Property bubble in Hong Kong: 
A predicted decade-long slump (2016-2025)

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Abstract  Between 2003 and 2015 the prices of apartments in Hong Kong (adjusted for inflation) increased by a factor of 3.8. This is much higher than was observe in the United States prior to the so-called subprime crisis of 2007. The analysis of this speculative episode confirms the mechanism and regularities already highlighted by the present authors in similar episodes in other countries. Based on these regularities, it is possible to predict the price trajectory over the time interval 2016-2025. It suggests that, unless appropriate relief is provided by the mainland, Hong Kong will experience a decade-long slump. Possible implications for its relations with Beijing are discussed at the end of the paper.

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Introduction

In addition to being an economic phenomenon, speculative bubbles have important social aspects. They give rise to a speculative frenzy which leads buyers to forget previous episodes that ended in disasters.\(^1\)

The sheer size of property bubbles ensures they are one of the most important speculative bubbles. Their main characteristic is that during such episodes prices are lifted up by the dynamics of speculation. Moreover, in the final stages of the bubble, both supply and demand and interest rate levels become largely irrelevant.\(^2\)

It is this aspect which allows the effect to be described and predicted by a fairly simple mechanism as demonstrated in previous papers (Roehner 2001, Richmond 2007, Richmond et al. 2013). In such episodes one can define three prices which provide a schematic description of the price trajectory: the price \(p_1\) at the beginning of the upward phase, the price \(p_2\) at the top of the peak and the price \(p_3\) at the end of the downward phase. In relation with these prices, one can also define the corresponding amplitudes: \(A_1 = p_2 / p_1\) and \(A_2 = p_2 / p_3\).

The basic rule which emerges from the study of previous historical episodes is that \(p_3\) is only slightly higher than \(p_1\). In short, the more prices go up, the more they must come down. Moreover, the duration \(\tau_2\) of the declining phase is only slightly shorter than the duration \(\tau_1\) of the rising phase. In other words, the most basic approximation (a more accurate picture will be given subsequently) is that speculative price peaks are symmetrical with respect to their two phases.\(^3\)

Needless to say, such predictions cannot take into account external factors such as government interventions or major disruptions (e.g. the end of the Soviet Union in 1990 or the worldwide financial crisis of 2008). In other words, in order to test if our understanding is correct one needs instances of property bubbles in which there is minimal incidence of exogenous factors. It is from this perspective that the Hong Kong bubble is of particular interest.\(^4\)

From its start around 2003 to its climax and burst in the fall of 2015, the rising phase

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\(^{1}\)Several instances of speculative frenzy for various items (stocks, collectible books, coins and stamps, houses and apartments) are described (not only qualitatively but also quantitatively) in Roehner (2001), particularly in chapter 5 entitled “Contagion of speculative frenzy”.

\(^{2}\)Curiously, many economic studies fail to take advantage of the great simplification permitted by this feature. For instance, a study entitled “Is Hong Kong property a bubble?” (http://discount-investing.com) starts by asking “Is there a shortage of new housing?” There is of course a shortage of new housing in all big cities but this question becomes completely irrelevant during the slump phase of a speculative episode when the market is dominated by a flight away from risky assets falling in value.

\(^{3}\)This pattern has been observed repeatedly, yet it is still largely overlooked by “experts”. Thus, the predictions offered on the Internet in the case of Hong Kong rarely cover more than one year and we did not find any which covers the next decade.

\(^{4}\)For our research another important advantage of the Hong Kong case was the fact that the website of the “Rating and Valuation Department” of the Hong Kong government provides very detailed data not only for prices but also for rents.
of the Hong Kong residential property bubble offers so to say an ideal text-book case of a speculative bubble. Why? In order to answer this question we need to outline the mechanism through which property bubbles spring up.

**Mechanism of property bubbles**

The mechanism which leads to a property bubble involves the following stages.

- In the initial phase of the process low interest rates facilitate purchases by persons who “need a roof over their head” and buy an apartment in order to live in it. In order to distinguish them from investors and following a standard terminology (Roehner 2002, Richmond et al. 2013), these persons will be called *users*.

- As the average price level goes up users are progressively shut out from the market with the result that the proportion of the transactions done by investors increases steadily. Among investors a further distinction is in order between those who seek a yield (we call them y-investors) and those who seek a capital gain (we call them c-investors).

- For c-investors the price level is irrelevant provided they can resell at a higher price. However, because the progression of the rent is bounded by the income of tenants, the yield (i.e. annual rent divided by the purchase price) is bound to dwindle as prices shoot up. Thus, y-investors are also progressively driven out of the market. A market dominated by c-investors is necessarily very unstable because any substantial downward oriented price fluctuation may trigger a market downturn.

**Government interventions**

The previous process corresponds to the ideal case where there are no government interventions. The government may try to “cool off” the market for instance by increasing interest rates, by making market access more difficult for investors who hold already several properties or by increasing taxes on the profit generated by short-term sales. Moreover, following the burst of the bubble, the government can prop up the market by bailing out property developers or by buying unsold buildings in order to diminish excess inventories. A good illustration of this kind of anti-cyclic measures is provided by the policy of the South Korean government from 2007 to present (i.e. 2016). In a first phase the measures were aimed at cooling the market whereas in a second phase (still underway) their purpose was to revive it. In recent years Singapore and China provided two other examples of government interventions in property markets. In a general way government intervention is the rule rather than the exception.

On the contrary, in Hong Kong there were few interventions. As a consequence of Hong Kong’s currency board monetary system (more detailed explanations are given in Appendix A), the (real) short-term interest rate necessarily follows the US rate.
Thus, the fact that US rates have been close to zero over half a decade provided a fertile ground for the development of the Hong Kong bubble. As the market downturn occurred only 6 months ago, we do not yet know if the government (whether the Hong Kong government or the central government) will come to the help of bankrupt property developers or whether it will prop up the market in some other ways. That is why one should distinguish two parts in the present paper.

In the first part we analyze the rising phase and show that almost all the patterns that one expects to observe were indeed displayed. This includes the following effects.

- **The recurrence effect** by which we mean that the 2003-2015 price development was basically the same (in length and rate) as in the previous episode of 1985-1997.
- **The decreasing yield effect** by which we mean that the rent/price ratio decreased from about 5.6% at the start of the bubble to about 3% at its peak. Equivalently, this change can also be expressed in a way more commonly used in stock markets by saying that the price earnings ratio (price/rent) increased from 18 to about 33.
- **The price multiplier effect** by which we mean that for different kinds of apartments the amplitude of the price peak is an increasing function of their initial price. The scope of application of the price multiplier effect is by no means limited to property prices. It can also be detected in the price peaks of many other items for which speculation can take place, e.g. stocks, collectible stamps or antiquarian books (Maslov et al. 2003, Roehner 2000, Roehner 2001 particularly the chapter entitled “Price multiplier effect”).

In the second part of the paper we offer a prediction for the trajectory of the price fall during the decade 2016-2025, but it must be emphasised that this prediction rests on the assumption of minimal exogenous interference. If there are major changes in the organization of the market the prediction will no longer apply. First, we explain our analytical description of speculative peaks. This description does not only apply to property prices but to all kinds of price bubbles including commodity price bubbles (see Roehner 2001, p. 158). Secondly, we will see that the values of the parameters $\alpha$ and $\tau$ describing the rising phases (1987-1997) and (2003-2015) are fairly similar which leads naturally to the assumption that they will remain similar for the downward phase.

**Organization of the Hong Kong property market**

The Hong Kong property market has two components each of which represents about one half of the market.

- The public housing part is subsidized by the Hong Kong government. It offers rental housing (about 30% of the whole market) and subsidized sales (about 18%).
- Private housing (about 52%)
All the price and rent data used subsequently are for the private housing part. The coexistence of a public and private sector is a feature shared by many cities, for instance, Singapore or Paris.

**Changes in the valuation of the housing stock**

What is the global value of residential real estate in Hong Kong? According to official figures for 2015, there were 3.7 million persons in private sector apartments, the average living space per person of which was 13 square meters and the average price was about HKD 100,000 per square meter. (Hong Kong Housing Authority 2015). Thus, one deduces the following estimate for the private housing stock:

Private HK housing stock = $3.7 \times 10^6 \times 13 \times 10^5 = 4.8 \times 10^{12} = 4.8$ trillion HKD

As a check one can do an alternative calculation based on the number of flats. The same report of the Housing Authority tells us that in 2015 there were 1.5 million flats in the private sector. Assuming an average apartment size of 40 square meters one gets:

Private HK housing stock = $1.5 \times 10^6 \times 40 \times 10^5 = 6 \times 10^{12} = 6$ trillion HKD

The public housing sector comprised 1.2 million flats. However, as their price is not well defined we will limit our estimate to the private sector. For the sake of simplicity let us keep 5 trillion HKD as our estimate. In order to give a clearer interpretation it will be helpful to translate it into renminbi and USD. With the exchange rates of May 2016 (1 RMB=1.19 HKD, 1 USD=7.76 HKD) one gets:

Private HK housing stock (HKhs) = 4.2 trillion RMB = 0.64 trillion USD

To get a better sense of the last estimate it can be compared to the following figures:

(1) The revenue of the Hong Kong government in fiscal year 2014-2015 was HKD 0.48 trillion (Census and Statistics Department of Hong Kong) equivalent to 0.08 times the value of the Hong Kong housing stock (at 2015 price level).

(2) The revenue of the Chinese government in 2014 was RMB 6.5 trillion, equivalent to 1.5 times the value of the HK housing stock in 2015.

(3) The value of US Treasury securities held by China at the end of July 2015 was USD 1.24 trillion equivalent to 1.9 time the 2015 value of the Hong Kong housing stock.

Because the items 1 and 2 are annual flows they must be compared with changes in the housing stock; for instance one may assume a fall of 10% per year which would

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5The average household in the private sector comprises only 2.9 persons.

6The dollar estimate can also be compared with an estimate of total residential property in China (including Hong Kong) given in the “International Business Times” (25 January 2016) which is: USD 39 trillion.
represent HKD 0.5 trillion per year which equals the revenue of the Hong Kong government.

In short, a collapse of the HK property market at an annual rate of 10% per year may have a substantial impact not only in Hong Kong but also in mainland China. Through its sheer magnitude, such a property crisis may also have geopolitical implications. We will come back to this question in the conclusions.

Incidentally, it may be seen that the collapse of the previous property bubble was smaller in magnitude for two reasons: (i) The peak price in 1997 was only about one half of its value in 2015 (in constant HKD). (ii) The amplitude of the peak (with respect to its initial level) was also only about one half its value in the second bubble, which means that annual changes were almost 4 times smaller.

**Downturn in other Hong Kong real estate markets**

In many countries, for instance the United States, the cycle of office property is not synchronized with the cycle of residential property. However in Hong Kong the apartment cycle is not only synchronised with the office cycle, it is also synchronised with both the market for retail commercial property and that for flatted factories. The prices of office real estate started to fall in the fall of 2015 after having reached a price level 5.5 higher than the level of 2003 (in constant HKD). If real estate prices are not propped up in some way, the simultaneous downfall of the residential and office markets may create great difficulties.

**Recurrence effect**

In previous papers (Richmond 2007, Richmond et al. 2013) it was shown that:

- Between 1970 and 2015 there were three recurrent property bubbles in the UK and two in Ireland.
- Between 1960 and 2015 there were four recurrent property bubbles in the west of the United States.

The corresponding price peaks followed one another in such a way that the end of the downward phase of episode number \( k \) was immediately followed by the start of the upward phase of episode number \( k + 1 \). Moreover the shapes of the prices peaks were basically the same.

Similarly, Fig. 1 shows that between 1983 and 2016 Hong Kong experienced two speculative episodes in close succession. It shows also that the current bubble is of greater magnitude than the previous one.

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7These are buildings similar to apartments but built for light industrial activity. In 2014 only about 200,000 square meters were still in use. This area represented 0.4% of the total area of residential real estate. In other words, for a global assessment this category can be omitted.
Fig. 1 Recurrent speculative episodes in Hong Kong. The prices are annual prices for apartments of less than 40 sq.m in the New Territories which constitutes by far the largest part of the Hong Kong Territory. The prices of the last quarter of 2015 and first quarter of 2016 were added in order to show the beginning of the downturn. This size-class was selected because it is likely to have the largest number of transactions and more transactions will result in a smoother curve; although somewhat different in price levels, the curves for the other classes are parallel to this one. It can be noted that between 2003 and 2015 the wages were practically stagnant. The dotted curve gives a rough projection based on the first episode. A more precise prediction will be given below. The numbers within parenthesis give the amplitudes of the upward and downward phases of the respective peaks. The green descending line shows the annuals yields (scale on the right-hand side expressed in percent); they have a negative correlation of -0.76 (the 0.95 confidence interval is -0.88,-0.54) with the prices. Source: Rating and Valuation Department of the Hong Kong Government. “Trading Economics” website for the evolution of wages.

Decline of the yield, increase of the PER

From the perspective of an investor whether or not an apartment or a stock is overvalued is determined by the yield. For stocks it is the ratio of the annual dividends to the price of the stock. For a house or an apartment it is the ratio of the annual rent to the price. The price earnings ratio (PER) is the inverse of the yield.

For stock markets historical records show that the long-term average of the PER is comprised between 15 and 20. A PER of 35 indicates a fairly unstable market which is bound to fall sooner or later. Historical data for property markets lead to the same conclusion. The PER reached a level of 35 in the “New Territories” in the fall of 2015, thus signaling a notable market instability.

A PER of 35 corresponds to a yield of 2.8%. Note this is a gross rental yield in the
Fig. 2 From left to right (i) rent index, (ii) price index and (iii) price earnings ratio. “Downtown” means the Hong Kong island; “suburbs” means the “New Territories”. The data are for apartment of less than 40 square meters and are expressed in current HKD. A PER of 20 means a yield of 1/20=5%. Source: Rating and Valuation Department of the Hong Kong Government.

sense that it does not make any allowance for vacant periods, administration costs, repairs, property taxes. As a result, it is safe to say that landlords in Hong Kong earn essentially nothing on their apartments or may even have to accept a negative yield.

Fig. 2 shows that prices increased faster than rents particularly in the second half of the ascending phase. It also shows that for the more expensive downtown apartments the relative price increase was higher. This constitutes the “price multiplier effect” that will be considered in more detail below. On the contrary, the increase in rent was the same in downtown and suburbs.

Fall in sales versus fall in prices

It is commonly observed that the volume of transactions begins to fall before prices start to fall.

As can be seen in Fig. 3 monthly sales are highly volatile. For the picture to become more meaningful one must apply some kind of averaging. Although less volatile, annual averages do not indicate any clear trend until the fall becomes really substantial. By using a moving window with a width of 31 months one sees a clearer trend albeit with the drawback that at each time point the last 15 months will be hidden. It means that the trend will be displayed with a time lag of 15 months. Thus, for the purpose of forecasting the downturn of prices, the moving average technique is hardly better than the annual sales.

Sales began to fall in late 2010 that is to say 5 years before prices also eventually began to fall. Such a long gap is fairly uncommon and may probably be due to the very low interest rate over the period 2010-2016.
Fig. 3  Monthly number of sales. The curve with the red dots shows the annual averages of monthly sales. The blue curve without dots corresponds to a moving average window of 31 months. Source: Rating and Valuation Department of the Hong Kong Government.

Test of the price multiplier effect

During a speculative episode the price of an item jumps from an initial level $p_1$ to a peak level $p_2$ before more or less returning to level $p_1$. The ratio $p_2/p_1$ is referred to as the amplitude $A_1$ of the peak. It turns out that usually $A_1$ is an increasing function of the logarithm of the initial price (Roehner 2001, chapter 6):

$$A_1 = m \ln p_1 + b$$ (1)

There are two ways in which we can test whether this regularity holds or not. One is with respect to location, i.e. Hong Kong versus New Territories, the other is with respect to apartment size.

Price and amplitude with respect to location.

In the first quarter of 2003, the price per square meter of apartments of less than 40 sq.m. was kHKD 21.3 in the new Territories and 25.3 in Hong Kong island. There was a similar price gap in the other size classes. On average over all size classes, the New Territories had a price of kHKD 27.0 against 41.5 for Hong Kong island. Therefore, according to the price multiplier rule, one would expect a higher amplitude for the Hong Kong prices than for the New Territories prices. And indeed we see below that this is the case.

For the 5 size classes, the parameter $m$ in relationship (1) is positive with the follow-
ing values:

\[(0, 40) : 3.9 \quad (40, 70) : 1.4 \quad (70, 110) : 1.5 \quad (110, 160) : 1.9 \quad (> 160) : 3.0\]

The average over all size classes is \(m = 2.3\) which is consistent with the values found for different locations in other markets (Roehner 2001).

**Price and amplitude with respect to size**

In Hong Kong island, in the first quarter of 2003, the price per square meter of apartments of more than 160 sq.m. was \(\text{HKD 65}\), that is to say 2.5 times more than the price of 25.3 recorded in the smallest size class. If one takes into account the other size classes, one finds a high correlation of 0.99 between size and price per square meter. Therefore, according to the price multiplier rule, one would expect a higher amplitude for the large apartments than for the small ones.

But now find surprisingly that it is exactly the opposite. There is indeed a significant correlation between the amplitude and \(\log(p_1)\) but instead of being positive as expected, \(m\) is actually negative: \(m = -1.8 \pm 1\) (correlation of \(-0.89\)).

The same observations hold for the New Territories. There is again a high correlation of 0.98 between size and price but \(m\) is also negative: \(m = -5.2 \pm 1.4\) (correlation of \(-0.97\)).

Expressed in words, the larger the apartment, the less active was speculation. One possible reason for this couple be the existence of fiscal regulations aimed at discouraging luxury purchases.

**Prediction for the price trajectory 2016-2025**

In Fig. 1 we gave a rough prediction which was simply based on the symmetry argument. In this section we propose a more precise description of the shape of the downward price trajectory. In line with previous publications (Roehner 2001 chapter 7, Richmond et al. 2007) a price peak will be described by the following two-parameter function (\(\alpha\) and \(\tau\) are the two parameters whereas \(t_2, p_2\) are given by observation):

\[
p(t) = p_2 \exp \left[-\left|\frac{t - t_2}{\tau}\right|^\alpha\right] 
\]

The top of the peak is defined by time \(t_2\) and price \(p_2\). \(\alpha\) determines the shape of the peak and \(\tau\) determines how fast the price decreases on each side of the peak.

The estimation procedure of the parameters consists in two steps.

- Linearization of the rising and declining sections
- Least square regressions which gives \((\alpha_1, \tau_1)\) and \((\alpha_2, \tau_2)\).
Then, the prediction procedure involves three stages.

1. First we estimate the parameters for the peak 1987-2002 using quarterly prices; this leads to (the $\tau$ are expressed in years):
   
   upward phase: $\alpha_1 = 0.80$, $\tau_1 = 12$
   
   downward phase: $\alpha_2 = 0.41$, $\tau_2 = 16$
   
   The fact that $\alpha_2 < \alpha_1$ shows that in the vicinity of the summit the declining trajectory is steeper than the rising trajectory.

2. Secondly, we estimate the parameters of the upward phase of the second peak (also using quarterly prices) in order to check if they are similar to those of the first peak; this leads to: $\alpha_1 = 1.1$, $\tau_1 = 10$
   
   For $\alpha_1$ the difference with respect to the previous pair $(\alpha_1, \tau_1)$ is about 30% and 18% for $\tau_1$.

3. As the previous step gave confidence in a similarity of the two episodes, the predicted downward trajectory was drawn by using the same parameters as in the downgoing phase of the first episode. This led to Fig. 4b.

**Property bubble in London?**

A report by the Swiss bank UBS (Holzhey and Skoczek 2015) issued in October 2015 gave Hong Kong and London as the two most overvalued real estate markets worldwide. It is therefore natural to briefly compare the two markets.

Fig. 5 suggests that the situations in Hong Kong and London may be very different notwithstanding the UBS ranking. More precisely, in 2008 London was in the same situation as Hong Kong in 2015 in the sense that 2008 marked the end of a long period of price increase which had brought about a multiplication of prices by $A_1 = 3.3$ between 1996 and 2008. As a matter of fact, this rising phase was characterized by an $\alpha$ value which was very similar to the $\alpha$ of the upward phase of 1983-1990. Moreover in terms of shape, the declining phase which started in 2008 was also similar to the previous one of 1990-1996, with the same $\alpha$ value of 1.4 in both cases.
Fig. 4b  Predicted downward trajectory 2016-2025. The prediction is based on the assumption that this speculative episode will be similar to the episode of 1987-2002. This assumption is supported by the fact that the upgoing phases are fairly similar.

In 2010, however, everything changed. The trend reversed and a new upward phase started. Whether or not this was due to the policy of “quantitative easing” is difficult to say. It is clear that this policy made it easier for banks to provide loans but by itself this should not create an appetite for real estate operations if the market is perceived as overvalued. The UBS report emphasizes that with a rent/price yield under 3% the market was indeed somewhat overvalued at the end of 2015.

The Brexit vote of 23 June 2016 added an additional layer of uncertainty. Not surprisingly, the “Nationwide” press release of July 2016 says that “the housing market outlook is unusually uncertain”. As a matter of fact, the massive exogenous factors of quantitative easing (or the end of it) and Brexit make any prediction impossible at least in the framework of our model. If we assume that the rising phase of 2014-2016 was the continuation of 1996-2008, then one is in a Hong Kong like situation. On the contrary, if one assumes that a new cycle started in 2010, then the market appears in a completely different perspective.

Conclusion

It has been emphasized that in its ascending phase which covers 2003-2015 the Hong Kong residential property market followed the general rules and characteristics of speculative episodes in property markets that came to light through the analysis of episodes which occurred in other countries. One can keep in mind the following
The recurrent nature of these speculative episodes is emphasized by the stability of the shape parameter $\alpha$: it is around 1 in the ascending phases and around 1.5 in the descending phases. According to the “Nationwide” press release of July 2016, the Brexit vote of 23 June 2016 hardly affected UK house prices: the change from June to July was the same as from May to June, namely an (annualized) increase of 5.2%. Whether the same stability will prevail in coming months remains an open question. *Source: The data are from the website of the “Nationwide Building Society”.*

features:

- The recurrence rule means that the characteristics of the present episode are fairly similar to the ascending phase (1986–1997) of the previous Hong Kong episode.
- The yield rule (or equivalently price earnings ratio rule) described the erosion of the yield which fell from 6.2% in 2003 to 2.9% in 2015.
- The price multiplier effect underlines the fact that the amplitude of the price peak is highest for the most expensive segment of the property market.

Based on the previous regularities we proposed a testable prediction of the price trajectory for the interval 2015-2025.

The predictions proposed in Roehner (2006) and in Richmond (2007) respectively for the west of the US and for London-Dublin turned out to be reasonably successful. In 10 years from now on it will be interesting to see how successful the present prediction is.

**What will be the consequences for the Hong Kong economy?**

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8A comparison between the predictions and the actual price trajectories was made in Richmond et al. (2013).
Will the property slump lead to bank failures? To what extent will it affect the economic growth of Hong Kong? Will the crisis spread to mainland China? The only way to give “experimental” answers is to analyze what happened in the previous episode.

In answer to the first question it turns out (rather surprisingly) that there were no major bank failures as a result of the property slump. According to the Monetary Authority in August 2003 (that is to say at the end of the slump) only “22% of all residential mortgages were larger than the current value of the properties they financed” (Bradsher 2003). How is such a low percentage compatible with the fact that property prices had been divided by 2.6 between 1997 and 2003? The only possible explanation seems to be that the loans covered only a fraction of the price. In the same article one learns that banks required borrowers to put up at least 30% of the price of the apartment. Bradsher suggests that the persons who bought an apartment in fact borrowed less than 50% of its price. That is why, it is the Hong Kong middle class, not the banks, which bore the brunt of the crisis. In this respect, one should recall that in this period all Asian countries had a very high saving rate. Will the present bubble again be absorbed by the buyers rather than by the banks?

There are several indications to the opposite.

(1) In order to attract more middle class customers the banks offered loans over very long durations (up to 30 years) and which covered up to 90% or even 100% of the price. Most of the loans are variable rate loans which means they can be adjusted for inflation. Thus, one would suspect that once price will have fallen substantially many people will become unable to repay their loans, not so much the interest but rather the capital itself.

(2) A confirmation of the previous characteristics can be found in present-day Internet advertisements of Hong Kong banks. For instance HSBC ( “Hong Kong and Shanghai Banking Corporation”) and the “Development Bank of Singapore” (DBS) propose mortgages with a loan-to-value ratio of up to 90%. Every bank offers its own mortgage rates and the HK government does not publish any average. Comparison of loan conditions is made even more difficult because, as in the US prior to the subprime crisis, the banks offer “perks”, for instance a free fire insurance.

At a more macroeconomic level, Table 1 compares the performances of Hong Kong, China, Singapore and South Korea during the 1992-2002 time interval.

Three features appear fairly clearly.

- Growth was everywhere faster before 1997 than after. This was due partly to the impact of the crisis of 1997-1998; growth was slowest in Hong Kong and Singapore which in addition experienced real estate crashes.
- There was a marked deflation in Hong Kong; in addition real wages (not shown)
Table 1 Comparative growth in Hong Kong and neighboring countries before and after 1997

|                | Real GDP 1992 – 1997 | Real GDP 1997 – 2002 | Ratio $g_2/g_1$ | CPI 1992 – 1997 | CPI 1997 – 2002 |
|----------------|----------------------|----------------------|----------------|----------------|----------------|
| Hong Kong      | 12%                  | 6.5%                 | 0.56           | 9.2%           | −2.9%          |
| China          | 12%                  | 8.0%                 | 0.67           | 13%            | 0.64%          |
| Singapore      | 12%                  | 3.4%                 | 0.28           | 2.5%           | 0.55%          |
| South Korea    | 9.3%                 | 5.7%                 | 0.61           | 5.0%           | 3.9%           |

Notes: GDP means “Gross domestic Product”, real GDP means corrected for inflation; CPI means “Consumer Price Index”; the figures are average annual changes. In Hong Kong and Singapore there were property bubbles which burst in 1997; the collapse of real estate prices was faster in Singapore than in Hong Kong.

Source: Website of “Trading Economics”.

remained stagnant.

- In Singapore real estate prices fell by 50% within two years, that is to say twice as fast as in Hong Kong. This sharp fall was probably the main cause of the sluggish growth.

Property bubble in Taipei

In 2016 the Taipei-Keelung-Taoyuan metropolitan area in the north of Taiwan had a population of 9.1 million which represented 40% of the total population of Taiwan. Since 2001 it has developed a speculative bubble which, for the whole of Taiwan, has an amplitude of 2.5 once adjusted for inflation. Although 40% smaller than in Hong Kong, it may nevertheless result in a serious property slump in coming years. The summit of the price peak was reached in May 2015. The parameters of the upgoing phase were $\alpha_1 = 1.1$, $\tau_1 = 11$ year, not much different from the values in Hong Kong, namely $\alpha_1 = 1.1$, $\tau_1 = 13$ year.

Possible geopolitical implications of a property slump in Hong Kong

Over the past ten years real estate prices did increase markedly not only in Hong Kong but also in the centers of major Chinese cities such as Beijing, Guangzhou or Shanghai. However there were two main differences: (i) In the mainland wages and salaries were multiplied by two or three whereas in Hong Kong they stagnated. (ii) If one includes the suburbs of major cities, the inland cities (e.g. Chongqing) or smaller cities (not to speak of rural areas), then the average price increase is much smaller than in Hong Kong. That is why the burst of the bubble is expected to have more detrimental effects in Hong Kong than in the mainland.

In its February 2016 assessment of the situation in Hong Kong the Fitch rating

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Perhaps due to the fact that from 2011 to 2015 the interest rate had remained near 2% compared to almost zero in Hong Kong.
agency sees the greatest risk for Hong Kong banks in their exposure to mainland loans. Bearing in mind the magnitude of the property assets in Hong Kong (of the order of one or two trillions of USD) we propose turning this proposition around and asking the following questions:

- What is the exposure of mainland banks to Hong Kong property loans?
- Will the Beijing government have the will and capacity to bail out Hong Kong?
- If Hong Kong is indeed bailed out by the Chinese government will that change the relationship between Hong Kong and the Chinese Government.

Giving a reliable answer to the first question would require a specific study that would be out of place in the present paper. Trying to answer the second question would be a fairly speculative matter. Therefore we will focus our attention on the third question. More precisely, will a bailout improve or worsen the relations between Beijing and Hong Kong?

At first sight it might seem that a bailout should earn Beijing some gratitude, however the recent example of Greece versus Germany shows that if the bailout is done with contempt and arrogance it may worsen the relation between the partners.

Back in 1997 the so-called pan-democracy camp adopted a fairly non-cooperative stance with respect to the Chinese government. The fact that overall Beijing had respected the “Basic Law” did not close the gap. On the contrary, during the past decade several movements and parties have appeared whose program contains claims for independence.

Here again it would be mere speculation to try to predict what will be the attitude of the central government for we do not have any precedent which could serve as a guide. However, it is worthwhile to keep in mind possible implications of the crisis in Hong Kong. Will the Chinese government be able to prevent a domino effect? Will it be clever enough to take advantage of this opportunity to tighten the links with Hong Kong? Moreover what will be the policy of the United States? In broad lines it was defined in the “Hong Kong Policy Act” passed in 1994, which

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10 One can mention the following (the date of creation is given within parentheses):
- The “Hong Kong Independence Movement” (Feb. 2005)
- The “Hong Kong Autonomy Movement” (May 2011)
- “Civic Passion” (Feb 2012)
- The “Hong Kong Independence Party” (Apr 2015)
- The “Hong Kong National Party” (Mar 2016).

11 However there was a small-scale precedent in 1985 when the shipping business of Tung Chee-hwa was rescued from looming bankruptcy by a USD 100 million loan by the PRC. In 1997 Tung became the first Chief Executive of Hong Kong.

12 This Act ties the benefit of specific economic privileges granted by the US to HK to the preservation of a large
continues to raise Chinese displeasure because by favoring Hong Kong’s autonomy it set up a soft form of interference.

Appendix A: Role of the USD–HKD currency board

The HKD is pegged to the USD in a currency board system. The verb “to peg” means to fix at a certain level. The peg between the US dollar and the Hong Kong dollar means that the exchange rate between the two currencies is to remain fixed at a given level, currently 7.80 HKD for one USD.

Currency pegs are fairly common. At one time there was also a peg between the renminbi and the dollar. However the Hong Kong peg is special in two respects.

- In contrast to the Singapore peg which is with respect to a (confidential) basket, of various currencies, HK has a fairly rigid peg with only one currency.
- A currency board system is quite uncommon because under such a system HK’s major monetary decisions (for instance the volume of money supply) are US-dependent.

In financial publications the monetary system of HK is usually praised for having ensured a rapid development and a great stability. However, when one compares Hong Kong to Singapore this judgment appears to be somewhat overrated: between 1976 and 2010, the real GDP of Singapore was multiplied by 10 against 5.6 for Hong Kong; in terms of stability Singapore had also a better achievement. For instance from 1989 to 1996, Hong Kong had an inflation rate over 10% whereas in Singapore it remained below 5%.

The important point is not the peg itself for indeed many currencies are pegged in some way or another. For instance, since 1985 the Singapore dollar is pegged to the central parity of an undisclosed trade-weighted basket of currencies and is allowed to float within an undisclosed bandwidth of this central parity. Actually a peg is never completely rigid. Thus the HKD is allowed to float within the interval $7.80 \pm 0.05$. It is only when one of these limits is reached that the Monetary Authority (Hong Kong’s de facto central bank) intervenes.

We said that in addition to the peg, Hong Kong has also a currency board. The implication of such a monetary system is that in order to issue new HK banknotes the note-issuing banks\textsuperscript{13} must submit the same amount in USD (at the fixed exchange rate) to the “Exchange Fund”. Through this process the Exchange Fund has accumulated a huge amount of dollars; at the end of 2015 it had reached $440 billion.

\textsuperscript{13}Two of the three note-issuing banks are British, namely HSBC and the “Standard Chartered Bank” and one is Chinese (Bank of China).
Fig. A1 Close link between US and Hong Kong short-term interest rates. LIBOR (which means London Interbank Offered Rate) consists of a whole set of series respectively for the dollar, British pound, euro, and so on. HIBOR (which means Hong Kong Interbank Offered Rate) is a short-term rate for the HKD. This high correlation is an effect of the HKD-USD peg. After the initial decision in 1983 the connection was made tighter in subsequent years due to institutional improvements such as the “Accounting arrangements” of 1988: from 0.70 in the time interval 1984-1988 the correlation between interest rates rose to 0.98 in 1988-1994. Sources: Pershing Square 2011, Trading Economics: Fed funds rate versus HK benchmark rate, Hong Kong Monetary Authority 1994.

Fig. A2 Mortgage rates in the USA, Singapore and Hong Kong. Unsurprisingly, with respect to short-term rates, mortgage rates have their own dynamic. The correlation USA–Singapore is 0.87 whereas the correlation USA–Hong Kong is 0.77. Between 2009 and 2016 the inflation rate in Hong Kong was around 4%. As the average mortgage rate was lower than inflation, one wonders how selling mortgages could be profitable. In fact, one should keep in mind that every HK bank offered its own specific loan conditions. Sources: USA: https://ycharts.com. Singapore: Monetary Authority of Singapore. Hong Kong: Based on figures for new mortgages from the Hong Kong Monetary Authority’s monthly “Residential Mortgage Survey”.
Fig. A2 shows that with respect to short-term rates mortgage rates have their own dynamic. However, very low short-term interest rates made it more difficult for the HK Monetary Authority to “cool the market” by raising mortgage rates substantially (assuming it was sufficiently independent from the wishes of the banking sector to have the will to do that, which is not obvious). Thus, the peg was one of the causes of the bubble, the other being that banks were allowed to offer “unhealthy” loan conditions.

As documented in the notes of Table A1 the decision of September 1983 to peg the Hong Kong currency to the USD under a currency board system did not meet the approval of the people of Hong Kong.

| Peg | British pound | British pound | Japanese yen | British pound | USD | No peg | USD |
|-----|---------------|---------------|--------------|---------------|-----|--------|-----|
| CB  | yes           | yes           | yes          | yes           | ?   | No     | yes |

Notes: CB means “currency board”. From 1895 to 1935 the currency of Hong Kong (as well as Singapore) consisted of “British trade dollars” minted in India. During the British colonial time one can say that it was a CB system in the sense that ultimately the monetary policy was decided in London. The question mark indicates that so far we could not find sufficient information about this episode. Incidentally, it is often said that the decision to establish a currency board was taken in the wake of the panic following the “Black Saturday” of 24 Sep. 1983 when the exchange rate of the HKD fell to an all-time low of USD 1 = HKD 9.6 (i.e. 23% below its current rate). In fact, according to John Greenwood (2008) who played a key role in this story, the draft of the project was written in early Sep. 1987, then discussed with Milton Friedman and Maxwell Fry (professor at the University of Hawaii). Then, the project was sent to Washington where it was approved by the British PM (probably after also consulting with President Reagan) at a meeting held at the British Embassy in Washington on Tuesday 27 Sep. 1987. At the beginning of his account, Greenwood writes that “there was solid opposition in Hong Kong to my proposal for the restoration of a currency board”. In a sense this is understandable because it meant upholding the colonial regime.

Sources: Pershing Square (2011), Greenwood (2008). The second source is not completely reliable for it says that “following the Thatcher visit to Beijing in September 1982, the HK dollar had began to depreciate until in mid-September 1983 inflation surged to 18%”. In fact the inflation rate was 16% in Sep. 1981, then dropped steadily to 9% in Sep. 1982. In Sep. 1983 inflation stood around 11%.

A peg can work without currency board. As an illustration one may consider the case of Saudi Arabia. Although Saudi Arabia does not have a currency board system its currency, the riyal, is pegged to the USD (currently 1 USD=3.75 riyal) since 1960. Until 1986 the fixed exchange rate was adjusted periodically (with changes of less than 2% usually) but since 1986 the exchange rate has remained unchanged. Even in this system without currency board there is nevertheless a mandatory 100% currency backing of riyals emission by foreign exchange reserves (Al-Jasser 2005, p. 265 and
270). Thus, the main difference with Hong Kong is that in Hong Kong the foreign exchange reserve must be in USD whereas in Saudi Arabia it can be in any reserve currency. As Saudi Arabia’s oil income is completely in USD in practice there is little difference between the two cases.

Why did we give a close attention to the question of foreign exchange reserves in Hong Kong? The answer is simple. Within a few years, as the real estate crises develops, this may become a key issue for Hong Kong. It may emerge and unfold through the following steps.

1. First of all, it should be observed that for any currency (as indeed for any commodity) a high demand is better than a sluggish or declining demand. The reason is obvious. Historically, many sovereign debt crises were triggered by falling exchange rates but, to our best knowledge, none was triggered by a rising exchange rate.

2. Therefore for any country, and especially if its currency is a reserve currency, all situations which increase the demand for that currency go in the right direction, e.g. when USD are required to buy oil or other commodities or when the issuance of a country’s currency must be backed by USD (as is the case of any country which has a currency board based on the USD). In the early 1990s US economist Steve Hanke, a former Chief Economic Adviser to President Reagan, visited South American and East European countries to give advice to their governments on the currency board system. His attempts met temporary success in Argentina, Bulgaria, Estonia, Lithuania and Bosnia-Herzegovina (for more details see Hanke’s biographical article on Wikipedia). However, Argentina dropped the dollar peg during the crisis of 2000-2002 while the four European countries eventually pegged their currencies to the euro.

3. In two or three years when property prices will have fallen by 50% or more it is likely that some persons, both in Hong Kong and Beijing, will observe that the crisis was engineered by the peg to the dollar and will suggest that it be changed to a peg to the renminbi or at least to a basket of currencies including the renminbi. Actually, such a move has already been predicted and anticipated by some hedge funds (see Pershing Square 2011).

There is no conflict of interest.

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