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Real Estate Price Peaks—A Comparative Overview

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Abstract

First, we emphasize that the real estate price peaks which are currently under way in many industrialized countries (one important exception is Japan) share many of the characteristics of previous historical price peaks. In particular, we show that: (i) In the present episode real price increases are, at least for now, of the same order of magnitude as in previous episodes, typically of the order of 80% to 100%. (ii) Historically, price peaks turned out to be symmetrical with respect to the peak; soft landing, i.e., an upgoing phase followed by a plateau, has rarely (if ever) been observed. (iii) The inflated demand is mainly boosted by investors and high-income buyers. (iv) In the present as well as in previous episodes, the main engines in the upgoing phase have been the "hot" markets which developed in major cities such as London, Los Angeles, New York, Paris, San Francisco or Sydney. In our conclusion, we propose a prediction for real estate prices in the West of the United States over the period 2005–2011. We also point out that investment funds, which already play a key role in stock markets, have in recent times begun to heavily invest in real estate. In the future, one can expect them to become major players in property markets worldwide. The outcome of the present episode will tell us how quickly this transformation evolves. Thus, if the height of the present peak substantially surpasses the magnitude of previous ones, one may infer that investment funds have been able to establish strong communication channels between real estate assets on the one hand and financial assets (e.g. bonds, stocks, options) on the other hand.

Keywords: real estate, speculative trading, property bubble, recession, debt.

1. Introduction

In May 2005, one of my Californian colleagues who closely monitors the American real estate industry wrote to me: "I think the future is very hard to even estimate, much less predict, because this market has no historical precedent that I can identify. For one thing, both originating lenders and the secondary market seem to have thrown caution to the wind". Are we really in uncharted territory? Answering this question will be one of the main objectives of this paper. Figure 1 provides a few quick preliminary clues. It shows that real estate prices in the West of the United States experienced four peaks during the
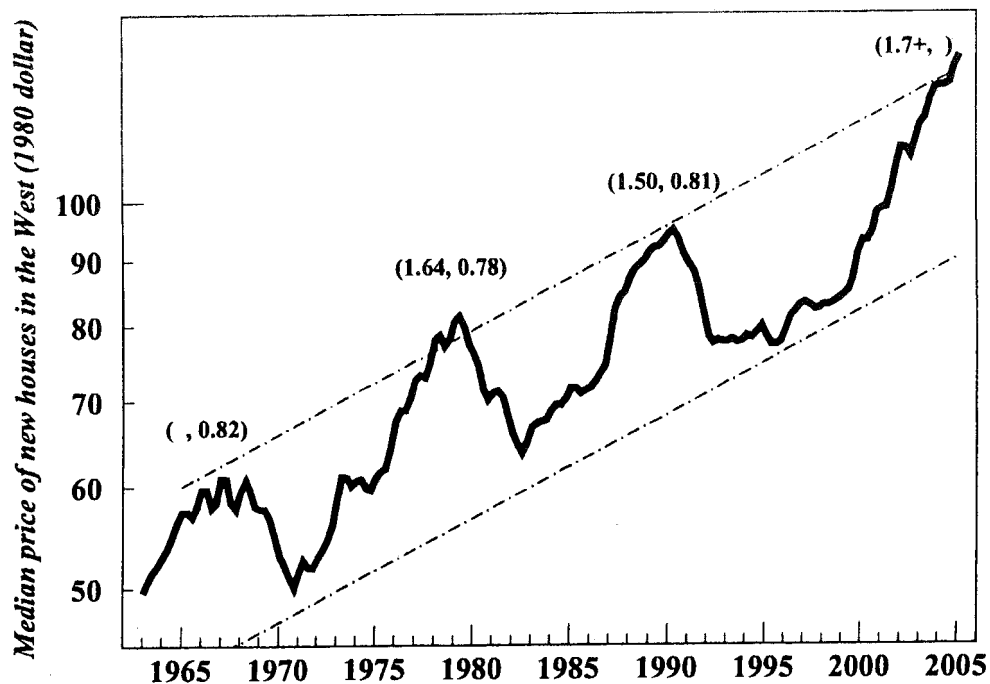
Fig. 1. Median price of new houses in the West of the United States. The two numbers above the peaks give the amplitude of the peak (the ratio of peak price to initial price) and the amplitude of the fall in the downgoing phase (ratio of trough price to peak price). The notation 1.7+ shows that the current peak is still in its upgoing phase and will have an amplitude larger than 1.7. The whole curve has been smoothed using a three-year centered moving average. *Source: U.S. Bureau of Census.*

past 40 years. The three previous peaks provide possible guidelines as to the future of the fourth peak that is currently under way. Naturally, there is no absolute certitude that the present peak will unfold as the previous ones. There are mainly two new factors: (i) The present peak has a bigger amplitude and duration than the previous ones, in itself this would probably not preclude a repetition of the previous scenarios; (ii) Investment funds (in which we include pension funds, equity funds, hedge funds) have taken a much greater part in the present episode than in previous ones. This explains the exceptional size of the peak but, as these institutions can mobilize much larger amounts of capital than the real estate companies which operated in previous episodes, they may be able to stage a softer landing. We come back to this question in the conclusion.

The paper focuses on three issues.

• It emphasizes that real estate price peaks occurred repeatedly in the 19th and 20th centuries.

• It examines whether during peak episodes, prices are driven by demography or by speculative trading.

- It shows that the "engines" of peak price episodes are the "hot" markets of big cities.

From the point of view of economic theory, the second question is crucial because it tells us which variables a model should contain. If prices were driven by demography the model would have to include a large number of exogenous variables, such as, for instance, population change, revenue increase, and price of construction (salaries, materials, interest rates). On the other hand, if speculative trading is the main moving force, price peaks may be described in the framework of self-organized criticality introduced by the late Per Bak. The task of developing such a model will be left to a subsequent paper.

From a macroeconomic perspective, real estate price peaks are of great importance. Let us recall that the recession experienced by the Californian economy between 1991 and 1995 had its origin in the real estate market crash of 1990 (for more details see Roehner, 2002, pp. 115–117). On an even larger scale, the property crash in Japan during the 1990s affected adversely the Japanese economy. It led to a disappearance of wealth that amounted to 1.6 quadrillion yen, that is to say, twice the country's GDP. Instead of using about 10% of their salaries to service their loans, Japanese households had to devote more than 20% of their salaries to the repayment of their debt (Straits Times, November 9, 2002). At the time of writing, the price of land in Japan is still declining (Wall Street Journal, July 11, 2005): since mid-1991 it has been divided by 2.1.

2. Historical Examples of Real Estate Price Peaks

In order to give a microeconomic underpinning to real estate price surges, let us briefly recall an episode which took place during the rush to the West in the late 19th century. As ticket prices to Southern California dropped substantially, emigration soared. More than 41,000 people came to San Diego between 1885 and 1888. By the peak of the building boom in 1888, at least 10 brickyards employing over 500 workers were operating in San Diego. In late 1888, San Diego's real estate market began to deflate. One of the largest brickyards, the Park Brick Yard Company, went out of business. By 1889, people were leaving in droves, driving San Diego's population down to less than 17,000. A similar real estate boom occurred in Los Angeles; it came to an end in 1889, that is to say, a few months after the one in San Diego.

Were the market collapses in Los Angeles and San Diego brought about by a nationwide economic recession? The answer is no. As a matter of fact in 1888–1889, with an unemployment rate as low as 4%, the state of the economy was good. It is only
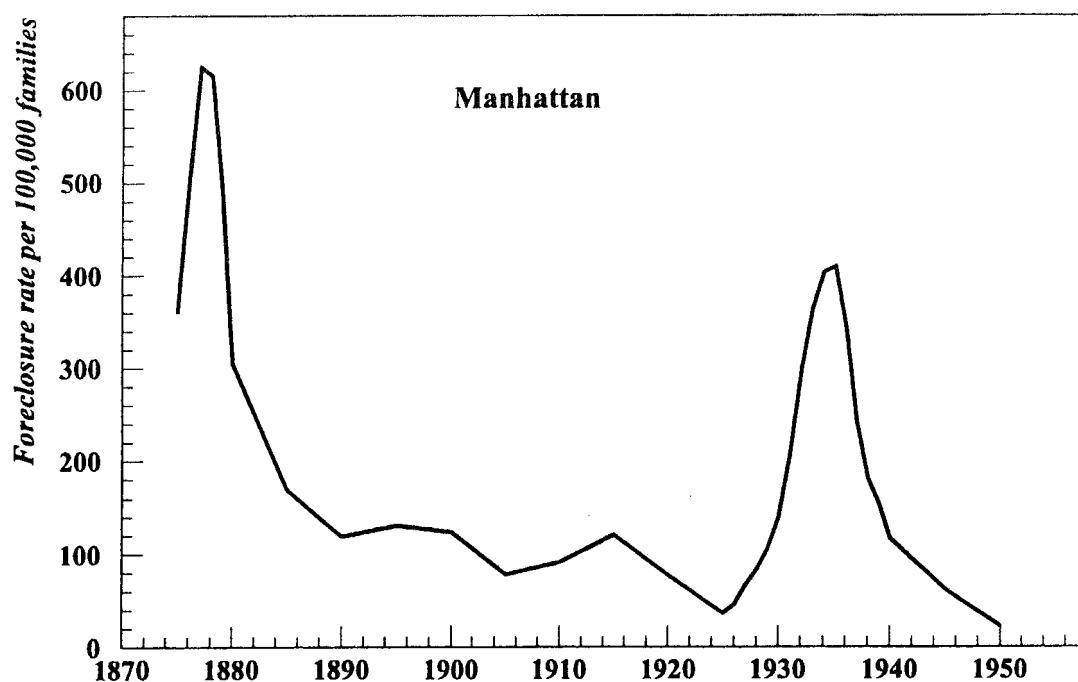
Fig. 2a. Foreclosures in Manhattan (New York). When a house owner becomes unable to repay mortgage installments a foreclosure sale takes place. The two peaks correspond to the recession of 1878 and to the Great Depression respectively. *Sources: Wenzlick (1972), Kaiser (1997).*

in subsequent years, with the onset of the depression of 1893–1894 that unemployment rates picked up, reaching levels of 10% in 1893 and 15% in 1894 (see the data provided by David O. Whitten in the article about the Depression of 1893 in the eh.net encyclopedia).

Did the crash of the property market in California have an impact on the economy nationwide? Again, the answer is no. As we have just seen, the recession occurred 6 years later and cannot, of course, be attributed to the property crash. How can one explain that it had no sizable impact on the economy? In 1890, California had a population of 1.2 million, which represented less than 2% of the US population. Moreover, the property crash in the West was *not* paralleled by a similar crash in the East. This is made clear by Fig. 2a, which shows the mortgage foreclosure rate in Manhattan. Obviously there was no surge in foreclosures in 1888–1889.[1]

What can one learn from this example?

• Firstly, real estate booms seem to have their own dynamic. Property crashes occur when prices have reached unsustainable levels without being necessarily triggered by a

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[1] More surprisingly, there was only a small increase in foreclosure numbers during the recession of 1893–1894 in marked contrast with what happened during the Great Depression.
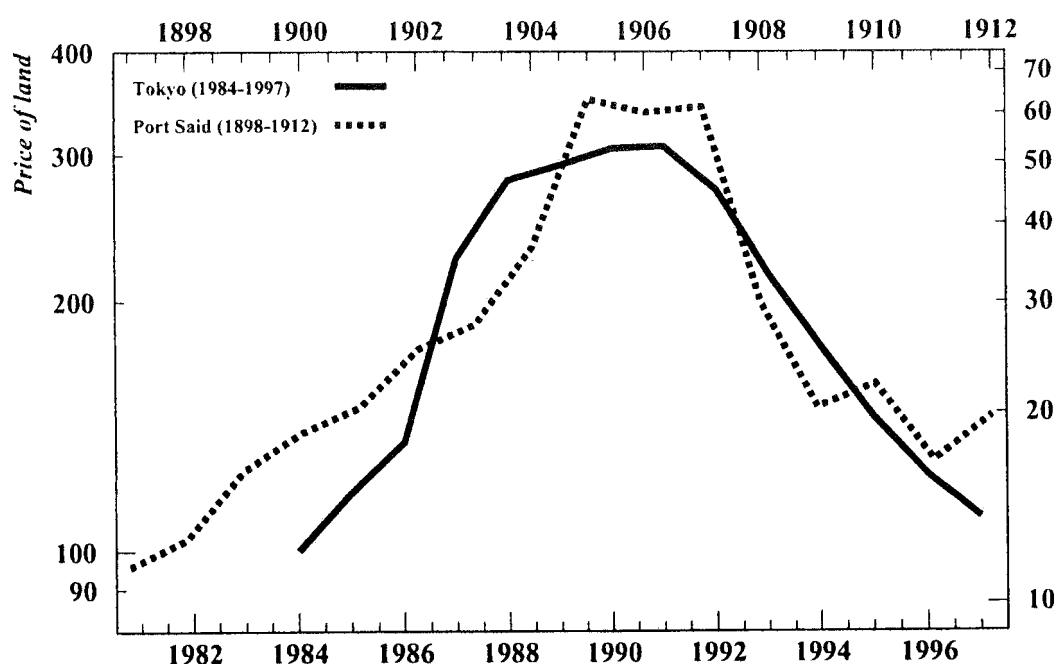
Fig. 2b. Price peaks for land. Solid line: annual (nominal) prices of commercial land in the Tokyo area (left-hand side and bottom scales). Dashed line: annual price of land in Port Said at the entrance to the Suez Canal, expressed in French francs per square meter (right-hand side and top scales). The Suez Canal was opened in 1869. Although these episodes are almost one century apart, they are fairly similar in the sense that in both cases the property crash came along with a stock market crisis. This association between stock and real estate crisis is fairly common: the simultaneous stock and property crashes in Paris in 1882 and in 1931 are two other instances. *Sources: Bourgeois (1913), Grison (1965), Financial Times (17 October 1997).*

nationwide recession or by a jump in interest rates.[2]

• Secondly, property markets in the North-East and in the West were quite disconnected. It is only in the last decades of the 20th century that they have become more correlated.

Other historical examples of real estate price peaks are given in Figs. 2b, 3 and 4. Fig. 2b is of interest because it emphasizes the similarity in the shape of two peaks which occurred in different time periods and in distant countries. In the same way, Fig. 3 points out the close parallelism between the peaks of 1889 and 1929: they have the same amplitude (amplitude of a peak being defined as the ratio (peak price)/(initial price)) and almost the same duration. Figure 4 shows the 1985–1995 price peak in Britain (more will

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[2] Short-term interest rates of commercial paper were in fact at a (temporary) low in 1888–1889 as can be seen from the following time series (Homer and Sylla, 1996, p. 320). 1887: 5.73%, 1888: 4.91%, 1889:4.85%, 1890: 5.62%, 1891: 5.46%, 1892: 4.10%, 1893: 6.78%, 1894: 3.04%.
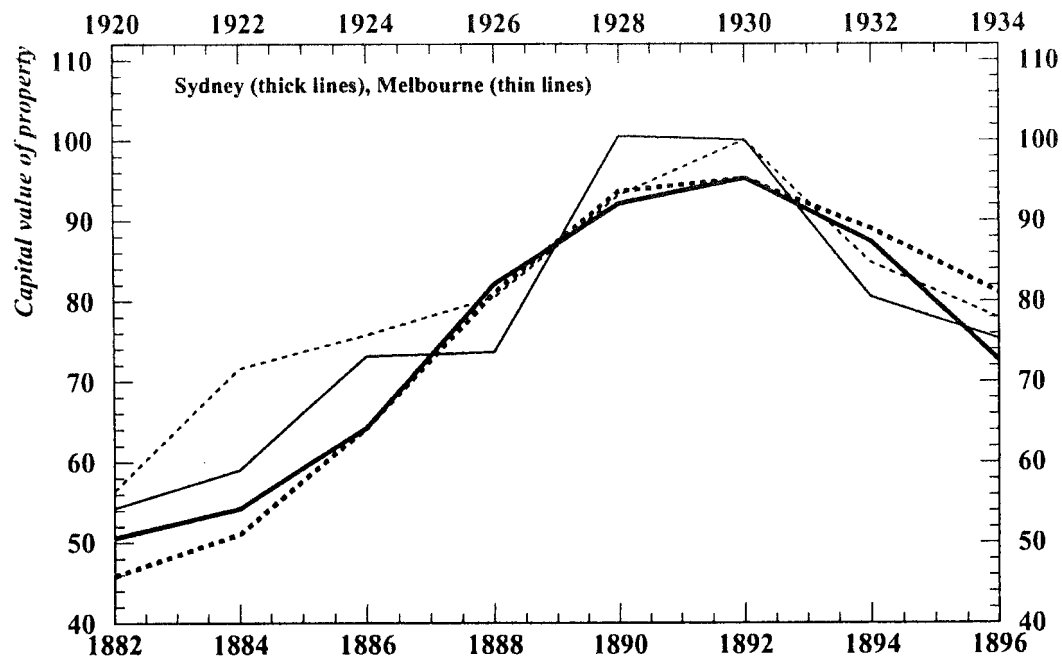
Fig. 3. Property valuation in Sydney and Melbourne (Australia). Solid lines: 1882–1896 (left-hand side and bottom scales), dashed lines: 1920–1934 (right-hand side and top scales). Note the parallelism between the 1890 and 1930 episodes. It must be observed that accurate time series of property price data are not available; the graphs rather show estimates of property value. *Sources: Fisher and Kent (1999).*

be said about this case in section 4).

These various examples along with additional evidence given in Roehner (2004, pp. 112–114) suggest the following rules of thumb.

1) Roughly speaking price peaks are almost symmetrical with respect to their maximum, which means that the rising and falling phases have approximately the same duration.

2) The total duration of a peak is about 12–14 years which means that the upgoing and downgoing phases last about 6–7 years.[3]

3) Usually the amplitude of the peak is less than 3 because price increases are restrained by income levels.[4]

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[3] A closer look shows that usually the falling phase is somewhat shorter than the rising phase, therefore a more accurate rule would be: rising phase ~6–7 years, plateau in the vicinity of the peak ~2 years, falling phase ~4–5 years.

[4] When a property boom is primarily driven by commercial capital as was the case in San Diego or Port Said, the amplitude can be larger than 3.
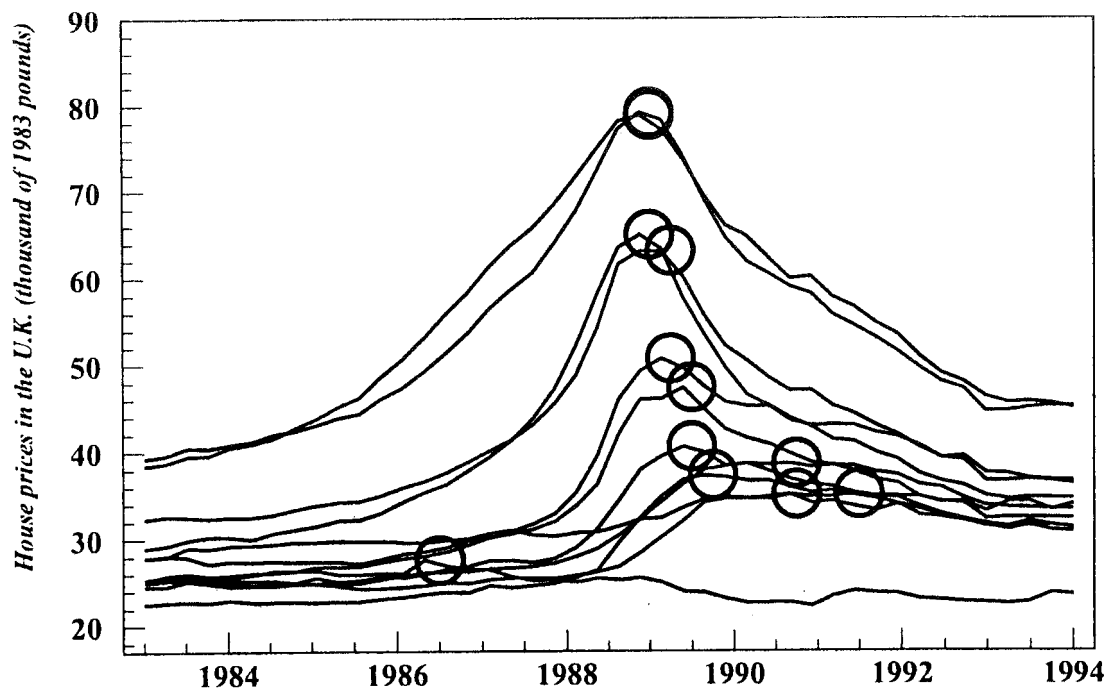
Fig. 4.   House prices in Britain during the speculative episode of 1984-1994. Each curve represents the price in one of the 12 regions composing the United Kingdom. The two highest curves correspond to "Greater London" and the "South East". The circles indicate the positions of the maxima; the more distant the region is from London, the later it reached its maximum. Note that the obvious outlier corresponding to the maximum of the lowest curve (Northern Ireland) should not be taken seriously for this curve, in fact, has no real maximum. *Source: British property data are collected and published by the Halifax group (West Yorkshire, England). I am most grateful to the people at the Halifax company for their kind assistance.*

3.   Are Price Peaks Driven by Demography or by Speculative Trading?

By the expression "driven by demography" we mean driven by population and average income increases. Driven by speculation means that a sizable part of the houses are bought by investors who plan to sell them one or two years later; speculative trading also includes transactions in properties which are still in their design stage (sometimes referred to as "off-the-plan transactions") which are sold one or two years *before* actual completion.

Whether or not a property boom is driven by speculation is always a hotly-debated question because of its obvious implications. If the boom is driven by demography, one may expect that the period of price increase will be followed by a plateau without any substantial price fall. On the other hand, if prices are pushed up by speculation, one should expect a price pattern similar to those described in section 1. Needless to say,
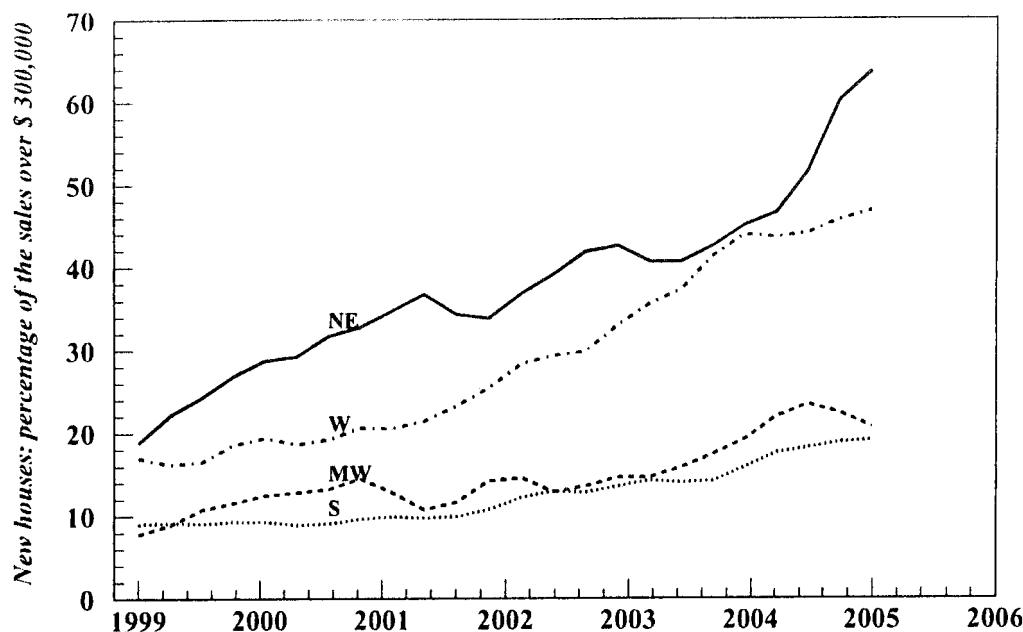
Fig. 5. Percentage of sales over $300,000. If demand were driven solely by demographic factors and revenue increase, there would be no reason for the huge increase in the percentage of expensive home sales. Note that there is a similar increase in the percentage of transactions over $1 million: in 2002 they represented 3.0% of the transactions in California whereas in 2004 they represented 5.0%. According to DataQuick, Ross in Marin County and Rancho Santa Fe in San Diego county were communities where virtually all home sales were in the million-dollar category. *Sources: DataQuick Real Estate (DQNews.com); US Bureau of the Census: New residential sales (New houses sold by sales price).*

such a price pattern may scare away potential buyers, which is why real estate agents may be tempted to present it as a remote and unlikely perspective.[5] Here we will restrict ourselves to listing a number of criteria which should help us to come up with a definite conclusion.

1) Are the increases in property prices much faster than GDP growth?

2) Are prices of expensive houses rising faster than prices of more affordable houses?

3) Are stock prices of real estate companies climbing to towering levels?

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[5] The fact that the views of real estate analysts may be affected by conflicting interests does not facilitate the emergence of a clear understanding. This can even restrict data availability; thus, in the period 1999–2003 it was very easy to find (free) Australian real estate price series on the Internet, but after the downturn many real estate institutes restricted access to subscribers. Similarly, after the downturn, in spite of prices falling at annual rates of 8%–10%, real estate experts would continue to use such euphemisms as "the flat market in Sydney" or "the market has cooled down".
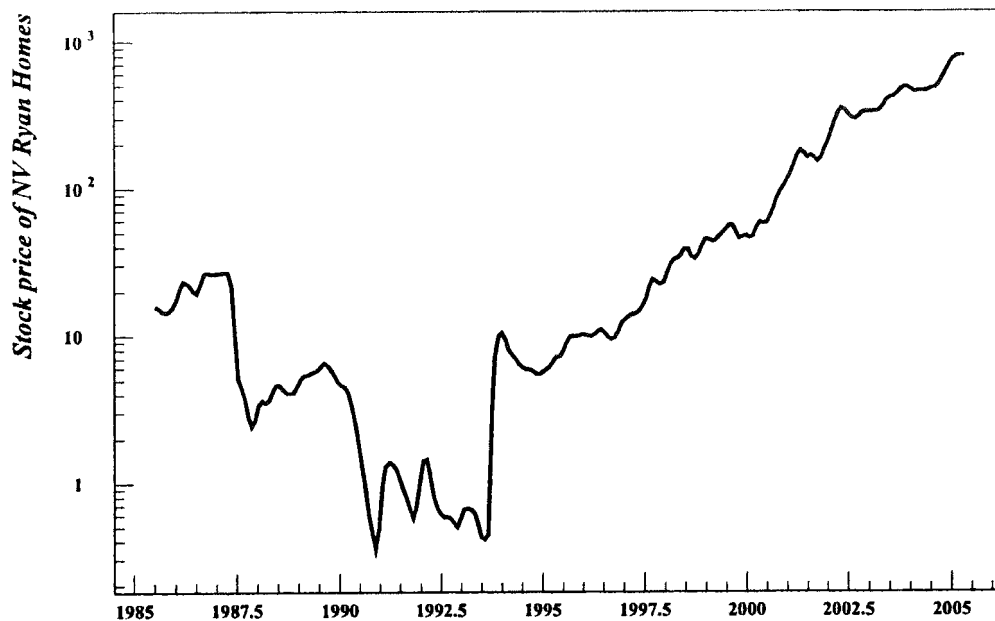
Fig. 6. Stock price of NV Ryan Homes (AMEX: NVR). NVR operates in home building and mortgage banking in 11 states mainly in the eastern part of the United States. In the 10-year time interval between 1995 and 2005, its stock price was multiplied by one hundred. In late March 2005 its market capitalization was one third of the capitalization of General Motors. The price fluctuations in the 1985–1994 period to some extent reflect the property boom which, at least in the North-East, peaked around 1988 and bottomed around 1994. *Source: http://finance. yahoo.com.*

4) Does the proportion of transactions carried out by investors grow along with the level of prices?

As an illustration of the first criterion, one can mention the case of Hong Kong between 1992 and 1998 (see Fig. 8). The average price of apartments jumped from US$ 2,100 to US$ 8,600, which represents an annual growth rate of 41%. Obviously this is completely disconnected from GDP growth.

The second criterion is closely related to the price multiplier effect, which is explained in the next section. It has been shown elsewhere (Roehner, 2000, 2001 chapter 6, 2002 chapter 7; Maslov *et al.*, 2003) that this phenomenon, can be observed in all kinds of speculative price peaks, whether in property, collectible stamps, rare books or stocks. In a sense, it can be seen as a signature of speculative price peaks. A related consequence is described in Fig. 5: it shows that as prices climb sales tend to concentrate on the most expensive market segments; this effect is particularly strong in the North East of the United States.

Figures 5 and 6 provide two elements which should permit an answer to the question in criteria 2 and 3 for the period 1995–2005.

The fourth criterion would probably be the most effective; unfortunately, one has only fairly scattered statistical data; for instance, one knows that between 2000 and 2004 in the United States, the share of purchases made by investors increased from 5.8% to 8.5% (Chattanooga Times Free Press, March 20, 2005). Naturally, as one could expect this percentage is higher in "hot" markets where prices increase faster. Thus, in the first quarter of 2005, they represented on average 11% in 30 metro-areas; in places like Phoenix, Las Vegas or in many parts of California, transactions by investors represent 15% (USA TODAY, June 23, 2005).

Finally, the very fact that during a price peak episode, prices are often rising simultaneously in several industrialized countries irrespective of local conditions shows that a common driving force is at work in all these markets. At the time of writing (July 2005), prices are still rising in California as well as in Paris, but they have tended to flatten in Britain, whereas in Melbourne or Sydney they have been falling for about one year.

4. What Fuels Price Peaks? The Key Role of Big Cities

There are (at least) two different types of property booms, the commercial type and the residential type. Examples of the commercial type are provided by San Diego and Port Said, as discussed in section 1. Needless to say, neither San Diego nor Port Said were big cities in the 1880s. In these booms, apart from residences, the rush also included hotels, banks, shops, public buildings and so forth. In contrast, the boom of 1985–1995 in Britain concerned only residential property. What we say in this section applies only to the second type of real estate booms.

The major role played by big cities is illustrated by the fact that in the United States there have been price peaks of an amplitude greater than two almost only in the North-East (Boston, New York) and in California (Los Angeles, San Francisco) and marginally in the Chicago Metropolitan Area. Figure 4 further explains how price increases spread from big cities to neighboring areas. The highest curve corresponds to London; as can be seen, the time lag between the maximum in London and the maxima in northern counties is comprised between one and two years.

This observation has interesting practical implications. It means that the market downturn can first be observed in the hottest places. For instance, during the third and fourth quarter of 2004, prices in London fell, whereas they were still increasing in the rest of Britain (albeit at a slower rate than earlier). This seems to suggest that by July 2005 (at time of writing) Britain already was in the downward phase of the price peak.
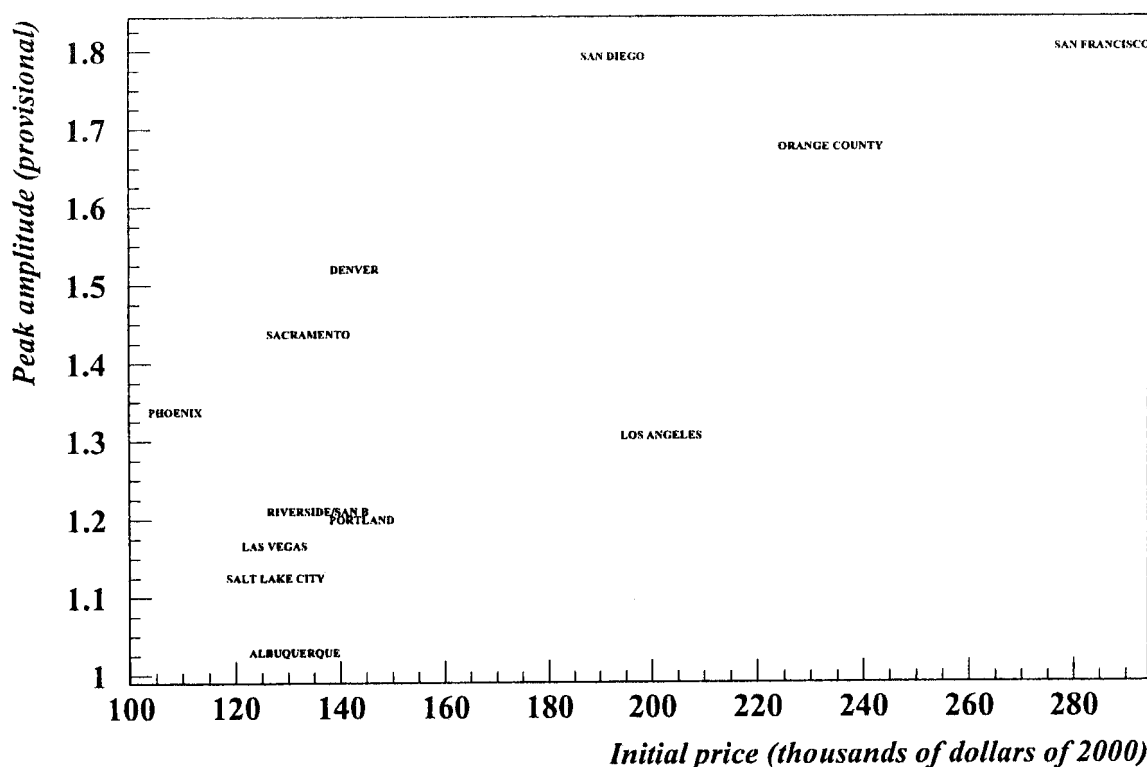
Fig. 7. Correlation between initial housing prices and peak amplitudes, West of the United States, 1995–2002. Peak amplitude is here defined as the ratio: (price in 2002)/(price in 1995); in 2002 the peak was not yet reached which means that these are in fact provisional peak amplitudes; the correlation between initial prices and (provisional) peak amplitudes is equal to 0.75. *Source: Websites of the California Association of Realtors and of the National Association of Realtors.*

The same conclusion holds for Australia, where Sydney (which is the hottest market) has seen declining real estate prices since 2004.

The fact that price increases are positively correlated with prices at the beginning of the price peak is illustrated in Fig. 7 in the case of the Western region of the United States. Thus, the average price in Las Vegas, which was $ 120,000 in 1995, had been multiplied by 1.2 in 2002, whereas the average price in San Francisco, namely $ 280,000 in 1995, had been multiplied by 1.8 in 2002. Additional evidence about the price multiplier effect can be found in Roehner (2000), Roehner (2001, chapter 6), Maslov *et al.* (2003), and Roehner (2004).

In section 2 we observed that prices continue to climb until they reach an "unsustainable" level. How can this level be identified? Figure 8 provides a clue. It shows that during a property boom, prices increase faster than rents. Therefore, there is a
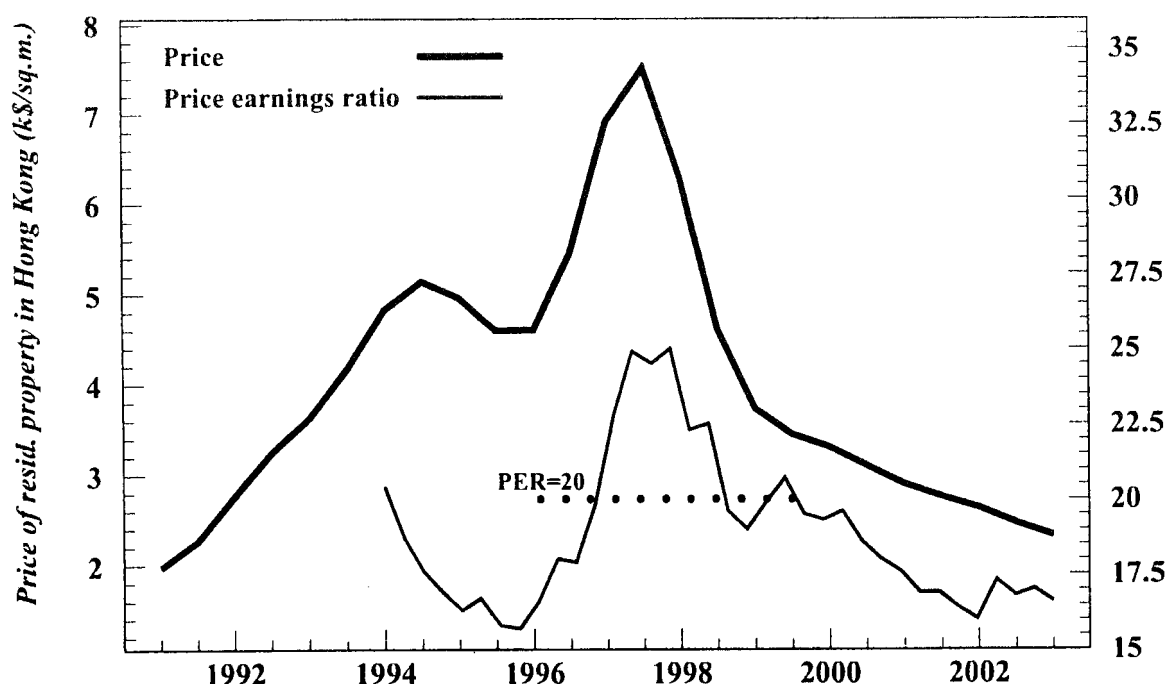
Fig. 8. Price and price-rent ratio in HongKong during the speculative episode of 1992–2002. The prices are expressed in 10^3 US$ per square meter. When seen from the owner's (instead of tenant's) perspective the price-rent ratio should rather be called a price earnings ratio; this is why we used this expression in the graph; it has the additional advantage of establishing a clear link with the price-earnings ratio of stocks. *Source: Website of the Rating and Valuation Department of the Hong Kong Government.*

moment when the yield[6] of apartments becomes lower than the average yield of financial markets. At that point the price increase becomes the only real source of profit; this is an unstable situation in the sense that any downward price fluctuation may generate a spate of selling and trigger a market wide downturn.

What is the role of interest rates? As already mentioned, real estate price peaks have their own dynamic. While declining interest rates may boost prices and transaction volumes in the upgoing phase, they cannot stop a market from falling once the downturn has occurred. This was demonstrated in the United States in 1992–1994, a period of declining interest rates *and* of falling real estate prices in California. More recently in 2004, the fall in real estate prices in Australia continued in spite of declining interest

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[6] The annual rent represents the income brought in by an apartment; therefore the ratio: (annual rent)/ (price of the apartment) represents the yield of the apartment in the same way as the ratio: (annual coupons)/(price of the bond) represents the yield of a bond. Similarly, the ratio: (annual dividends)/ (stock price) represents the yield of a stock; for stocks it is more common to use the price-earnings ratio (stock price)/(annual dividends), which is the inverse of the yield.

rates: in July 2002, at the height of the real estate boom, the yield (i.e., interest rate) of the 10-year (Australian) Treasury bond was 5.86%; in November 2004 it was down to 5.22% but this did not prevent the downward spiral of property prices in Sydney from continuing.

5. Conclusion

In this conclusion we first present a projection for prices in the West of the United States over the period 2005–2011. Then, we explain why it may be possible to offer predictions for real estate prices whereas making predictions for stock markets is much more difficult if not altogether impossible.

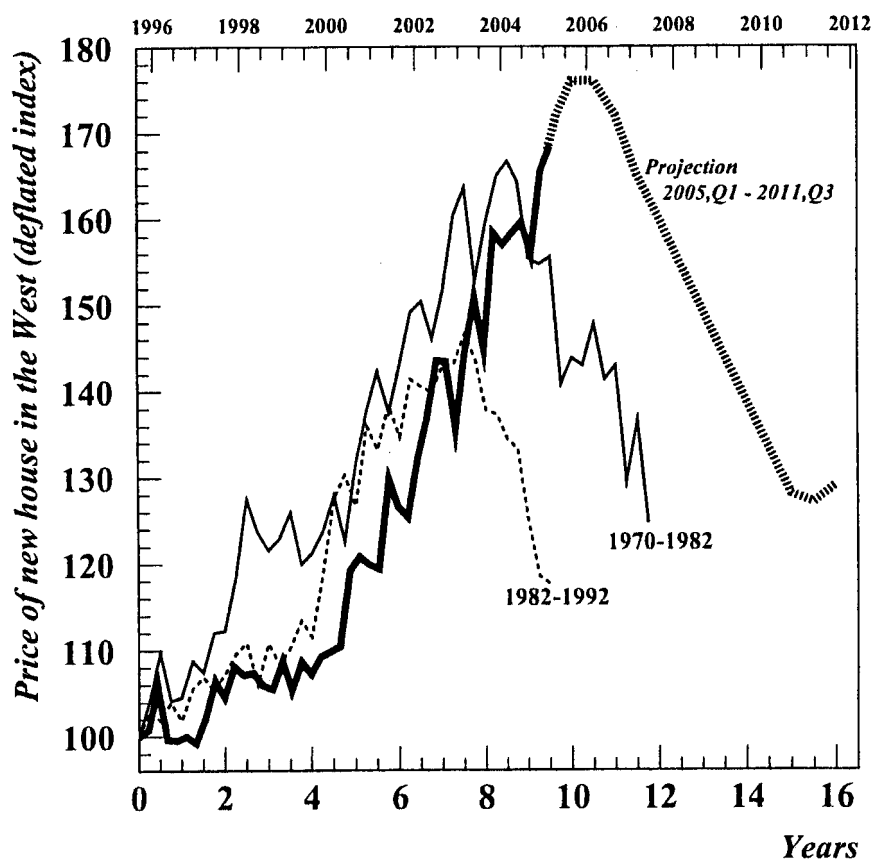Figure 9 provides a synoptic view of three of the peaks represented in Fig. 1 along

Fig. 9. **Projection for the price of new houses in the West of the United States: 2005–2011. The figure summarizes three of the four episodes shown in Fig. 1. The two downgoing phases are characterized by exponential price falls with rates of the order of −6.5%. The projection was modeled on the same pattern. Note that the precise moment of the downturn cannot be forecast in the same way because it depends on exogenous factors such as interest rate levels or exchange rates. However, after the downturn, one can expect a subsequent 5-year period characterized by a downward trend with a rate averaging about −6% per year.**

with the 2005–2011 projection. In previous papers we described speculative price peaks
by a function of the form:

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

where p_2, t_2 denote the peak-price and peak-time respectively; α and τ are two adjustable
parameters. In the present case it turns out that the exponents α are almost equal to 1,
namely 1970–1982: $\alpha=0.99$, 1982–1992: $\alpha=1.06$; the parameters τ turn out to be
almost the same as well, namely of the order of 13.5 quarters (i.e. 3.3 years). As a result,
one is encouraged to model the downgoing path of the current episode by the same
parameters. This leads to the dotted line projection in Fig. 9.[7] Needless to say, this
projection rests on the assumption that there is no fundamental change with respect to
the two previous episodes. In particular, we assume that in spite of their expanding
assets, investment funds will not be able to rule property markets in coming years to the
same extent as they are able to direct stock markets.

Apart from their own specific interest, speculative episodes in property markets are
also of great value because they are similar to, but simpler than, speculative episodes in
stock markets. The first point, the similarity of price peaks in property versus stock has
been briefly summarized above (more details can be found in Roehner, 2004a). The fact
that property markets are simpler than stock markets can be attributed to the following
circumstances. (i) Transactions take much longer in real estate than in stocks, typically
one or two months compared to one or two minutes; as a result property prices are
subject to only low frequency shocks whereas stock prices are subject to shocks whose
frequency spectrum extends over several orders of magnitude (from 1/minute to 1/year).
(ii) Most of the financial instruments available on stock markets (such as, for instance,
options, futures, and convertible bonds) do not (yet) exist in property markets. (iii) As
shown in a former paper (Roehner, 2004b), the strategy of big investment funds have a
determinant impact on the price of stocks.[8] Such funds also have considerable influence

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[7] A prediction about the moment of the downturn (which we did not try to predict here) can be found
in a recent paper by Zhou and Sornette (2005); another related (and groundbreaking) contribution to
this debate is provided by Taisei Kaizoji (2005).

[8] One can recall in this respect the action of Jeffrey Vinik, the manager of Fidelity Magellan, a fund
of parent company Fidelity Investment whose assets represent about 10% of the American GDP. In
late 1995, concerned by earning growth problems in the technology sector, he cut the fund's
investment in this sector from 43% to 24%. Although perhaps sound in itself, Vinik's strategy came
too soon and misfired. Disavowed by Magellan's main investors, he left the company in July 1996
(New York Times, Jan. 12, 1996; Boston Herald, July 11, 1996).

in *commercial* real estate; in contrast, their involvement in *residential* real estate has so far been smaller, although this situation may change in the next decades.[9]

Until recently, there was but little communication between stock and real estate markets, but with the advent of financial globalization the boundaries between the two sectors have tended to disappear. For instance, on September 2004, Fidelity Investment opened a real estate branch called Fidelity International Real Estate. For the time being the assets of this fund remain fairly modest but there can be little doubt that this marks the start of a growth trend. The outcome of the present episode will show how quickly the transformation occurs. If the amplitude of the peak in Fig. 9 turns out to reach a level of 2.5 (instead of 1.76 as in the graph) this will be evidence that a major metamorphosis has already taken place in the Californian real estate market.

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[9] As an illustration one can mention a recent project of North Western Mutual, one of the largest American real estate investors. In March 2005, it launched a $350 million project in Virginia which combined 800 residential units with 100,000 square meters of class A office space and a 256-room Marriott hotel (New Port Daily Press, March 3, 2005).

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