The Forecasting Capacity of Housing Price Expectations

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This study captures the essential elements of the price expectations of market participants in a rising market.   Adopting a forward-looking approach, this paper explores the effectiveness of expectations as an indicator of forthcoming housing price changes in Hong Kong.   Examination of the quarterly survey data from December 2003 to September 2007 indicates that both homeowners and non-homeowners tend to overestimate the probability of future housing price increases yet underestimate its volatility.   This adds weight to the argument that market participants are generally not rational in the prediction of price movement.   Homeowners, investors and potential home buyers have more or less the same level of confidence about the future market outlook. Like non-owners, they expect higher prices. The number of correct forecasts exceeds incorrect forecasts, suggesting that overall price expectations are fairly close to realization.   It can be broadly concluded that the aggregate price expectations in the long run can be an appropriate forecasting tool for future market performance.

Keywords

Price expectations; Forecastability; Housing market; Hong Kong

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1.   Introduction

Most price analyses in Hong Kong are primarily based on historic data, which are of little use; if any, in predicting future housing prices and investment decisions.   At present, the most reliable analysis of house sale prices is performed by the Rating and Valuation Department (RVD) of the Government of the Hong Kong Special Administration Region (HKSARG), People's Republic of China.   It is mainly used for stamp duty purposes.   The property price indices (PPI) are independently established and grounded on transacted prices in Hong Kong.   However, these indices are treated as "lagged" indicators of past price trends.   They apparently ignore the effect of expectations on the formation of property prices.

A forecast is an estimate or prediction.   In real estate, every appraisal is a forecast or estimate of value.   In most cases, a forecast is needed because changes affect the components of property value.   The trend of previous house price movements may provide a useful reference for professional property appraisers, investors, bankers and homeowners, but the search for this trend is very often a notoriously problematic area.   Meanwhile, it is sensible to assume that most of the time, people's price expectations are correct, subject to the availability of information.   Hence, the aggregate price expectations of market participants can be used as a reliable basis for forecasting changes in future housing prices.   On a forward-looking basis, the BRE Project, the first of its kind in Hong Kong, is developed through a longitudinal research on the confidence of housing consumers and the aggregate of their expectations of residential property prices.   This paper tests for the forecastability of expectations in housing prices that are surveyed in the project.   In the study, it is hypothesized that people overestimate the probability of future price increases when property prices recover and that homeowners and potential home buyers have higher price expectations, and predict future housing price movements more accurately than non-homeowners.

Following this introduction, Section 1 presents the literature review on price expectations.   Section 2 describes the research project and its methodology. Section 3 tests the accuracy of price forecasts and the predictive ability of price expectations.   The last section concludes the study.

2.   Literature Review on Price Expectations

A large body of literature has established that price expectations play a crucial role in the determination of housing prices.   For example, Harris (1989) supports that expectations of future appreciation are important determinants of house sale price. Similarly, Phillips (1985) and McDonald (1985) note that expected appreciation of house values may bid up house prices independent of expected rents.   Case (1986) concludes that buyers' expectations of capital gains actually create the anticipated gains.   Ott et al. (2000) suggest that real estate markets often violate the random walk and rational expectation hypotheses.   The empirical test of Clayton (1996)

rejects the joint null hypothesis of rational expectations, suggesting price may deviate temporarily from fundamental values in real estate price cycles.   Case and Shiller (1989, 1990), Mankiw and Weil (1989), Hosios and Pesando (1991), and Meese and Wallace (1994) conclude that house price movements are positively correlated with historic capital gains in the short run.   Given the foregoing, Turnovsky (1970) finds that the extrapolative scheme is most satisfactory from the point of the goodness of fit.   Furthermore, the strongest expectations are formed by adapting to price change (see, for example, Diamond (1980), Figlewiski and Wachtel (1981), Hamilton and Schwab (1985), Tse and Webb (2001)).   Interestingly, these findings over the past decades are inconsistent with rational (forward looking) expectations or semi-strong market efficiency.   However, if rising housing prices were extrapolated to the future, in hopes of a never-ending rising trend, there would be "bubble" expectations (or a "self-fulfilling prophecy[1]").   Mankiw and Weil (1989), Hosios and Pesando (1991), and Meese and Wallace (1994) conclude that house price movements are positively correlated with historic capital gains in the short run.   According to Stiglitz (1990), a speculative "bubble" exists "if the reason that the price is high today is only because investors believe that the selling price will be high tomorrow – when 'fundamental' factors do not seem to justify such a price." Therefore, it can be broadly asserted that price fluctuations may be the direct result of the self-fulfilling behavior of market participants.   In essence, housing actors are influenced by bandwagon effects.   Prices rise simply because they are expected to do so.   This Pygmalion hypothesis of self-fulfilling expectations is demonstrated in Wong and Hui (2006).

Another part of the literature deals with the behavioral aspects of market participants. A branch of this literature uses irrational behaviors in the market to explain, in part, the price volatility.   Clayton (1998) suggests that a sharp run-run in house prices is due in part to irrational expectations [fads, noise traders, trend chasing].   Dreman and Lufkin (2002), and Shiller (2001) conclude that investor overreaction is the cause of a major price reversal,[2] and in more acute cases, can be the major cause of financial bubbles and panics (see also Welch 2000, 2001).   The survey results of Welch (2000, 2001) show that investors are unrealistically optimistic about expected stock returns.   In particular, Barber and Odean (1999) highlight two common mistakes that investors make: excess trading and the disposition effect[3.]   They argue that these systematic biases originate from human psychology (see also Kahneman, et al. (1982)).   Specifically, Fisher and Statman (2000) find that investors are often wrong and they are the victims of cognitive biases.   They suggest that an

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[1] A prophecy created by the Pygmalion effect, which suggests that expectations of a powerful individual, even if it was wrong, would influence the behavior of a weak individual.

[2] Investor overreaction is the cause of major price reversal, and in more acute cases, can be the major cause of financial bubbles and panics, see, for example, Dreman and Lufkin (2000), and Shiller (2001). A detailed survey on literature in empirical finance relating to behavioral principles deriving from psychology, sociology, social psychology and anthropology is presented in Shiller (1999).

[3] Barber and Odean (1999) argued that systematic biases originated from human psychology. The tendency for overconfidence causes excess trading, a common mistake of investors.

understanding of the behavior of investors is ultimately the only road to an understanding of the behavior of the market. Previous studies seem to overlook the effect of general economic conditions that can alter the attitudes of housing actors towards price movement and attach much importance to the formation of price expectations.   One might certainly argue in effect that the market has not taken into full account certain changes in people's expectations.   In a deflationary period, a survey by Wong et al. (2005) conducted in 2000 suggests that homeowners and investors tend to be unrealistically overconfident in the long-term performance of Hong Kong's real estate market.   In 2005, the same excessive confidence is found even in a declining market.   However, do overconfidence and overreaction appear again in a moderate or inflationary period?   If the answer is positive, do they give the same upward-biased price estimate as in a declining market?   It appears that these questions are not properly answered in the real estate literature.   We have found that questionnaire surveys in our previous study are useful in collecting information about individual behavior. The objective of this paper is to examine the behaviors of market participants towards the prediction of housing price movements and explore the accuracy of their forecasts in an inflationary period.

3.   The Research Project

This study stems from the BRE Index Project, which has been undertaken by the Building and Real Estate Department of the Hong Kong Polytechnic University since June 2003 in collaboration with the Hong Kong Baptist University, Texas A & M University in the USA and University of Cambridge in the UK.   The main purpose of the project is to demystify the role of expectations, explore changes in confidence of people over time and produce an independent confidence index for residential property prices in Hong Kong.   From a practical standpoint, the project provides insight into levels of confidence that may predict future market performance.   From a theoretical standpoint, the study attempts to examine the rationality of expectations of housing prices.

3.1   General Methodology

The investigative methodology relies on longitudinal telephone surveys conducted in March, June, September and December.   The coverage of samples is wide, as 98 percent of households in Hong Kong have installed a telephone.   Interviews were conducted by independent and trained university students at convenient times for respondents,   usually   on   weekday   nights   and   under   close   supervision. Computer-generated samples of telephone numbers were used.   Surveys were conducted in Cantonese with the help of the Computer-Assisted Telephone Interviewing software.   A statistical analysis was performed by the Statistical Package of Social Sciences software.

Respondents were surveyed on housing price expectations in three forecast horizons; three months, one year and three years.   Their investment considerations, real estate

fundamentals affecting the home purchase decision, confidence levels, housing preferences and demographics were also gathered.   The survey questions were simple and straightforward, and worded in everyday Chinese.   Each telephone interview took an average of seven minutes to complete.

3.2   Target Population

The target respondents were the non-expert populace, aged 18 and above, in the local residential property sector.   They were branched into two groups: homeowners (HOs); Group A and non-homeowners (NHOs); Group B.   Each group was further divided into people considering a home purchase (Group A1 or B1), conditional purchasers (Group A2 or B2) and non-homebuyers (Group A3 or B3).   Conditional purchasers are those who wish to buy real property under condition(s), such as an increase in family income, decrease in interest rate, better job opportunity, etc.   Non-buyers are HOs or NHOs, who have no idea whatsoever for buying at all.   Again, price expectation questions were not posed to non-buyers (i.e., Groups A3 and B3) with no interest at all in the marketplace, to avoid reducing index reliability and forecasting power of the price expectation.

3.3   Sampling Procedures

Computer-generated random sampling procedures were employed to ensure a random selection of respondents.   First, telephone numbers were drawn from three residential telephone directories of the New Territories, Kowloon and Hong Kong and Islands regions.   Secondly, from these "number seeds", another set of numbers was generated by changing the last four digits randomly to include unlisted or new numbers.

3.4   Sample Size

About 15,000 contact numbers were made, and around 1,000 successful interviews were targeted in each round of survey.   In total, 15 surveys were used from December 2003 through June 2007.   A total of 284,537 telephone calls were made with 91,272 valid samples secured and 15,435 complete interviews conducted.   The response rate was overall, 16.91 percent of the total sample (Table 1).   This response rate is consistent with that of other similar surveys in Hong Kong.

Forecasting Capability of Price Expectations

On the price expectation front, respondents were asked to predict the changes in housing price.   A typical expectation question is: "What do you expect the percentage of rise / fall of housing prices to be in three months, one year and three years?"   Their forecasts are then compared with actual price changes to examine accuracy.   The results of the 3-month forecast are charted in Figures 1, 2 and 3 for HOs, NHOs and overall, respectively.

Table 1   Summary Statistics of the Surveys

Survey		Total	Valid	Complete	Response	Sample
No	Date	Dials	Samples	Interviews	Rates (%)	Errors (%)
1	Dec 2003	11,271	3,515	810	23.04	+/-3.44
2	Mar 2004	12,219	4,214	960	22.78	+/-3.16
3	Jun 2004	16,100	5,592	1,176	21.03	+/-2.85
4	Sep 2004	14,591	4,359	893	20.48	+/-3.28
5	Dec 2004	16,950	4,932	1,156	23.43	+/-2.88
6	Mar 2005	15,403	4,942	1,078	21.81	+/-2.88
7	Jun 2005	15,877	7,476	1,120	14.98	+/-2.93
8	Sep 2005	18,260	5,893	1,029	17.46	+/-3.05
9	Dec 2005	20,350	6,153	1,007	16.37	+/-3.09
10	Mar 2006	19,113	6,537	1,056	16.15	+/-3.02
11	Jun 2006	25,993	7,167	1,034	14.43	+/-3.04
12	Sep 2006	24,103	7,125	1,008	14.15	+/-3.09
13	Dec 2006	22,004	6,111	1,031	16.87	+/-3.05
14	Mar 2007	32,402	8,797	1,075	12.22	+/-2.99
15	Jun 2007	19,901	8,459	1,001	11.82	+/-3.09
	Total	**284,537**	**91,272**	**15,434**	**16.91**	**-**

Figure 1   Expected and Actual Changes in Housing Prices- Homeowner

Figure 1 - Expected and Actual Changes in Housing Prices - Homeowner

Figure 2   Expected and Actual Changes in Housing Prices- Non-Homeowner

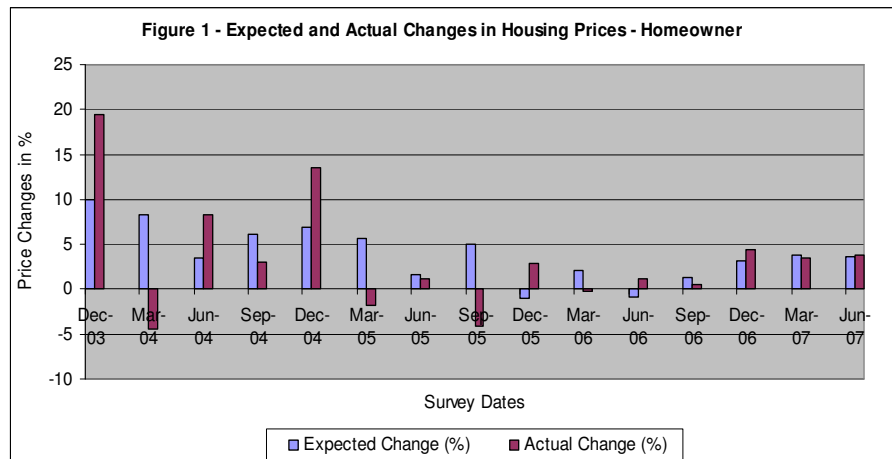Figure 2 - Expected and Actual Changes in Housing Prices - Non-homeowner

Figure 3   Expected and Actual Changes in Housing Prices- Overall
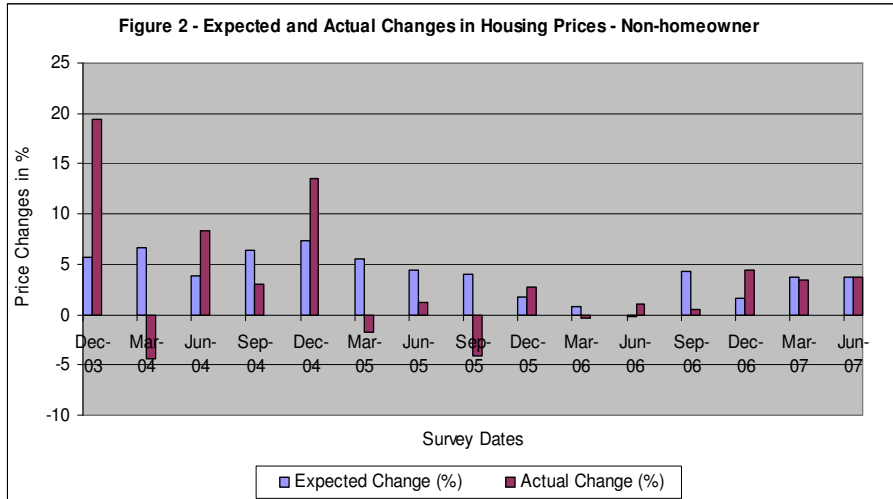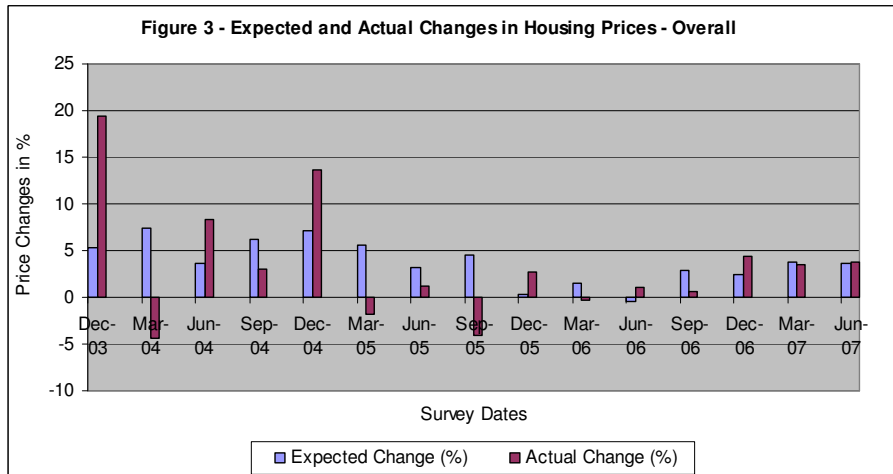

Figure 3 - Expected and Actual Changes in Housing Prices - Overall

In general, the forecasts are fairly accurate in terms of the direction of price movements. Of the 15 surveys, only 5 surveys record a forecast in the opposite direction of the actual price movement. On average, a high percentage of people's expectations are met. Overall, of the 15 occasions, there are only 4 occasions where the actual price drops. Does this evidence support the claim that the belief or forecast of respondents is accurate? Is it easier to forecast more accurately when the market is rising, relative to a falling market? This paper examines the effectiveness of price expectations. The continuing belief in its usefulness is also explored.

Table 2   Expected Percentage Change in Housing Prices for Three Months from Survey Dates and Realizations in the Following Three Months

Survey No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Overall[4]
Survey Dates	Dec 2003	Mar 2004	Jun 2004	Sep 2004	Dec 2004	Mar 2005	Jun 2005	Sep 2005	Dec 2005	Mar 2006	Jun 2006	Sep 2006	Dec 2006	Mar 2007	Jun 2007	
Panel A - Expected price changes in three months from survey date																
Homeowners																
Mean[1]	5.02	8.24	3.49	6.12	6.84	5.70	1.68	4.97	-1.08	2.09	-0.80	1.27	3.16	3.65	3.83	54.18 (69.48)
Median	4	5	5	5	5	5	5	5	-3	3	-2	3	3	3	5	-
Mode	2	5	5	5	5	5	5	5	-5	5	-5	5	5	5	5	-
Standard Deviation	3.77	6.65	10.34	5.80	6.48	4.23	10.02	8.67	8.47	8.42	7.27	7.43	6.22	7.71	6.76	-
Minimum	1	1	-50	-10	-15	-10	-50	-20	-40	-50	-20	-30	-10	-30	-50	-
Maximum	20	50	50	50	30	20	20	50	40	40	20	30	20	50	20	-
No. of Observations	70	108	113	94	154	128	85	99	129	118	137	92	124	257	161	1,869
Non-homeowners																
Mean 1	5.70	6.62	3.85	6.36	7.30	5.51	4.44	4.03	1.75	0.85	-0.18	4.32	1.66	3.65	3.70	59.56 (75.88)
Median	4	5	5	5	5	5	5	5	3	2	1	5	3	3	5	-
Mode	2	5	5	5	5	5	5	5	5	-5	5	10	5	5	5	-
Standard Deviation	4.59	5.71	9.78	5.69	6.97	3.92	11.56	6.66	10.31	7.11	11.32	7.32	6.49	7.21	6.76	-

(Continue…)

(Table2 Continued)

Survey No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Overall[4]
Survey Dates	Dec 2003	Mar 2004	Jun 2004	Sep 2004	Dec 2004	Mar 2005	Jun 2005	Sep 2005	Dec 2005	Mar 2006	Jun 2006	Sep 2006	Dec 2006	Mar 2007	Jun 2007	
Minimum	1	-50	-50	-5	-10	-5	-15	-20	-15	-20	-70	-10	-10	-30	-50	-
Maximum	20	30	50	30	50	20	70	20	70	20	33	30	20	50	20	-
No. of Observations[1]	53	106	121	77	161	92	109	103	113	129	126	113	106	196	139	1,744
Overall																
Mean[1]	5.31	7.44	3.63	6.23	7.07	5.62	3.23	4.49	0.24	1.44	-0.51	2.95	2.47	3.65	3.77	57.03 (74.40)
Median	4	5	5	5	5	5	5	5	-0.5	2	-1	5	3	3	5	-
Mode	2	5	5	5	5	5	5	5	-5	5	-5	5	5	5	5	-
Standard Deviation	4.14	6.24	9.70	5.74	6.73	4.09	10.97	7.71	2.46	7.77	9.41	7.51	6.34	7.49	6.75	-
Minimum	1	1	-50	-10	-15	-10	-50	-20	-40	-50	-70	-30	-10	-30	-50	-
Maximum	20	50	50	50	50	20	70	50	70	40	33	30	20	50	20	-
No. of Observatios[1]	123	214	234	171	315	220	194	202	242	247	263	205	230	453	300	3,613

(Continue…)

(Table2 Continued)

Survey No.	2	3	4	5	6	7	8	9	10	11	12	13	14	15		Overall[5]
Realization Dates	Mar 2004	Jun 2004	Sep 2004	Dec 2004	Mar 2005	Jun 2005	Sep 2005	Dec 2005	Mar 2006	Jun 2006	Sep 2006	Dec 2006	Mar 2007	Jun 2007	Sep 2007	
Panel B - Percentage change in actual property price indices and average property prices in the three months after the survey																
% change in property price indices[2] — Class B	19.72	-4.15	8.93	2.61	13.8	-2.34	1.63	-4.07	2.57	-0.44	0.44	-0.22	4.15	3.56	3.54	49.73 (58.85)
Class C	27.14	-6.52	9.52	3.18	15.52	-0.28	1.38	-5.73	4.54	-0.46	0.28	1.57	2.00	4.56	2.9	59.60 (72.14)
All Classes	19.42	-4.35	8.30	2.97	13.57	-1.80	1.18	-4.15	2.78	-0.32	1.08	0.54	4.37	3.78	3.44	50.81 (60.70)
% change in average property prices[3] — Class B	28.31	-10.58	18.51	1.78	15.81	-8.83	3.91	-4.32	5.52	-1.87	0.01	0.95	5.08	5.69	5.54	65.51(78.02)
Class C	34.31	-10.35	15.49	0.97	17.41	-7.29	4.60	-4.37	5.21	1.51	-2.51	-0.49	5.03	7.39	6.10	73.01 (89.57)
All Classes	NN/P	N/P	N/P	N/P	N/P	N/P	N/P	N/P	N/P	N/P	N/P	N/P	N/P	N/P	N/P	N/P (NP)

Notes [1] The mean is the average of expected percentage changes in housing prices in the subsequent three months from the date of survey anticipated by homeowners (Groups A1 and A2), non-homeowners (Groups B1 and B2) and overall (Groups A1, A2, B1 and B2). All responses of "Prices stay the same" and "No idea/Refused to answer" are excluded from the calculation. This applies to the number of valid observations.

[2] Based on the actual change in PPI (ΔPI) with the base year of 1999 = 100 of "Class B" (40 m² to 69.9 m²), "Class C" (70 m² to 99.9 m²) and "All Classes" private domestic flats (territory-wide) three months after the survey date as per the *Hong Kong Property Review - Monthly Supplement*, various issues, Rating and Valuation Department (RVD), HKSARG, where: $\Delta PI_i = (PI_i - PI_{i-1}) / PI_{i-1} * 100\%$ at survey time i, for i = Survey 1 (December 2003),…, Survey 15 (June 2007).

[3] Based on the change in actual property prices (ΔPP) in HKD per m² of "Class B" flats and "Class C" flats three months after the survey date

the Hong Kong Property Review - Monthly Supplement, various issues, RVD, HKSARG, where: $\Delta PP_i = (PP_i – PP_{i-1}) / PP_{i-1}$ * 100% at survey time i, for i = Survey 1 (December 2003), …, Survey 15 (June 2007). Actual property prices are derived by averaging the property prices of private domestic flats in the Hong Kong, Kowloon, and New Territories regions per Hong Kong Property Review - Monthly Supplement, various issues, RVD, HKSARG.

[4] The "overall" mean (%) is the aggregate of all "mean" values in percentage, on a survey basis of the 15 surveys used for homeowners, non-homeowners and overall groups. For example, the "overall" mean of homeowners is 5.02 + 8.24 + 3.49 + , …, + 3.83 = 54.18 . Strictly speaking, on aggregate, the "overall" mean value should be viewed as the summation of all expected price changes in each survey compounded at a growth / declining rate at the expected rate of change of each survey from December 2003 (Survey No. 1) through to June 2007, refer to the figures in brackets. For example, for homeowners, the "overall" mean value of expected price change is: [1-(1+5.02%) x (1+8.24%) x (1+3.49%) + , …, + (1+3.83%)]= 69.48%.

[5] The "overall" mean is the summation of all percentage changes in PPI or actual property prices in three months, on a survey basis, from each survey date for 15 surveys. For example, for Class B flats, the "overall" percentage change in PPI in the course of the survey period is 19.72 - 4.15 + 8.93 + 2.61 +, …, + 3.54 = 49.73. Figures in brackets denote the percentage changes in PPI or actual property prices, on aggregate terms, from December 2003 (Survey No. 1) through to September 2007 (three months after the last Survey No. 15), relative to December 2003. For example, for Class B flats, the "overall" percentage change in PPI throughout the survey period is [(102.3 – 64.4) / 64.4] x 100% = 58.85%, where 102.3 is the Index in September 2007 and 64.4 is the Index in December 2003 (provisional).

N/P: Figures not compiled by RVD, HKSARG.

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Table 2 presents the expected changes in housing prices for three months from the survey dates and their realizations in the following three months.   Panel A is the expected price change in percentage by HOs, NHOs and overall.   The total expected changes are calculated as the summation of all the mean values of the 15 surveys, on the survey's basis for each survey and aggregate basis from Surveys 1 to 15.   Panel B summarizes the actual price changes in terms of PPI and transacted prices of private residential buildings in Hong Kong. The total actual changes are calculated as the summation of all the actual changes in the PPI and actual property prices of two consecutive quarters between each survey, and as the aggregate change in Indices and actual prices from Survey 1 through to September 2007, three months after the last survey (Survey 15), relative to Survey 1.

The confidence of people is forward-looking and should be reasonably reflected in their price expectations.   The question is: are high (or low) levels of the expectations associated with subsequent rises (or declines) in housing prices?   To answer this, we consider that if there is a direct relation between actual prices (or price indices) and the expectation levels, we should find that high levels of actual housing prices or higher values of the PPI provided by the RVD are associated with expected increase in housing prices of the respondents.

Overall, the survey found that respondents expected that housing prices would increase marginally (mean value ranges from +1.44% to +7.44%) or decrease marginally (-0.51%) in the three-month forecasting horizon.   However, for the actual change, PPI (Class B) increase in a much volatile manner, ranging from +0.44% to +19.72%, and decrease marginally on four occasions, ranging from -0.22% to -4.15%, on a quarterly basis.   Actual price changes (Class B) also increase at different paces in each survey, ranging from +0.01% to +28.31%, and their decreases range from -1.87% to -10.58%   In short, the magnitude of people's anticipated increase or decrease is marginal, but the actual changes in PPI and actual prices are more remarkable throughout the four-year survey period.   This suggests the conservative attitude of the participants towards the changing property market and the subsequent underestimation of the volatility of housing prices.

There is a popular belief that market participants are all too frequently, trend followers (Dreman, 1982).   As markets approach their highs, most of them become bullish, and when they move towards their lows, they become bearish.   While people commit errors, they expect the current market outlook would continue. Thus, past price trends are appropriate for future changes in housing prices. However, when the price change is significant as shown in some of the quarters, such as a 28.31% increase in March 2004 which was immediately followed by a sharp 10.58% decrease in the next quarter, or a 15.81% increase in December 2004 that was followed by a sudden decrease of 8.83% in the subsequent quarter, market participants may find great difficulties in following the market patterns, as determined in the research. This is evidenced by the underlying randomness of price changes depicted in Panel B of Table 2.

It should be noted that in the comparison, Classes B and C properties are used, since on average, 52.2 percent and 21.8 percent of the respondents[5] were currently living in Classes B (40 m^2 to 69.9 m^2) and C flats (70 m^2 to 99.9 m^2), respectively, during the survey period.   These two classes account for a total of 74 percent of the population under study.

Since the price changes are significant and do not follow the same moving pattern, a question remains: "Are the price forecasts of respondents far off from the real situation?"   Based on the results shown in Table 2, Table 3 summarizes and compares the expected changes in housing prices and the actual changes in the PPI in the three-month forecasting horizon.   Two approaches are adopted to examine the predictive ability of people.   First, respondent claims are checked against the actual price changes over the past quarter, survey by survey.   This provides a snapshot of the deviation from the actual figures.   The differences are aggregated up to the last survey.   The second approach is a comparison of the overall performance of the forecasting with cumulative changes in actual price, both spanning the whole survey period.   This approach indicates the difference between expectations and realizations in overall terms.   In essence, the survey data support the claim that people's price expectations are high and more bullish in a rising market.   Noticeably, their expectations of increases in price are consistently higher than the actual increases, suggesting overconfidence.   The same behavior is also associated with a fall in the market as found in Wong et al. (2005), only with much more significant deviations between expected and actual prices.   The results of our previous survey will be later discussed in detail.

As shown in Table 3, based on the survey, the price expectations of HOs (54.18%) are closer to the actual change in PPI (49.73%) for Class B properties than NHOs (59.56%).   With respect to the cumulative changes during the course of the survey, the phenomenon is similar, as reflected by HO's expected change of 69.48% and the NHO's 75.88% as opposed to the actual change in PPI of 58.85% for Class B properties.   The results will be elaborated in terms of positive hits (expected increase is realized) and negative hits (expected decrease is realized) in the following section entitled "Positive/Negative Hits and False Positives/Negatives", where it is found that the number of correct hits by NHOs is slightly more than those by the HOs.

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[5] A total of 48.4% (22.0%), 57.7% (21.6%), 53.0% (19.7%), 54.2% (24.2%), 51.6% (19.2%), 50.3% (24.3%), 47.6% (26.0%), 53.2% (20.1%), 53.8% (23.8%), 47.3% (20.0%), 52.1% (21.3%), 50.0% (21.9%), 56.9% (21.9%), 54.7% (19.9%) and 52.7% (21.5%) of respondents said in Survey Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15, respectively, that they were living in Class B (C) flats during the survey period.   On average, 52.2% were living in Class B and 21.8% in Class C flats.

Table 3   Summary of Expected and Actual Changes in Housing Prices

Types of changes	Expected changes in percent			Actual changes in percent			Difference in percent
Periods	March 2004 to Sept 2007			March 2004 to Sept 2007			March 2004 to Sept 2007
Categories	HO	NHO	All	Price indices			Price indices
Building classes	Class B	Class C	All classes	Class B	Class C	All classes	All classes
Changes on survey basis	54.18	59.56	57.03	49.73	59.60	50.81	+6.22
Cumulative change	69.48	75.88	74.40	58.85	72.14	60.70	+13.70

An interesting finding is that in all cases, the forecasts for both HOs and NHOs far exceed the index increase (There are overestimations of 6.22% on a survey basis and 13.70% on a cumulative basis, both for "all classes" flats).   This illustrates their over-optimism towards the future market outlook.   The results are consistent with the findings of Welch (2000 and 2001), and Wong et al. (2005).   Echoing our previous survey, the current longitudinal research finds that both HOs and NHOs also overreact in a rising market.   They are over-optimistic and tend to underestimate the volatility of the housing prices in Hong Kong, suggesting that housing actors are not always rational and have their cognitive biases, which is probably the root cause of the price reversal.   This overconfidence is closely related to some deeply-rooted psychological phenomena.

Overall, another important finding is that the housing market generally follows what most people think it will do. A high percentage of optimistic respondents signal a positive outlook of the market, and vice versa.   In this regard, it is overall sensible to regard that price expectations move in the same direction as the index, and the expectations are not far away from the actual situation.   The expectations are predictive and indeed a "leading", instead of lagging, behavioral and attitudinal predictor of house price changes in the long run.

4.1   Positive/Negative Hits and False Positives/Negatives

Previous findings are buttressed by another survey question on whether the prices of respondents' houses will increase, decrease or remain the same in the three months following the survey date.   The accuracy of the predictability of respondents can further be measured by a direct comparison of the forecasted and actual price changes.   The comparison can examine the claim of a respondent that one can forecast increases and decreases in housing prices.   The results of the forecast and the realization for the sample are presented in Table 4.

Table 4   Forecast of Change in Housing Prices and Realizations in the Three Months Following the Survey Date

Survey no.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Survey Dates	Mar 2004	Jun 2004	Sep 2004	Dec 2004	Mar 2005	Jun 2005	Sep 2005	Dec 2005	Mar 2006	Jun 2006	Sep 2006	Dec 2006	Mar 2007	Jun 2007	Sep 2007	Total
Price increased [1]	Yes		Yes	Yes	Yes		Yes		Yes		Yes	Yes	Yes	Yes	Yes	
Price decreased [1]		Yes				Yes		Yes		Yes						
Homeowners																
Price will increase [2]	**72**	**125**	**75**	**93**	**126**	**138**	**70**	**107**	**63**	**86**	**66**	**65**	**98**	**105**	**162**	**1451**
Represented by:																
Positive hits [3]	72		75	93	126		70		63		66	65	98	105	162	995
False positives [5]		125				138		107		86						456
Price will decrease [2]	**3**	**5**	**19**	**3**	**11**	**5**	**32**	**20**	**90**	**40**	**80**	**39**	**37**	**14**	**18**	**416**
Represented by:																
Negative hits [4]		5				5		20		40						70
False negatives [6]	3		19	3	11		32		90		80	39	37	14	18	346
Total	**75**	**130**	**94**	**96**	**137**	**143**	**102**	**127**	**153**	**126**	**146**	**104**	**135**	**119**	**180**	**1867**

(Continue…)

(Table 4 Continued)

								Non-homeowners								
Price will increase[2]	54	118	80	95	124	96	102	117	83	92	86	99	79	103	143	1471
Represented by:																
Positive hits[3]	54		80	95	124		102		83		86	99	79	103	143	1048
False positives[5]		118				96		117		92						423
Price will decrease[2]	17	12	18	4	5	4	34	23	55	61	62	27	39	24	19	404
Represented by:																
Negative hits[4]		12				4		23		61						100
False negatives[6]	17		18	4	5		34		55		62	27	39	24	19	304
Total Response	71	130	98	99	129	100	136	140	138	153	148	126	118	127	162	1875
Survey no.	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**		
Survey Dates	**Mar 2004**	**Jun 2004**	**Sep 2004**	**Dec 2004**	**Mar 2005**	**Jun 2005**	**Sep 2005**	**Dec 2005**	**Mar 2006**	**Jun 2006**	**Sep 2006**	**Dec 2006**	**Mar 2007**	**Jun 2007**	**Sep 2007**	**Total**
Price increased[1]	Yes		Yes	Yes	Yes		Yes		Yes		Yes	Yes	Yes	Yes	Yes	
Price decreased[1]		Yes				Yes		Yes		Yes						

(*Continue…*)

(Table 4 Continued)

	Overall															
Price will increase [2]	**126**	**243**	**155**	**188**	**250**	**234**	**172**	**224**	**146**	**178**	**152**	**164**	**177**	**208**	**305**	**2922**
Represented by:																
Positive hits [3]	126		155	188	250		172		146		152	164	177	208	305	2043
False positives [5]		243				234		224		178						879
Price will decrease [2]	**20**	**17**	**37**	**7**	**16**	**9**	**66**	**43**	**145**	**101**	**142**	**66**	**76**	**38**	**37**	**820**
Represented by:																
Negative hits [4]		17				9		43		101						170
False negatives [6]	20		37	7	16		66		145		142	66	76	38	37	650
Total responses	**146**	**260**	**192**	**195**	**266**	**243**	**238**	**267**	**291**	**279**	**294**	**230**	**253**	**246**	**342**	**3742**

Notes [1] Based on the actual change in PPI (ΔPI) with the base year of 1999 = 100 of "All Classes" private domestic flats (territory-wide) three months after the survey date as per the *Hong Kong Property Review - Monthly Supplement*, various issues, Rating and Valuation Department (RVD), HKSARG, where: $\Delta PI_i = (PI_i - PI_{i-1}) / PI_{i-1} * 100\%$ at survey time i, for i = Survey 1 (December 2003), ..., Survey 15 (June 2007). "Price increased" denotes ΔPI_i is positive, and "Price decreased" denotes ΔPI_i is negative.

[2] "Price will increase" or "Price will decrease" are the expected increase or decrease in housing prices in the subsequent three months from the date of survey anticipated by Homeowners (Groups A1 and A2), Non-homeowners (Groups B1 and B2) and Overall (Groups A1, A2, B1 and B2). Figures are the no. of responses obtained in the surveys. All responses of "Prices stay the same" and "No idea/Refused to answer" are excluded from the calculation.

[3] Positive hits occur when housing prices were expected to increase and housing prices actually did increase in the subsequent three months after the survey, indicated by a positive ΔPI_i, or "Price increased".

[4] Negative hits occur when housing prices were expected to decrease and housing prices actually did decrease in the subsequent three months after the survey, indicated by a negative ΔPI_i, or "Price decreased".

[5] False positives occur when housing prices were expected to increase, but housing prices actually decreased in the subsequent three months after the survey, indicated by a negative ΔPI_i, or "Price decreased".

[6] False negatives occur when housing prices were expected to decrease, but housing prices actually increased in the subsequent three months after the survey, indicated by a positive ΔPI_i, or "Price increased".

For comparisons, the forecasts and realizations in the sample are divided into four cells of a matrix as shown in Table 5. The four cells are: the first cell, which contains positive hits where an increase is forecasted and realized; second cell, which contains false positives, where an increase is forecasted, but a decrease is realized; third cell, which contains false negatives where a decrease is forecasted, but an increase is realized; and fourth cell, which contains negative hits where a decrease is forecasted and realized.

Positive and negative hits are evidence of conformity, whereas false positives and negatives are evidence of unconformity.   It is human nature to focus on positive or negative hits, but neglect false positives or negatives.   Einhorn and Hogarth (1978) suggest that the illusion of validity persists as people always focus solely on the conforming evidence.   However, the unconforming forecasts should not be ignored.

The period for testing is specified for all 15 surveys from the fourth quarter (Q4) of 2003 through to the second quarter (Q2) of 2007.   An examination of all four cells enables an assessment of the accuracy of price expectations.   The results of the HOs, NHOs and overall are summarized in Tables 6, 7 and 8, respectively.   It should be stressed that the concerns of the respondents are confined to HOs A1 (buyers on the market) and A2 (conditional buyers); and NHOs B1 (buyers on the market) and B2 (conditional buyers) only.   All non-buyers (A3 and B3) were not asked about the price change.   Excluding the non-buyers, the respondents account for a quarter (3,742 / 15,434) of the total valid subjects under survey.

Table 5   Forecasts of Changes in Housing Prices and Realizations

Realization　　　　　Forecast	Housing prices actually increased (3 months later)	Housing prices actually decreased (3 months later)
Housing prices will increase	Positive Hits	False Positives
Housing prices will decrease	False Negatives	Negative Hits

The cells in Tables 6, 7 and 8 contain the number of respondents with the specified combinations of forecasts and realizations for each survey. If the frequency of false positives and negatives is high, then the expectation is useless as a forecasting tool, not because it does not provide good forecasts, but because of the number of bad forecasts. However, as shown in Table 8, overall, there are clearly more positive (2,043) and negative (170) hits and less false positives (650) and negatives (875) than can be expected from a random process.   In other words, conformity outweighs unconformity. The case presented in Table 8 is 59 percent hits ((2,043+170) / 3,742 * 100%). Hence, the observations are consistent with the hypothesis that the expectations are useful (correct for 59 percent of the time) in forecasting changes in housing prices. There are 57 percent hits for HOs (Table 6) and 61 percent for NHOs (Table 7). It seems that in forecasting price movements, HOs and NHOs perform more or less equally well, although their expectations are higher than the reality.

Table 6   Forecasts of Changes in Housing Prices in the Three Months Following the Date of Survey and Realizations of Homeowners (Groups A1 and A2)

Realization / Forecast	Housing Prices actually increased [1] (3 months later)	Housing Prices actually decreased [1] (3 months later)	Total
Housing prices will increase [2]	Positive Hits 995	False Positives 456	1,451
Housing prices will decrease [2]	False Negatives 346	Negative Hits 70	416
Total	1,341	526	1,867

Table 7   Forecasts of Changes in Housing Prices in the Three Months Following the Date of Survey and Realizations of Non-homeowners (Groups A1 and A2)

Realization / Forecast	Housing Prices actually increased [1] (3 months later)	Housing Prices actually decreased [1] (3 months later)	Total
Housing prices will increase [2]	Positive Hits 1,048	False Positive 423	1,471
Housing prices will decrease [2]	False Negatives 304	Negative Hits 100	404
Total	1,352	523	1,875

Table 8   Forecasts of Changes in Housing Prices in Next Three Months from the Date of Survey and Realizations of Overall (Groups A1, A2, B1 and B2)

Realization / Forecast	Housing Prices actually increased [1] (3 months later)	Housing Prices actually decreased [1] (3 months later)	Total
Housing Prices will increase [2]	Positive Hits 2,043	False Positives 879	2,922
Housing Prices will decrease [2]	False Negatives 650	Negative Hits 170	820
Total	2,693	1,049	3,742

Notes [1] "Housing Prices actually Increased/Decreased" three months later refers to the rise/fall in the PPI (All Classes) of the *Property Review*, various issues, compiled by the Rating and Valuation Department, HKSAR Government in the three months following the survey, relative to the survey date.

[2] "Housing Price will Increase/Decrease" refers to the expected housing price increase or decrease in the three months after the survey date as perceived by the respondents. The numbers in the table are the total responses obtained from Survey 1 (December 2003) to Survey 15 (June 2007). Responses to "Price will stay the same" and "No idea/Refused to answer" are not included for calculation.

5.   Conclusions

The objective of this paper is to examine the behaviors of market participants towards the prediction of housing price movement in an inflationary period and explore the predictive ability of price expectations.   This paper uses the price expectations of HOs and NHOs obtained from 15 related surveys conducted from 2003:Q4 to 2007:Q2 to examine how market participants view future price movements and the predictive ability of their price expectations.   The market condition in the course of the four-year study is moderate and rising.   The survey results show that the number of correct forecasts exceeds the number of incorrect forecasts, suggesting that their price expectations are somehow useful and usable as an indicator of forthcoming changes in housing prices.   In general, people's aggregate expectations over the sample period, upon which their confidence of the market outlook is formed, are fairly close to the actual situations.   Another finding is that HOs, investors or potential home buyers tend to have more or less the same level of confidence about the future market outlook. Like the non-owners, they expect higher prices. The accuracy of their price forecasts is somehow the same. Also, the market participants tend to over-react in the market.   They are especially over-optimistic about the future outlook in an inflationary period.   In the meantime, they also tend to underestimate the volatility of speculative asset prices in Hong Kong, suggesting that they are not always rational in a rising market.   While the findings in Wong et al. (2005) suggest the over-optimism of the housing actors in a deflationary period, this research fills an important gap by exploring price expectations and confirming a similar excessive-confidence phenomenon in an inflationary period.   The expectations of housing actors may vary over time under different economic conditions.   However, if they are systematically overconfident, they will commit errors in all circumstances.   As shown by the survey results, in predicting housing price movement, the number of correct forecasts by NHOs slightly exceeds that by the HOs.   Nonetheless, the number of their correct forecasts exceeds that of incorrect forecasts.   Therefore, it can be broadly concluded that the aggregate price expectations of market participants in the long run can be regarded as an appropriate forecasting tool for future real estate performance.   The non-statistical forecasting tools with less stringent data requirements used in this paper may be suitable to situations where statistical techniques cannot be reliably and realistically applied.

References

Barber, B.M. and Odean, T. (1999). The Courage of Misguided Convictions. *Financial Analysis Journal*, **November/December**, 41-55.

Cagan, Phillip. (1956). The Monetary Dynamics of Hyperinflation. In *Studies in the Quantity Theory of Money*, Milton Friedman (Edn.), 25-117, Chicago, IL.: University of Chicago Press.

Case, Karl E. (1986). The Market for Single-family Homes in the Boston Area. *New England Economic Review*, **May/June**, 38-46.

Case, Karl E. and Shiller, Robert J. (1989). The Efficient of the Market for Single Family Houses. *American Economic Review*, **79**, 1, 125-37.

_____ (1990). Forecasting Prices and Excess Returns in the Housing Market. *Journal of American Real Estate and Urban Economics Association,* **18**: 253-73.

Clayton, Jim (1996). Rational Expectations, Market Fundamentals and Housing Price Volatility. *Real Estate Economics*, **24**, 4, 441-70.

_____ (1998). Further Evidence on Real Estate Market Efficiency. *Journal of Real Estate Research,* **15**, 1/2, 41-57.

Diamond, Douglas B. (1980). Taxes, Inflation, Speculation and the Cost of Homeownership. *AREUEA Journal*, **8**, 281-98.

Figlewski, Stephen and Wachtel, Paul (1981). The Formation of Inflationary Expectations. *The Review of Economics and Statistics*, **Vol LXIII**, No. 1, 1-10.
Dreman, D. (1982). "The Myth of Market Timing," *Forbes,* **January 4**, 1982, 292-93.

Dreman, David N. and Luffin, Eric A. (2000). Investor Overreaction: Evidence that Its Basis Is Psychological, *The Journal of Psychology and Financial Markets*, **1**, 1, 61-75.

Einhorn, H.J. and Hogarth, R. (1978). Confidence in Judgment: Persistence in the Illusion of Validity, *Psychological Review*, **85**, 5, 395-416.

Figlewski, Stephen and Wachtel, Paul (1981). The Formation of Inflationary Expectations. *The Review of Economics and Statistics*, **63**, No. 1, 1-10.

Fisher, K.L. and Statman, M. (2000). *Investor Sentiment and Stock Returns.* Association for Investment Management and Research, **March/April**, 16-23.

Hamilton, Bruce W. and Schwab, R. (1985). Expected Appreciation in Urban Housing markets. *Journal of Urban Economics*, **18**, 103-18.

Harris, Jack C. (1989). The Effect of Real Rates of Interest on Housing Prices. *Journal of Real Estate Finance and Economics*, **2**, 47-60.

Hosios, A.J. and Pesando, J.E. (1991). Measuring Prices in Resale Housing Markets in Canada: Evidence and Implications. *Journal of Housing Economics*, **1**, 303-17.

Kahneman, D., Slovic, P. and Tversky, A. (1982). *Judgment Under Uncertainty: Heuristics and Biases.* Cambridge: Cambridge University Press.

McDonald, John F. (1985). Expectations and Urban Housing prices. *Urban Studies*, **22**, 543-49.

Mankiw, N. and Weil, D.N. (1989). The Baby Boom, the Baby Bust and the Housing Market. *Regional Science and Urban Economics*, **19**: 235-58.

Meese, R. and Wallace, N. (1994). Testing the Present Value Relation for Housing Prices: Should I Leave My House in San Francisco? *Journal of Urban Economics*, **35**, 245-66.

Ott Steven H., Riddiough Timonthy J., Yi Ha-Chin and Yoshida Jiro (2000). On Demand: Cross-country Evidence from Commercial Real Estate Markets. Processed, 2000.

Phillips, Robyn S. (1985). "The Relationship Between the Residential Rents and House Values Explaining Inter-temporal and Cross-sectional Variation, 1974-1979." US Department of Housing and Urban Development.

Shiller, Robert J. (1999). Human Behavior and the Efficiency of the Financial System. In Taylor, J.B. and Woodford, M. (Edns.), *Handbook of Macroeconomics*, **1**, 1305-40.

_____ (2001). *Bubble, Human Judgment and Expert Opinion.* Cowles Foundation Discussion Paper 1303, Cowles Foundation for Research in Economics, Yale University.

Stiglitz, J. E. (1990). Symposium on Bubble. *Journal of Economic Perspectives*, **4**, 2, 13-18.

Turnovsky, Stephen J. (1970). Empirical Evidence on the Formation of Price Expectations. *Journal of American Statistical Association,* **65**, 332, 1441-54.

Tse, Raymond Y.C. and Webb, James R. (2001). Public vs. Private Real Estate in Hong Kong Using Adaptive Expectations. *Journal of Real Estate Portfolio Management,* **7**, 2, 143-49.

Welch, I. (2000). Views of Financial Economists on the Equity Premium and on Professional Controversies. *Journal of Business*, **73**, 501-37.

———— (2001). "The Equity Premium Consensus Forecast Revisited." Working Paper, Yale University.

Wong, J.T.Y. and Hui, E.C.M. (2006). Research Notes – Power of Expectations. *Property Management*, **24,** 5, 496-506.

Wong, J.T.Y., Hui, E.C.M., Seabrooke, W. and Raftery, J. (2005). A Study of the Hong Kong Property Market: Housing Price Expectations. *Construction Management and Economics* (September), **23**, 757-65.