong Kong.

#### 5. Conclusion

Under the linked exchange rate in Hong Kong, the authority does not purchase any monetary policy. Indeed, Hong Kong follows the monetary policy of the US. What is happening now is that the US easy monetary policy has pushed market interest rates below the natural rate; thus funds flood into the asset markets. This causes fluctuations in the stock market. Even worse is that funds flood the property market. Property market is characterized by having inelastic short run supply. As property prices shoot up, the income effect from supplying less property in the second hand market outweighs the substitution effect, and as illustrated in the simulation exercise, speculative bubble will be generated. It is clear that global market forces are allocating too many resources to speculative bubble in Hong Kong.

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