AN EVALUATION OF THE PERFORMANCE OF UK REAL ESTATE FORECASTERS

PATRICK McALLISTER
Department of Real Estate and Planning
The University of Reading
(p.m.mcallister@reading.ac.uk)

GRAEME NEWELL
School of Construction, Property and Planning
University of Western Sydney
(g.newell@uws.edu.au)

GEORGE MATYSIAK
Department of Real Estate and Planning
The University of Reading
(g.a.matysiak@reading.ac.uk)

Abstract

Given the significance of forecasting in real estate investment decisions, this paper investigates forecast uncertainty and disagreement in real estate market forecasts. It compares the performance of real estate forecasters with non-real estate forecasters. Using the Investment Property Forum (IPF) quarterly survey amongst UK independent real estate forecasters and a similar survey of macro-economic and capital market forecasters , these forecasts are compared with actual performance to assess a number of forecasting issues in the UK over 1999-2004, including forecast error, bias and consensus. The results suggest that both groups are biased, less volatile compared to market returns and inefficient in that forecast errors tend to persist. The strongest finding is that forecasters display the characteristics associated with a consensus indicating herding.

Keywords: Real estate forecasting, forecast accuracy, forecast disagreement, individual forecast, consensus.

INTRODUCTION

For institutional real estate investors, expectations of future investment performance at the levels of individual real estate asset, sector, region, country and asset class are crucial to stock selection, and tactical and strategic asset allocation decisions. While all real estate forecasting is subject to some degree of uncertainty, a high degree of sophistication has been developed over recent years, with a range of advanced quantitative and qualitative procedures now used by institutional investors in real estate forecasting, including judgemental procedures, causal/econometric procedures and time series/trend analysis procedures (Higgins, 2000). This has seen numerous real estate forecasting studies in recent years concerning forecasting real estate rents, stock levels, returns, yields and cash flows; econometric and structural modelling, and comparisons of real estate forecasting procedures (see Newell *et al*, 2003).

Given the centrality of forecasting to real estate investment decisions and performance, the focus in this paper is on uncertainty in forecasts of real estate rents and returns, and disagreement in expectations. Uncertainty is an integral element of forecasts, and commercial real estate investors are constantly in the position of decision-making under uncertainty. "Forecasting competitions" suggest that the use of econometric modelling that dominates professional real estate forecasting can sometimes be of limited value. Confirming many studies outside the real estate sector, real estate researchers have found, in many instances, simple forecasts (e.g. via naïve predictors) to be more accurate than using complex econometric models (Chaplin, 1999, 2000; Higgins, 2001; Wilson *et al*, 2000). Further, in macro-economic forecasts, non-causal models often tend to dominate causal models (Hendry and Clements, 1999). In most standard micro-economic models, market participants are assumed to share a common information set and to form similar expectations conditional upon that information. However, there has been growing interest in the fact that market participants often disagree. The topic of forecast disagreement (outside real estate) has generated a substantial body of research (see below) focussing on sources and causes of forecast disagreement and, interestingly, signals and information contained in forecast disagreement.

This paper focuses on two dimensions of forecast uncertainty; namely, accuracy and disagreement. Drawing upon a data set of professional forecasts of UK real estate market performance over 1999-2004, we investigate these real estate forecasts in terms of forecast error, bias and efficiency at both the consensus and individual forecaster level. We examine the extent and nature of disagreement among professional real estate forecasters. In order to investigate the comparative performance of UK real estate forecasters and to provide a

benchmark again which this performance can be evaluated, we also examine the forecasting performance of major UK investment banks and fund managers. We compare the reliability of real estate forecasts with non-real estate analysts' forecasts of a range of variables such as GDP, earnings growth and stock market performance.

FORECAST FAILURE: UNCERTAINTY, ACCURACY AND RATIONALITY IN FORECASTS

The discussion about the different dimensions of forecast uncertainty echoes much of the debate on appraisal uncertainty and smoothing (e.g: Webb, 1994; Clayton, Geltner and Hamilton, 2001). The same distinctions are drawn between random variations between actual outcomes and predicted outcomes (error), and systematic tendencies towards optimism or pessimism (bias). Similarly, the large body of research on forecast bias reproduces similar concepts found in research on appraisal-smoothing. As in real estate, the term 'forecast smoothing' is used in the forecast literature to describe the tendency of forecasts to be less volatile than reality and to be display serial correlation. Clements (1995) identifies a tendency towards excessive smoothness in forecasts. Nordhaus (1987) speculates that the lack of volatility in forecasts, relative to actual outcomes, is due to factors such as the need to reach a consensus and to maintain forecast credibility by avoiding major "jumps". In research that assessed the accuracy of real estate market forecasts in the UK over 1999-2002, Newell *et al* (2003) found empirical evidence of forecast inertia. Newell et al (2003) concluded that persistent over-estimation and under-estimation, manifested in serial correlation in forecast errors, suggested a smoothing effect in which significant new information is needed before major revisions to prior real estate forecasts are carried out.

Forecast bias is closely linked to tests of efficiency and rationality in forecasts. Rational expectations would imply forecasts are efficient in that they do not display predictable errors. Essentially, tests for forecast efficiency look for correlations between forecast errors and observable variables, the existence of which implies that forecast errors are predictable and therefore not rational. Tests applied include identifying:

- non-zero mean in forecast errors;
- serial correlation in forecast errors;
- significant correlation between forecast errors and a constant and the forecast itself; and
- tests of correlation between forecast errors and a set of variables (assumed to be the information set).

Outside real estate, there is an extensive literature on the interlinked definition and causes of forecast failure. If we define forecast failure in terms of simple *ex post* differences between forecasts and actual outcomes[i], Hendry and Clements (2003) argue that it is rarely forecasting models that are the most important cause of forecast failure. Although it may in some circumstances be attributable to factors such as inadequate theory and inaccurate observations, it mainly arises due to structural breaks in the patterns under study. As Hendry and Clement (2003, 303) state; "all econometric models are mis-specified, and all economies have been subject to unanticipated shifts". This produces a situation where model specification can be irrelevant to performance, in that correctly specified models can be outperformed by poorly specified models. Consequently, from an *ex ante* perspective, Hendry and Clements (2003) make a distinction between measurable and un-measurable uncertainty. The former is linked to the intrinsic error term inherent in econometric modelling[ii]. However, the error can provide a misleading indicator of actual forecast uncertainty, given the largely unknowable uncertainty caused by unanticipated shifts and shocks.

Capstaff, Paudyal and Rees (2001) provide a comprehensive review of the empirical evidence on forecast accuracy among financial analysts' forecasts of earnings per share. They identify a number of findings consistent with other studies. Analysts tend to outperform time series models; be optimistic and can be reluctant to provide unfavourable forecasts; to over-react to positive information and under-react to negative information. They propose incentive structures and behaviourial biases as potential explanations of systematic optimism. As noted, Capstaff *et al* (2001) is just one example of the much cited bias of equity analysts in optimistic forecasting of the performance of companies which are clients. Among macro-economic forecasters, Laster *et al* (1999) found that in selecting forecast outcomes, forecasters are motivated not merely by forecast accuracy, but also by potential publicity for their firm. Accordingly, where the rewards from the publicity attached to being accurate are relatively higher, forecasters are more likely to differentiate their views from the consensus, deliberately biasing their forecasts; a form of "rational" bias. The balance between the attractions of publicity and a requirement for accuracy provides conflicting pressures for divergence and convergence (herding) forecasts. In a discussion of how forecasters may be biased, Croushore (1997, 6) mentions "publicity effects" and suggests that:

> "some (survey) respondents might shade their forecasts more toward the consensus (to avoid unfavourable publicity when wrong), whilst others might make unusually bold forecasts to stand out from the crowd."

Although there has been little published work on the accuracy of real estate forecasts, for the US Ling (2004) provides an interesting analysis of the forecasting ability of the sector and MSA rankings in the RERC survey. Ling (2004) assesses whether the consensus opinions on market conditions contained in RERC's survey results are useful in forecasting subsequent return performance. He finds no evidence to support the view that analysts' forecasts can improve performance and identifies no positive correlation between the prediction of the RERC survey respondents and actual return performance. Intriguingly, he also finds that consensus predictions are correlated with NCREIF returns in the two years prior to the survey. He therefore concludes that RERC's investment conditions survey is clearly backward looking and not forward-looking. Using a vivid metaphor, he describes using consensus opinions as akin to driving a car by looking in the rear view mirror.

FORECAST DISAGREEMENT

Bomberger (1996) examines disagreement and uncertainty in forecasts. Disagreement is defined in terms of a measure of the *ex ante* dispersion of individual forecasts around the mean forecast, whereas uncertainty is defined in terms of the *ex post* dispersion of individual forecasts around the actual. Whilst the two concepts are integrally related, a distinction is also drawn between individual and consensus uncertainty. The uncertainty of an individual forecast is greater than the uncertainty of the mean forecast. In an analysis of long-term inflation expectations, Bomberger (1996) finds that it is errors in the consensus forecasts rather than disagreement that are the dominant component of individual forecast uncertainty. However, it should also be noted that observed disagreement among forecasters may underestimate actual disagreement. Supporting the forecast smoothing hypothesis, Gallimore and McAllister (2005) found that professional real estate forecasters in the UK often engage in "self-censorship" or are "censored" when models generate contentious or conspicuous forecasts. This distrust of "big numbers" may be a rational bias, given the range of uncertainties about the inputs and the models; in addition to the reputational risks.

In explaining forecast disagreement, Williams (2003) draws upon theories of rational heterogeneity of beliefs which assume that agents have at their disposal a range of forecasting models, but are uncertain as to which model or models to use. Consequently, they adaptively update their model choice or priors over the various models based on forecasting performance. In essence, it is argued that idiosyncratic differences in agents' characteristics, (e.g. different initial conditions in model priors and costs to learning new models) implies that a range of models will be in use at any point in time. Linden (2003, 5) expresses the point,

arguing that "forecasters have both different types and different amounts of information to form their beliefs".

Subjectivity is intrinsic to real estate forecast formation and will generate disagreement among real estate forecasters. It has been recognised that differences in real estate forecasts occur due to differences in the structure of the econometric models, statistical procedures and data used (Mitchell and McNamara, 1997). In the UK, Gallimore and McAllister (2005) argue that judgement is pervasive in the forecast formation process occurring in (econometric) model formation, due to variations in choice of causal variables, data selection and treatment, and constant and parameter specification. Additionally, in a survey of professional forecasters, they found that the output of mechanical models is rarely the final forecast. Pure model output is usually amended, as it is mediated and contested within organisations and forecasters themselves (who, as noted above, often have incentives to avoid conspicuous forecasts). Similarly, in the US, Guilkey (1999) investigated the practice of US real estate market forecasters in terms of their parameters, methodology and output, and identified significant differences in the variables used, model specifications and the exogenous variables which are obtained from macro-economic forecast providers. He found disagreement amongst forecasters, concluding that real estate forecasters "get to their conclusions using very different methodologies and obtain very different MSA rankings" (Guilkey, 1999, 40).

There is also a body of work that tests for consensus in forecasts. The standard definition of 'consensus' is "an agreement of opinion". Where a statistical measure of consensus is being sought, measures of central tendency are typical. However, a more sophisticated deconstruction of consensus can be identified in the literature. Byrne and Lee (1999) argue that central tendency statistics do not robustly reflect the presence or absence of agreement. Following Schnader and Stekler (1979), they suggest that a consensus is present when forecasts are relatively close to each other and that no consensus exists if there is wide disagreement among the forecasts in a given cross-section. Analysis of the distributional properties of forecasts is necessary to enable an assessment as to whether a consensus exists. Byrne and Lee (1999) adapt a sequential test from Schnader and Stekler (1991) which puts a check for normality as the key test for consensus. However, even if normality is not present, it is argued that the lack of a consensus requires skewness (indicating a significant minority dissenting opinion). If skewness is not present, then significant platykurtosis must be present (if a distribution is leptokurtic, then there is even more clustering around the mean than when the distribution is normal).

Previous analyses suggest that forecast disagreement may contain useful signals and information about market performance. Examining hypotheses generated by price-optimism models, Diether *et al* (2002) find that the bigger the disagreement in analysts' forecasts of a stock's returns, the lower its future returns. Their central hypothesis is that optimistic buyers bias prices positively and cause future underperformance. Focussing on inflation forecasts, Mankiw *et al* (2003) identified under-reaction to information when forming expectations about inflation. They find that forecast disagreement rises with inflation and when inflation changes sharply. They suggest that disagreement about future inflation moves together with other macro-economic variables raising "the possibility that disagreement may be a key to macro-economic dynamics". Bomberger (1996) finds that forecast disagreement can act as a proxy for forecast uncertainty, so that there is a positive relationship between the forecast errors and forecast disagreement at the time of the forecasts. Looking at individual forecasters, Cooper *et al* (1999) distinguished between lead or dominant forecasters and follower forecasters. They argued that it was rational for less informed forecasters to delay publication of forecasts. Linden (2003) investigates patterns of asymmetries in forecast disagreement and their relationship with future performance. In essence, it is argued that significant skewness in distributions of forecasts can signal upside and downside risk, depending on market conditions.

In summary, this paper is concerned with assessing the nature and extent of the *ex ante* phenomenon of disagreement in real estate forecasts and assessing *ex post* the accuracy of consensus forecasts and the individual forecasts that comprise the consensus (if it is formally present). There is ample evidence from the capital markets and macro-economic forecasts to argue that disagreement and error are intrinsic to forecasting. Overall, the more interesting questions relate to the quantity and pattern of disagreement and error in real estate forecasts and the signals in and consequences of these aspects of forecast uncertainty.

DATA AND METHODOLOGY

Real estate forecasts for the UK over 1999-2004 were obtained from the Investment Property Forum (IPF) *Survey of Independent Forecasts: UK Property Investment* (IPF, 2004), as well as individual forecasters' values confidentially provided by the IPF. The IPF is a major real estate industry group in the UK and represents the interests of those involved in commercial real estate investment. With over 1400 members, including investment surveyors, fund managers, academics, bankers, lawyers, actuaries and related professionals, the IPF's objective is to enhance the knowledge, understanding and efficiency of real estate as an

investment by undertaking research and special projects, providing education for members, and encouraging discussion and debate amongst those concerned with real estate investment in the UK (see www.ipf.org.uk).

The IPF real estate forecast surveys have been conducted since November 1998 and have been conducted quarterly (February, May, August and November) since 1999[iii]. These IPF expert-opinion forecasting surveys collect information on future rental growth, capital growth and total returns from a range of UK real estate forecasters, including real estate advisors, fund managers and equity brokers. These rental growth, capital growth and total return forecasts are presented at the "total" UK property level, with office, retail and industrial property sub-sector forecast results not available.

Typically, 18-31 real estate forecasters participate in this quarterly survey, with an average of 24 participants per IPF real estate forecasting survey over 1998-2004. Details of the November 2004 IPF real estate forecasts survey, including participants, are shown in Exhibit 1. The participants involved further reinforces the breadth of the UK real estate forecasting community that respond to this IPF survey. Building upon Newell *et al* (2003), this study analyses the individual forecasts that create the consensus forecasts.

Inevitably, the analysis of individual forecaster consistency is hindered by organisational and personnel changes over the study period. Over 1998-2004, the IPF survey has seen new contributing organisations emerge, previous contributors leave (and sometimes re-emerge) and existing contributors merge with other existing contributors. This means that for a total of 46 contributors, there are only 10 who contributed for the full six years. There have also been changes in personnel within the various forecasting teams over this time period.

EXHIBIT 1: IPF SURVEY OF INDEPENDENT FORECASTS : RESPONDENT PROFILE : NOVEMBER 2004

Period of surveys: 1998-2004

Frequency of survey : quarterly (typically February, May, August, November)

Property parameters surveyed: rental growth, capital growth, total returns

Number of participants[iv]: 27

- property advisors: 12
- fund managers: 11
- equity brokers: 4

Participants:

- *Property advisors:* ATIS REAL Weatheralls, CB Richard Ellis, Cluttons, Colliers CRE, CVA Grimley, Cushman & Wakefield Healey & Baker, Knight Frank, Real Estate Forecasting, PMA, Experian Business Strategies, IPD, King Sturge
- *Funds managers:* Arlington Property Investors, Deutsche Asset Management, Henderson Global Investors, LaSalle Investment Management, Legal and General Investment Management, Prudential Property Investment Managers, Standard Life Investments, Cordea Savills, ING Real Estate Investment Management, Invesco, Scottish Widows Investment
- *Equity brokers*: Merrill Lynch, UBS, Morgan Stanley

Previous US real estate forecasting studies (e.g. Guilkey, 1999) have indicated that this type of real estate forecasting data is not readily available for the US. Similarly, some US survey-based real estate forecasts (eg: IRRs, cap rates, yields) are available from the Korpacz Real Estate Investment Survey (see www.pwcreval.com) and the Real Estate Research Corporation (see www.rerc.com). Grissom and DeLisle (1998) provide details of the Korpacz and Real Estate Corporation forecasting surveys. However, neither of these US forecasting surveys provide the necessary depth nor time series structure of forecasts comparable to the UK IPF real estate forecasting surveys. As such, no equivalent consensus expert-opinion real estate forecast surveys are available in the other mature real estate markets, such as the US or Australia. Hence this IPF survey represents a unique real estate forecasting service and expert-opinion real estate forecasting database.

In each IPF survey, participants are asked to forecast real estate performance (rental growth, capital growth and total returns) to the end of the current year, as well as forecast these real estate performance measures to the end of the year for the next two years. The 'target' is the IPD All Property Index. This sees real estate forecasts presented for up to thirty months ahead. With these IPF surveys conducted quarterly, this sees subsequent real estate forecasts presented for forecast lead times of 30M, 27M, 24M, …, 6M, 3M, 0M; thus allowing the assessment of the accuracy of real estate forecasting as the time difference between the real estate forecast and the actual real estate performance reduces on a quarterly basis from thirty months to zero months.

The IPF UK real estate forecasts were then compared with the respective Investment Property Databank (IPD) actual UK annual real estate returns (IPD, 2005a). The IPD real estate indices represent the commercial real estate performance benchmarks for the UK. The IPD annual database is the most reliable benchmark of direct real estate performance in the UK. It comprises approximately 11,000 properties with a total value of over £121 billion at

December 2004 (see Exhibit 2: Panel A), equivalent to 45% of the total real estate assets of UK investing institutions and listed real estate companies. Full details of the IPD UK real estate indices are available from www.ipdindex.co.uk.

EXHIBIT 2: IPD UK PROPERTY INDEX PORTFOLIOS: DECEMBER 2004

Panel A: Annual index

Property portfolio component	Number of properties	Value of portfolio	Percentage of portfolio value
Office	2,947	£33.3 billion	27.6%
Retail	4,359	£64.4 billion	53.3%
Industrial	2,966	£19.3 billion	16.0%
Other	714	£3.8 billion	3.1%
Total	10,986	£120.8 billion	100.0%

Panel B: Monthly index

Property portfolio component	Number of properties	Value of portfolio	Percentage of portfolio value
Office	736	£6.3 billion	23.6%
Retail	1,465	£15.5 billion	58.1%
Industrial	756	£4.4 billion	16.5%
Other	143	£0.5 billion	1.8%
Total	3,100	£26.7 billion	100.0%

Source: IPD (2005a, b)

An interesting feature of the forecasting problem is that the forecasters are forecasting rental and capital growth and total return at a given number of points during that year. As the year progresses, it would be expected that forecasting accuracy increases as the target end-of-year date becomes closer. Additionally, real estate forecasters for the IPD Annual Index are informed by the IPD Monthly Index[v] (IPD, 2005b). Although drawing from a different sample of properties (see Exhibit 2: panel B), this monthly index provides a monthly update on performance as the year progresses. For example, the IPF August survey forecast is a forecast for the next five months, with the forecaster able to draw upon the recorded IPD monthly returns to June/July. In effect, the forecasters are receiving regular signals about actual market returns that should enable them to update their real estate forecasts. These

implied forecasts also provide us with some insights about the efficiency of real estate forecasters in reacting to new information.

Legal and General Investment Management have also kindly provided us with forecasts for a range of capital market and macro-economic variables for a range of investment organisations. Full details of the organisations and the variables are provided below.

- ABN Amro
- Barclays
- Chase
- Citigroup Smith Barney
- CSFB
- Deutsche Bank
- Dresdner Kleinwort Wasserstein
- Goldman Sachs
- HSBC Securities
- JP Morgan
- L&G Inv Mgt
- Merrill Lynch
- Morgan Stanley Dean Witter
- Schroder SSB
- UBS Warburg

Similar to the IPF survey, these data typically consist of forecasts (which are usually updated quarterly) for a range of variables at calendar year end. The variables discussed here are GDP growth and CPI change in calendar year; dividend and earnings growth in calendar year and the percentage change in the FTSE index. In terms of timing, the key difference from the real estate forecasts is that the projections are produced on a more typical quarterly basis.

RESULTS

Overall, the project has a large number of individual forecasts for an array of non-real estate variables for the last six years. This presents a large number of options for analysing the data. In this paper we focus on a small number of aspects. However, a crucial issue to bear in mind when considering the observed patterns is that the macro-economic forecasts may form inputs in both the real estate and capital market forecasting models. For instance, common macro-economic assumptions may be independent variables in both the dividend/earnings growth forecasting models and the rental growth forecasting models.

Forecast Disagreement

In Exhibits 3 and 4, we present a summary of the one-year ahead forecasts for change (%) in real estate rental and capital growth and total returns and non-real estate variables[vi]. In each case, it is only based on the first forecast in the end-of-year returns; consideration of subsequent quarterly updated forecasts (at May, August and November) are not assessed in this section.

Forecast disagreement is indicated by the range between the maximum and minimum forecasts and the standard deviation of forecasts. Similarities are a prevailing theme. The median and the mean forecast tend to be similar, providing a preliminary indication of normality in the distribution of forecasts. The range between maximum and minimum for forecasts tend to remain relatively constant over the period. Additionally, the standard deviation of forecasts remains relatively stable from year to year. This suggests that the level of disagreement among forecasters is relatively stable for one year-ahead forecasts. Although the ranges appear large, it is apparent that around three quarters of the forecasts for total return are typically within 1.5% of the mean.

Further, the evidence of a consensus among real estate forecasters is strong. In all but one case, the annual distribution of the forecasts is normal for all forecasts. The only clear-cut exception is the rental growth forecast for 2002, when the distribution is significantly non-normal and there is significant negative skewness in the forecast for rental growth. This may reflect negative sentiment following the perceived increase in downside risks following 9/11 in 2001. Likewise, the forecasts for 1999 display similar characteristics. The rejection of non-normality is marginal and there is significant negative skewness. Again, this may reflect increased negative sentiment following the perceived growth in downside risks following the financial market turmoil in the second half of 1998 associated with the Russian debt crisis and the collapse of Long Term Capital Management. However, these factors only feature in rental growth forecasts and strong evidence of consensus remains about total returns and capital growth in both 1999 and 2002.

We find similar remarkably similar patterns for non-real estate forecasters. In Exhibit 4 we present the descriptive statistics for projections of dividend and earnings annual growth and FTSE annual change. Whilst the sample size may indicate small sample problems, at first sight it is clear that there is strong evidence of consensus amongst non-real estate forecasters. For both earnings (2003) and dividend growth (2000), there is only one year when the distribution of forecasts is non-normal. These similarities generate two possibilities. Firstly it may suggest that the tendency of forecasters to herd is not purely a real estate phenomenon

EXHIBIT 3: DESCRIPTIVE STATISTICS FOR IPF FORECASTS: 1999 - 2004

RENTAL GROWTH FORECAST (% p.a.)

	1999	2000	2001	2002	2003	2004
Mean	3.26	4.86	4.65	0.18	-0.88	-0.27
Median	4.00	5.00	4.65	0.55	-0.70	-0.10
Maximum	7.10	7.50	7.10	2.10	1.40	1.00
Minimum	-2.00	2.00	2.70	-4.00	-3.00	-2.00
Range	9.10	4.50	4.40	6.10	4.40	3.00
Std. Dev.	2.32	1.31	1.34	1.36	1.25	0.86
Skewness	**-0.99**	-0.18	0.12	**-1.40**	-0.10	-0.31
Kurtosis	3.35	2.44	1.83	**4.94**	2.49	2.47
Jarque-Bera	4.39	0.58	1.48	**11.59**	0.21	0.70
Probability	0.11	0.75	0.48	**0.00**	0.90	0.70
Observations	26	31	25	24	17	25

CAPITAL GROWTH FORECAST (% p.a.)

	1999	2000	2001	2002	2003	2004
Mean	2.21	5.68	3.19	0.40	-0.78	1.04
Median	2.50	5.70	3.00	0.30	0.00	1.00
Maximum	7.00	10.00	6.60	2.70	1.80	4.00
Minimum	-4.00	3.00	1.00	-3.00	-3.20	-2.00
Range	11.00	7.00	5.60	5.70	5.00	6.00
Std. Dev.	2.56	1.62	1.22	1.38	1.46	1.37
Skewness	-0.59	0.35	0.55	-0.63	-0.44	0.01
Kurtosis	3.04	3.06	3.92	3.22	2.13	2.73
Jarque-Bera	1.53	0.65	2.16	1.63	1.20	0.07
Probability	0.47	0.72	0.34	0.44	0.55	0.96
Observations	26	31	25	24	19	25

TOTAL RETURN FORECAST (% p.a.)

	1999	2000	2001	2002	2003	2004
Mean	9.40	12.78	10.38	7.31	6.07	7.97
Median	10.00	13.00	10.00	7.40	6.25	8.00
Maximum	15.00	17.00	14.90	9.20	8.30	10.10
Minimum	3.00	10.00	6.00	5.00	3.00	5.00
Range	12.00	7.00	8.90	4.20	5.30	5.10
Std. Dev.	2.62	1.61	1.91	1.22	1.45	1.26
Skewness	-0.46	0.45	0.32	-0.14	-0.54	-0.43
Kurtosis	3.29	3.30	3.65	2.33	2.42	2.67
Jarque-Bera	1.00	1.14	0.87	0.55	1.12	0.89
Probability	0.61	0.57	0.65	0.76	0.57	0.64
Observations	26	31	25	25	18	25

EXHIBIT 4: DESCRIPTIVE STATISTICS FOR LGIM FORECASTS: 1999 - 2004

DIVIDEND GROWTH FORECASTS (% p.a.)

	1999	2000	2001	2002	2003	2004
Mean	5.33	7.05	6.42	4.36	2.64	6.12
Median	5.00	7.00	7.00	4.00	2.65	6.00
Maximum	8.00	14.00	8.00	8.00	6.00	10.00
Minimum	4.00	4.00	4.00	-2.00	0.00	4.00
Std. Dev.	1.50	2.71	1.24	2.73	1.54	1.92
Skewness	0.93	1.52	-0.55	-0.86	0.59	0.76
Kurtosis	2.40	5.09	2.32	3.92	3.89	2.86
Jarque-Bera	1.91	**6.22**	0.83	1.75	0.92	0.88
Probability	0.38	**0.04**	0.66	0.42	0.63	0.64
Observations	12	11	12	11	10	9

FTSE CHANGE FORECASTS (% p.a.)

	1999	2000	2001	2002	2003	2004
Mean	n/a	n/a	12.95	11.56	19.67	5.63
Median	n/a	n/a	13.29	11.18	15.48	5.00
Maximum	n/a	n/a	22.13	18.84	39.59	11.71
Minimum	n/a	n/a	6.06	3.51	6.60	0.54
Std. Dev.	n/a	n/a	5.04	5.15	12.38	4.58
Skewness	n/a	n/a	0.04	-0.01	0.70	0.15
Kurtosis	n/a	n/a	2.12	1.90	2.04	1.59
Jarque-Bera	n/a	n/a	0.39	0.56	1.21	0.78
Probability	n/a	n/a	0.82	0.76	0.55	0.68
Observations	n/a	n/a	12	11	10	9

EARNINGS GROWTH (% p.a.)

	1999	2000	2001	2002	2003	2004
Mean	5.18	9.64	7.73	2.39	10.79	8.39
Median	5.00	9.00	8.16	3.00	9.50	8.00
Maximum	8.50	15.00	12.00	8.40	23.00	13.00
Minimum	1.70	5.00	1.20	-7.00	6.00	5.00
Std. Dev.	2.15	2.84	3.03	4.75	4.93	2.69
Skewness	-0.18	0.36	-0.60	-0.56	1.60	0.76
Kurtosis	1.96	2.56	2.81	2.44	4.83	2.43
Jarque-Bera	0.61	0.32	0.73	0.71	**5.68**	0.99
Probability	0.74	0.85	0.69	0.70	**0.06**	0.61
Observations	12	11	12	11	10	9

but is typical of wider economic forecasting sector. Alternatively since real estate forecasters typically use macro-economic forecasts, they may be maintaining their consensus attributes in real estate forecasts.

Comparative Forecast Accuracy

As discussed above, there are many dimensions to evaluating forecast accuracy. The topic of the measurement of forecast accuracy has itself generated substantial debate (see Fildes and Stekler, 1999 for a detailed review). In this paper we apply a range of common error metric measures – mean error and mean absolute errors to the data. We also provide some qualitative analysis of the timing ability of forecasters. However, the debate on forecast evaluation has highlighted that error metric measures do not control for a number of issues to ensure that fair comparisons are being made. Scale may be significant. Variables measured in large units (e.g. capital growth) will almost inevitably have large differences in terms of error metrics compared to more stable variables (e.g. GDP change). The volatility of the variable will affect the 'degree of difficulty' of forecasting. Variables which tend to display high levels of serial correlation (e.g. CPI change, rental growth) will tend to be easier to forecast than variables that move in a random pattern (e.g. stock prices and bond yields). Typically, differences in variability are controlled for by incorporating information on the observed change in the predicted variable.

We also compare the performance of forecasters against a naïve time series model (same change as last year). Theil's U-statistic is used. The naïve forecasting methods used in calculating Theil's U-statistic in this study were the **"same change"** forecasting strategy, in which the previous actual annual return is used as the real estate forecast for the subsequent annual period. In particular, in interpreting Theil's U-statistic:

- U=1 indicates the naïve forecasting method is **as good as** the forecasting technique being evaluated

- U<1 indicates the forecasting technique being evaluated is **better** than the naïve forecasting method

- U>1 indicates the forecasting technique being evaluated is **worse** than the naïve forecasting method.

Firstly, we focus on the simple differences between forecasts and actual outcomes. Focusing initially at a basic level, Exhibit 5 presents the results of the actual change in FTSE with the consensus predicted change in FTSE for the period 2001-2004.

Exhibit 5

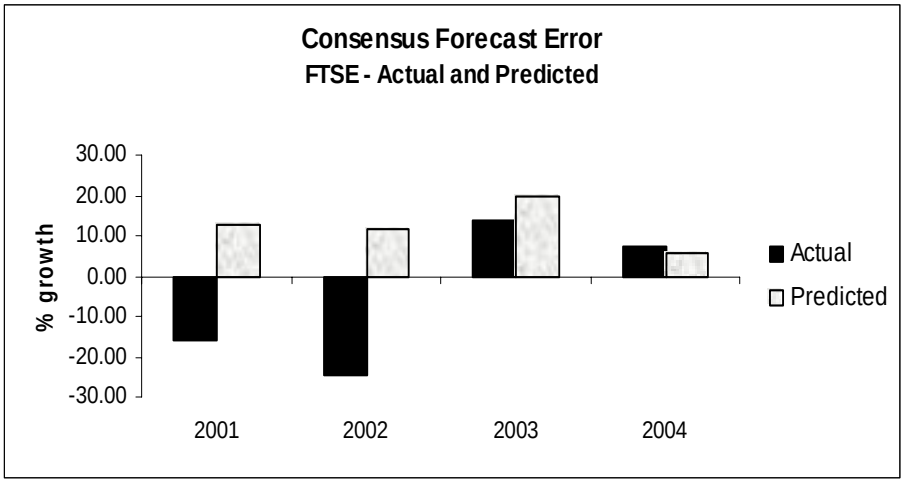
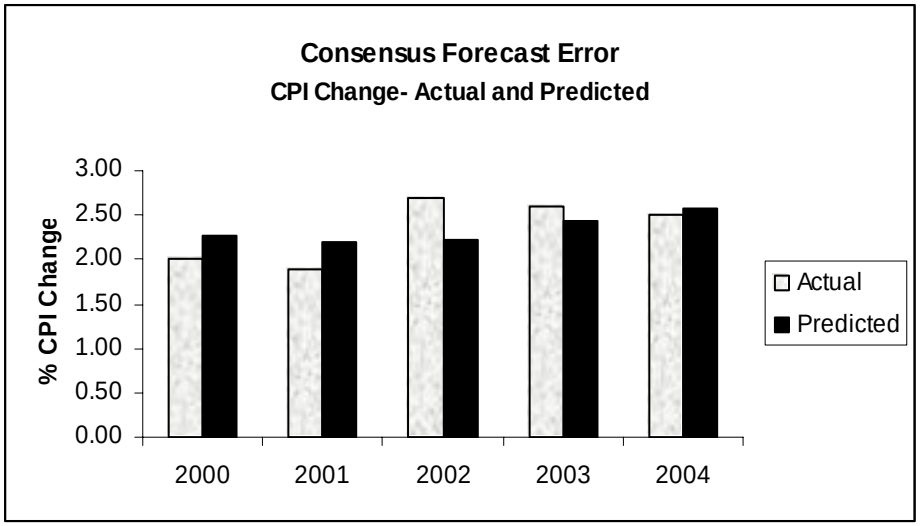


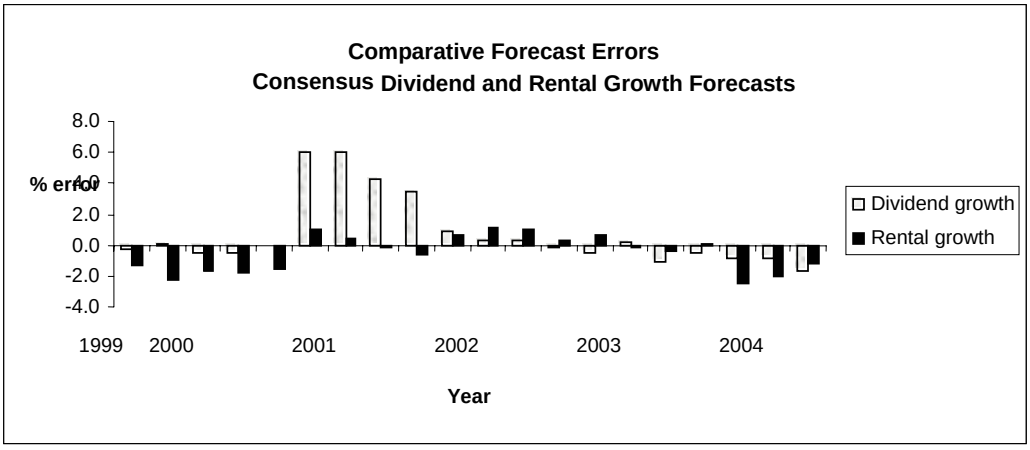
Exhibit 6



At first sight, the results (admittedly from only four observations) suggest that the performance of equity market forecasters is poor. In 2001 and 2002, the consensus forecasts had large absolute errors and failed to forecast the correct direction of the market. Indeed, it reinforces the apparent herding effect. No individual forecaster predicted a fall in the index in 2001 and 2002. Alternatively, equity markets may be extremely difficult to forecast and we need to control for both the variability and randomness of the return patterns. This point is clear when we look at Exhibit 6. Without allowing for differences in scale in the Y axis, we see straightaway that the forecasting record for CPI is much better. Perhaps a fairer comparison is between the consensus predictions for the income components of total return.

Exhibit 6 displays the simple mean error for quarterly[1] forecasts for end-of-calendar year growth in rental values and dividends. Although 2001 stands out as a period when equity market analysts persistently overestimated dividend growth, the similarities in both series are striking. If we exclude this year, the mean quarterly error is for dividend growth is (0.4%) and for rental growth it is (0.2%). Much more striking is the serial correlation in the errors (dividend growth: 0.73, rental growth: 0.62). This suggests that both groups of forecasters display notable sluggish in adjusting their forecasts.

Exhibit 7



Our final comparative analysis is Theil *U*-statistic. As noted above, this is a common approach to standardise different types of forecasts for evaluation. The results are displayed

[1] N.B Dates of the quarterly real estate and non real estate forecasts are different.

in Exhibit 8. We calculate the Theil U- statistic for each individual forecaster and then provide the average for each individual year.

Exhibit 9

Mean Theil U-statistic

	2000	2001	2002	2003	2004
Rental Growth	1.68	0.40	0.35	1.64	0.66
Capital Growth	0.58	0.89	0.84	3.61	1.38
Total Return	0.56	0.99	0.79	3.86	1.40
CPI Change	1.09	1.08	1.45	0.93	0.59
GDP Growth	0.21	0.43	0.37	0.50	0.25
Dividend growth	1.20	4.30	1.47	0.84	1.20
Earnings Growth	1.19	1.63	2.28	0.46	3.00
Base rates	0.68	3.46	1.30	0.50	0.67
FTSE growth		4.84	6.18	1.76	0.65

It is apparent that not only are there large differences between the variables but there are also large differences among the annual figures. It is significant that it is only for GDP that there is clear-cut evidence that forecasters outperform the naïve forecast. From this preliminary analysis, it is difficult to make a convincing case that forecasters add value. We now go on to examine whether any individual real estate forecasters stand out from the group.

Real Estate Forecasters v Real Estate Forecasters

In this section we compare the forecasting performance of individual real estate forecasters with each other. To assess the performance of individual forecasters, individual absolute differences for total returns were assessed for one year ahead forecasts for each year over 1999-2004. Overall, 18-31 real estate forecasters participated each year, representing organisations in the areas of real estate advisors (7-10 per year), fund managers (8-13 per year) and equity brokers (3-8 per year). While 46 organisations participated over this six year period, only 10 organisations provided forecasts each year.

Amongst the three groups of forecasters over 1999-2004, real estate advisors were seen to be the most accurate group of forecasters, followed by fund managers and equity brokers. This was the same order based on

i. all organisations per year,
ii. organisations participating in at least four of six years and
iii. organisations participating in all six years.

However, there were instances over this six year period where each of these groups was the best performed group, but also the worst performed groups; namely:

- best performed: real estate advisors (2/6),fund managers (3/6), equity brokers (1/6)
- worst performed: real estate advisors (3/6),fund managers (1/6),equity brokers (2/6);

This further reinforces the point that no single group of real estate forecasters outperforms the other two groups on a consistent basis.

In assessing the individual forecasting organisations, the objective was to assess whether some organisations were consistently amongst the top performers in forecasting ability. As such, within each year, the real estate forecasters were ranked and then assigned to quartiles. Exhibit 5 gives the details for those forecasters who participated in at least four of the last six years.

A number of points emerge from this individual forecaster analysis. Overall, these individual forecaster results confirm the lack of consistent performance by individual real estate forecasters over the period of 1999-2004. There is little indication to support the view that any individual forecaster is able to 'win' on a consistent basis. No forecaster was in the top quartile in all six years. The best was for two out of the six years. For those forecasters participating in at least four of the six years, the best performance in the top quartile was 75% of years (see PA9), with only three forecasters in the top quartile in at least 50% of the years (see PA1, PA9, FM9). Significantly, the best performers were also often amongst the worst performers in other years, being in the bottom quartile for up to 50% of the years (see FM9, EB1).

There is some preliminary evidence that some forecasters may 'lose' with some consistency. Some forecasters were in the bottom quartile in 50% of the years (see FM10, EB1, EB3), with 7 of the 22 forecasters being in the bottom quartile on at least 33% of occasions. We

need to examine whether this represents a statistically significant underperformance. In specific years, the "best" individual forecaster was a real estate advisor(4 of the 6 years), fund manager(1/6) and equity broker(1/6). However, the "best" individual forecasters were generally unable to repeat the performance in other years; for example, most successful were two of the "1sts" also getting "3rd best" in one subsequent year. Only six forecasters managed to get in the "top 3" in two years; no forecasters were able to do this in more than two of the six years. Over the full six years, three of the "best" individual forecasters were real estate advisors(#1, #3, #4);the other being a fund manager(#2);the best by an equity broker was #6.

Exhibit 5: Individual real estate forecaster quartile performance

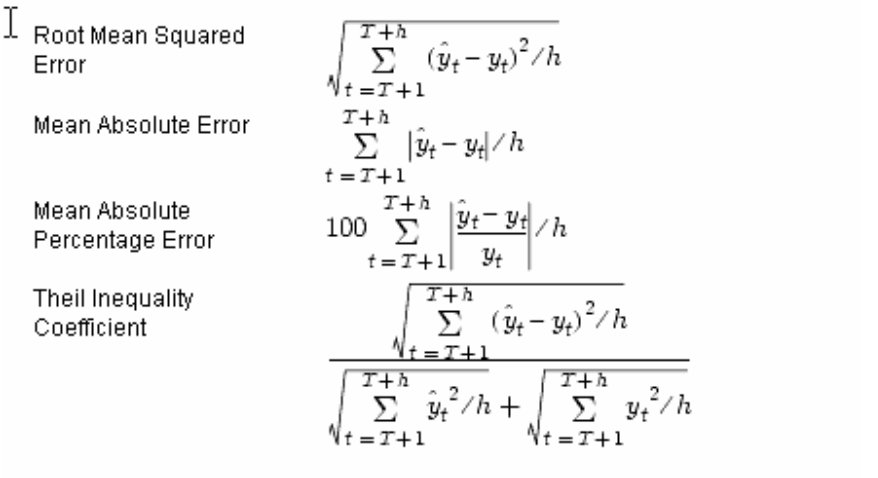
Property Forecaster	1999	2000	2001	2002	2003	2004	1999-2004
PA1	1	2	*	1	1	2	1
PA2	3	2	3	1	*	*	1
PA3	1	3	1	2	3	3	2
PA4	1	4	3	3	1	2	3
PA5	1	2	2	4	2	4	3
PA6	3	2	2	1	*	4	2
PA7	*	1	4	1	2	3	3
PA8	*	4	1	3	1	2	2
PA9	*	*	1	2	1	1	1
FM1	3	2	3	3	1	2	4
FM2	3	3	4	3	*	1	3
FM3	4	2	3	2	1	4	4
FM4	3	4	3	2	1	3	3
FM5	2	2	4	3	2	1	2
FM6	1	3	2	3	*	*	1
FM7	4	1	1	2	2	4	3
FM8	3	2	1	2	3	2	2
FM9	*	1	1	4	4	1	1
FM10	*	3	4	4	*	1	4
EB1	4	4	2	1	4	1	4
EB2	*	1	2	4	3	2	1
EB3	*	2	4	3	*	4	4

Note:
(1): 1=1st quartile, 2=2nd quartile, 3=3rd quartile, 4=4th quartile
(2): * =did not participate in specific year
(3): quartile performance for 1999-2004 is based on average absolute difference over respective years in which forecaster participated
(4): quartile performance for 1999-2004 is assessed on those forecasters participating in at least four of the six years

Real Estate Sub-groups - Ranking Performance

In this section we present the results of ranking the three groups of forecasters namely, property advisors, fund managers and equity brokers, together with a combined group. The rankings are in respect of consensus forecasts, being the average for each group fover the five year period 1999-2004 inclusive. The performance statistics are calculated for forecasts made over the longest period for each of the years 1999-2004.

The forecast error measures reported are:



Rental growth: Rankings based on average over the period 1999-2004

Forecaster	RMSE	MAE	MAPE	Theil's Inequality
PA	2	2	4	2
FM	3	3	3	3
EB	4	4	2	4
ALL	1	1	1	1

The ranking show that the combined group comprising of all forecasters produces, on average, the lowest forecast errors. This is a well documented result. For rental growth, property advisors appear to have produced the lowest forecast errors, followed by fund managers and lastly equity brokers.

Capital Growth: Rankings based on average over the period 1999-2004

Forecaster	RMSE	MAE	MAPE	Theil's Inequality
PA	2	4	4	3*
FM	4	3	3	3*
EB	3	2	2	2
ALL	1	1	1	1

* = same ranking

Once gain, the composite of all forecasts results in the lowest forecast errors. Over the period, there were variations for in ranking for individual years. Depending on the selected measure any of the groups would rank highest. The overall picture appears to be that equity brokers are ranked the highest followed by fund mangers. These rankings suggest that the forecasting skills for rental growth displayed by property advisors, as a group, do not necessarily carry over into capital growth forecasts where equity brokers may have had the edge.

Total Return: Rankings based on average over the period 1999-2004

Forecaster	RMSE	MAE	MAPE	Theil's Inequality
PA	3*	4	4	2*
FM	3*	3	3	2*
EB	2	2	2	2*
ALL	1	1	1	1

* = same ranking

Once gain, the combined group results in the highest ranking. The ranking pattern for total returns is repeated with equity brokers, as a group, being the most highly ranked. This suggest some consistency in the forecasts in that accurate capital growth forecasts carry over into total returns.

The results represent consensus forecasts and ongoing analysis is looking at the ranking of individual forecasters within these groups for individual years.

Testing for bias in the consensus forecasts

We examined whether the consensus forecasts were *unbiased forecasts*. On average, an unbiased forecast would fall very close to the actual outcome. A simple linear regression often used to test for bias in the forecast series is estimated for each category of forecaster. The word 'bias' is used in a statistical sense where there may

be a tendency to *consistently* under or over-estimate a value, such as, for example rental growth. The regression equation takes the form:

$$A_t = \beta_0 + \beta_1 F_t + \varepsilon_t$$

Where, At is actual value and Ft is the forecast value in some previous period. Unless $\beta_0 = 0 and \beta_1 = 1$, the value of At predicted by the equation will differ from the forecast value Ft. A choice needs to be made about the appropriate number of observations to use in the regression. Too few observations will reduce the number of degrees of freedom whereas too large a sample is likely to include older observations that may reflect biases that are different from more recent experience. As previously mentioned, the sample size we work

Consistency tests: B_0=0 and B_1=1

		Rental Growth	Capital Growth	Total Return
1999	**PA**	No	Yes*/No	Yes*/No
	FM	No	No	Yes*/No
	EB	No	No	No
	ALL	Yes*/No	No	No
2000	**PA**	No	No	Yes*/No
	FM	No	No	No
	EB	No	No	Yes
	ALL	No	Yes*/No	Yes*/No
2001	**PA**	Yes	Yes	Yes
	FM	Yes	Yes	Yes
	EB	No	Yes	Yes
	ALL	Yes*/No	Yes	Yes
2002	**PA**	Yes	Yes	Yes*/No
	FM	No	Yes	Yes*/No
	EB	No	No	Yes
	ALL	No	Yes	Yes
2003	**PA**	Yes	No	No
	FM	Yes	No	No
	EB	Yes	No	No
	ALL	Yes	No	No
2004	**PA**	No	No	No
	FM	No	No	No
	EB	No	No	No
	ALL	No	No	No

Note: * Passes F-test but not Chi-squared

with here are the run of forecasts for IPD end-of-year values., which range from sample sizes of 4 forecast observations to 12 forecast observations for each end year 1999 to 2004. The following tables summarize the results for a joint test of the null $\beta_0 = 0 and \beta_1 = 1.$

The results are mixed. For example, most of the forecasts for 2001 were largely unbiased. Rental forecasts for 2003 were unbiased whereas capital growth and total returns forecasts were not. All of the forecasts for 2004 were biased. Clearly, there are times when property forecasters are able to efficiently take information on board and reflect this in forecasts and on other occasions this is not the case. This requires further investigation in order to understand under what conditions property forecasters are able to provide unbiased forecasts.

Conclusion

The results presented in this paper represent initial work in looking at the forecast history of the UK real estate market based on the IPF data. The data set is relatively short, especially when compared with the long histories of forecasts in macro–economic variables. The number of contributors to the IPF survey is a small unbalanced panel. However, not-with-standing the relative limitations of the data set, it possible to obtain insights into the track record of the forecasts.

At the consensus level no one group of forecasters produces the most accurate forecasts across all three forecast property categories. Furthermore, there is some evidence that forecasts are biased in different periods.

Ongoing work is addressing the following questions: the internal consistency of forecasts across the three forecast categories, that is, are total return forecasts consistent with the rental and capital growth forecasts?; are forecast revisions consistent with macro-economic data and *revisions* in forecasts of macro-economic variables such as GDP, employment and interest rates. For individual forecasters a panel-based approach will analyse changes on an individual level, that is, why do the forecasts behave differently?

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[i] Evidence from UK real estate forecasters suggests that they would regard such a measure as a crude indicator of forecast success. Gallimore and McAllister (2005) find that most real estate forecasters regarded identifying the relative rather than absolute performance as the best indicator of success. Reflecting the preferences of many UK real estate forecasters, Granger and Pesaran (1999, 538) advocate a decision theoretical approach to forecast evaluation where there is a "consideration of the linkage between the modeler who produces forecasts and the decision maker who consumes them" in order to compare the relative usefulness of forecasts.

[ii] As a result there is growing interest in communicating results in terms of probability density functions.

[iii] No survey was conducted in February 1999.

[iv] Some survey respondents are unnamed for confidentiality reasons.

[v] There are typically minor differences in performance between the two indices. The monthly index consists of funds appraised on a monthly basis which are typically unitised funds. The lot size tends to be smaller in such funds so that certain sectors do not have as large weights e.g. shopping centres, London offices.

[vi] The 1999 forecast is based upon the November 1998 survey. The greater disagreement in this year may reflect the fact that the forecast is earlier.