The Production and Consumption of Commercial Real Estate Market Forecasts

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Executive Summary

Issues Addressed

Whilst the vast majority of the research on property market forecasting has concentrated on statistical methods of forecasting future rents, this report investigates the *process* of property market forecast production with particular reference to the level and effect of judgemental intervention in this process. Expectations of future investment performance at the levels of individual asset, sector, region, country and asset class are crucial to stock selection and tactical and strategic asset allocation decisions. Given their centrality to investment performance, we focus on the process by which forecasts of rents and yields are generated and expectations formed. A review of the wider literature on forecasting suggests that there are strong grounds to expect that forecast outcomes are not the result of purely mechanical calculations.

The literature suggests a number of stylized facts about the forecasting process and the role of judgement.

- Subjectivity is intrinsic to the interlinked activities of choosing variables, model selection and construction and data collection and treatment.

- Uncertainty is an integral feature of the forecasting process and forecast outputs.

- Organisational incentives and other agency effects can influence the outcomes of the forecasting process.

- The types and sources of forecasting failure are multi-dimensional and in many circumstances render forecast evaluation a more subtle procedure than a crude measure of errors.

Method

To investigate these issues, 19 semi-structured interviews were conducted with a cross-section of expert forecasters working in the UK market. The individuals within this sample frame represent a substantial sub-set of the property forecasting services available from UK-based organizations. The analysis and interpretation was supported by the use of textual analysis software, which facilitated the identification of key themes and their examination across the sample of interviewees.

Main Findings

- **Econometric techniques are the predominant approach** to rental forecasting with property forecasters dependent upon (typically) externally sourced forecasts of macro-economic variables in the modelling process.

- **Data issues are a recurring problem** for property forecasters. There are notable difficulties due to inconsistencies in definitions. The lack of common agreed standards regarding spatial boundaries, definitions of rental value, quality of (hypothetical) building and standards of supporting evidence results in additional uncertainty. These difficulties of obtaining consistent and reliable data are intensified in international markets. Unlike other assets, property forecasters are faced with uncertainties in establishing current levels (of rents and yields). Comparing property forecasting to a journey, not only are forecasters not sure about where they will arrive, they are also unsure about where they are starting from.

- **Models for forecasting property yields are regarded as much less reliable** relative to comparable models for rental forecasting. The underlying reasons are attributed to the closer causal relationships between yield movements and (unpredictable) capital market changes and the role of sentiment. As a result, judgment tends to play a greater role in yield forecasting.

- Whilst producers of forecasts recognise that **uncertainty is an unavoidable** companion of forecasts, the degree of uncertainty is rarely communicated to users in any formal or quantitative manner. This is mainly due to a lack of demand from users.

- **Forecasts need to be acceptable** to their users. Forecasters have incentives to avoid presenting contentious or conspicuous forecasts. There is clear evidence of these tendencies among a number of the forecasters in this study, with forecasts being adjusted to reduce this kind of risk. Where extreme forecasts are generated by a model, forecasters often engage in “self-censorship” or are “censored” following in-house consultation.

- **Forecast success and failure were generally defined in relative rather than absolute terms.** Forecasters placed importance on being correct about the performance rankings rather than getting the absolute numbers right. Echoing themes from the forecasting literature, forecast failure was attributed to shocks, structural breaks and input data problems.

1. Introduction

Property market forecasts are now integral to decision-making processes for many major property investors, supporting asset allocation, property fund strategy and stock selection. With better availability of data and technology, modelling has become increasingly sophisticated, with a range of procedures now commonly used in property forecasting. These may range through "pure" judgemental techniques to non-theoretical time series analysis and theory-driven econometric methods. The quality of property forecasts, however, reflects not just the quality of the forecasting model but also the quality of the producing organization's judgement interventions applied in the formation of the model and to its output. In this paper, we present a descriptive analysis of these processes and examine the ways in which judgement interventions impact on the process of property market forecast production and their consequent effects on forecast outcomes.

The academic literature on property and real estate market forecasting is now voluminous. We cite only a few examples below, drawing from Newell *et al* (2003). The last 15 years have seen rapid progress in the methodology of forecasting property rents, stock levels, returns, yields and cash flows (e.g., Benjamin *et al*, 1993; Brooks and Tsolacos, 2001; Chaplin, 1998, 1999, 2000; D'Arcy *et al*, 1999; Gardiner and Henneberry, 1988, 1991; Malizia, 1991; McClure, 1991; McGough and Tsolacos, 1995; Sivitanides, 1998; Wheaton and Torto, 1988). A great deal of research has been carried out on econometric and structural modelling of property markets (e.g., Chaplin, 1999; D'Arcy *et al*, 1999; Gardiner and Henneberry, 1988, 1991; Malizia, 1991; McClure, 1991; McGough and Tsolacos, 1995; Tsolacos, 1998; Tsolacos *et al*, 1998). In addition there has been limited work on comparison of property forecasting procedures (e.g., Brooks and Tsolacos, 2001; Chaplin, 1998, 2000; Wilson and Okunev, 2001; Wilson *et al*, 2000). Confirming many studies outside the property sector, simple forecasting procedures (e.g., via naïve predictors) have in many instances been found to be more accurate than complex econometric models (Chaplin, 1999, 2000; Wilson *et al*, 2000). Nonetheless, it is evident from the academic literature that the majority of forecasting methodologies continue to be based upon econometric modelling.

The remainder of this paper is organised as follows. In the immediately following section, we examine the nature of, rationale for, and some effects of the use of judgement in forecasting. This draws mainly upon previous research in the

forecasting literature but also includes a review of related research in property. The subsequent six sections outline the methodology and describe the results of an interview study of UK property forecasters which focuses on the role and consequences of the use of judgement in the forecasting process. Finally, we draw conclusions.

2. Judgement in forecasting

In broader forecasting research, the role of judgement in statistical procedures and pure judgemental forecasting itself have both been well-established research areas for two decades. From this, we can identify five broad areas in which judgement can be introduced to the forecasting process. These are:-

i. In quantitative model formation.
ii. In the evaluation and modification of quantitative model output by forecasters themselves.
iii. In the evaluation of and modification of "provisional" forecasts by experts and users.
iv. In the production of non-quantitative, pure judgemental forecasts.
v. In the implementation of forecasts by users.

As a result, it is recognised that forecasting cannot be a pure mechanical process rather

> "in practice, economic forecasts end up being a mixture of science based on econometric systems that embody consolidated economic knowledge and have been carefully evaluated – and art, namely judgements about perturbations from recent unexpected events (Hendry and Clements, 2003, 302).

In this paper the main focus is on judgement as applied in the production, and to the output, of econometric models. We do not discuss the use of "pure" judgemental forecasts, although they are widely used in the wider business community.

For econometric models, it is axiomatic that a purely objective forecast is unattainable. The "right hand side" variables are selected on the basis of a combination of theory and empirical research, with judgement unavoidable in the selection of variables to be included - the omitted variable problem is a common cause of model misspecification. In terms of the specification, "mathematical models involve smoothing constants, coefficients and other parameters that must be decided

by the forecaster" (Walonick, 2004, 2). The forecaster will also have to make decisions about forecast horizon, forecast interval, choice of computational model, as well as data selection and treatment.

In a discussion of forecast uncertainty, Linden (2003) emphasises the importance of data availability and physical and economic constraints on its collection. Essentially variations in data are inherent and forecasters will have different types and amounts of information with which to form their beliefs. Recent work by Mankiw and Reis (2002) places 'sticky information' due to the costs of collecting and processing data as being an important explanatory variable of forecast disagreement. The limited availability and capriciousness of much property market data means that data issues often require critical forecaster attention. These foregoing subjective choices, combining domain knowledge and statistical expertise, all work to influence the forecast output.

There are other limitations to pure mechanical forecasting processes that force further judgemental intervention on forecasters. For example, an underlying assumption of econometric forecasting is that past patterns will continue into the future - or, to paraphrase Guilkey's (1999) more vivid image: better econometric modelling only forecasts the past with greater precision. Although forecast failure may be attributable to factors such as inadequate theory and inaccurate observations, it may also arise due to structural breaks in the patterns under study. Clements and Hendry (1999) argue that such breaks are the underlying cause of much forecast failure, arising from political, economic and technological shocks causing shifts in the economic data that render previous models obsolete. This produces a situation where model specification can be irrelevant to performance, in that correctly specified models can be outperformed by poorly specified models. We discuss below how these points have important implications for forecast evaluation.

Problems can also arise where the explanatory variables include those that are themselves based on forecasts (Fildes and Stekler, 2002) For instance, previous "outsourced" forecasts of explanatory variables may in the past have displayed systematic errors e.g. were too pessimistic or optimistic. Turner (1990) illustrates that variations in the way in which forecasters decide to incorporate such knowledge (sometimes called "putting the model back on track") will produce variations in forecasts. Given the wide range of potential sources of error in "pure" model output it

is not surprising that the use of judgement subsequent to model application is generally regarded as a positive contribution to the forecasting process.

In addition, researchers are increasingly acknowledging that forecasters (far from uniquely) are social entities, with individual characteristics that interact with institutional, social, political and cultural contexts, in turn, influencing forecast outcomes (Gjaltema, 2001). An obvious example of the manifestation of this is the much cited bias of equity analysts in optimistic forecasting of the performance of companies which are clients. Another example is illustrated in the study conducted by Laster *et al* (1999). They found that macroeconomic forecasters, in selecting forecast outcomes, 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. Croushore (1997) 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."

Linked to the incentives for forecasters to herd and to maintain credibility, is a lack of volatility in forecasts relative to actual outcomes. Clements (1995, 419) investigated the role of judgement in creating excessive smoothness in forecasts and tentatively concludes that judgemental "adjustments tend to reduce the variation over time 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 measured the accuracy of property market forecasts in the UK, Newell *et al* (2003) found empirical evidence of forecast inertia. They 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 property forecasts are carried out.

There is a large literature on the interlinked concepts and causes of forecast uncertainty, accuracy, error and evaluation[1]. Hendry and Clements (2003) provide a useful distinction between measurable and un-measurable uncertainty. The former is mainly due to the intrinsic error term associated with econometric models. However, it can provide a misleading indicator of actual forecast uncertainty given the existence of largely unknowable uncertainty caused by unanticipated shifts and events. They argue that the latter is pervasive in economic change and, as noted above, explain a great deal of forecasting failure. This point also has significant implications for forecast (or model) evaluation. In essence, unanticipated events mean that model specification can be irrelevant to the performance of the forecast so that the value of rigorous model and/or forecast evaluation is limited.

> "Although some failures are due to bad models and some successes occur despite serious mis-specification, the observation of failure per se merely denotes that something has changed relative to the previous state, with no logically valid implications for the model of that state."

Alternatively, there is a view that forecasts should be evaluated according to the contribution that they make to decision-making. Granger and Pesaran (1999) advocate a decision theoretical approach 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.

The discussion above suggests that forecast evaluation is more complex than the measurement of crude errors. It also suggests that it may be rational for forecasters to attach limited importance to forecast and model evaluation. More fundamentally, the potential impacts of unanticipated events also require forecasting processes to be adaptive. In practice, this tends to manifest in judgemental intervention. This helps to explain the apparent anomaly of superior performance of simple (often pure time series) models in forecasting competitions. It is not due to the fact that the models are simple but rather that they lend themselves more easily to judgemental intervention.

As noted in section 1, most of the work on property market forecasting has focussed on statistical techniques and there has been limited work in this area on the use of judgement in forecasting. However, despite increased sophistication in forecasting methodologies, it has been recognised that differences in property forecasts still

[1] Much of the analysis in terms of definitions, methodology and causes is similar to the valuation

occur due to differences in the structure of the econometric models, statistical procedures and data used (Mitchell and McNamara, 1997), as well as the use of potentially flawed economic forecasts (Higgins, 2001). In the US, Guilkey carried out a detailed analysis of private sector real estate forecasting models in terms of their parameters, methodology and outputs. He identifies important differences in the variables used, model specifications, and the exogenous variables which are obtained from macro-economic forecasts providers. With regard to the latter, he found that the organizations providing macro-economic forecasts to real estate forecasters chose different explanatory variables. Where they had overlapping explanatory variables, the three macro-economic forecasting providers were using different assumptions about interest rates, federal expenditures, exchange rates, GDP growth. He also finds that after the forecasts are determined econometrically, "all three of the major players reserve the right to subjectively alter the forecasts on the basis of specific information they have about the MSA" (Guilkey, 1999, 30). In turn, even where real estate forecasters are using the same provider of macro-economic forecasts, the data is being "massaged" very differently by the different providers. As a result, he identifies widespread disagreement amongst forecasters concluding that

> "real estate forecasts make use of other peoples' supply and demand forecasts but they get to their conclusions using very different methodologies and obtain very different MSA rankings"
>
> (Guilkey, 1999, 40).

The foregoing review of the literature gives reason to believe that subjective human judgement, exercised by experts and applied to quantitative forecasting model outputs, may be both an important and complex dimension in the process in forecasting property markets. Fundamental problems with quantitative econometric techniques associated with structural shifts, unanticipated events, uncertainties in data and model specification can all undermine the anticipated reliability of model outputs. Consequently, both producers and users of forecasts have strong (if variable) justification for adjusting pure model output. In addition, there are agency problems associated with the forecasting process. The following sections describe an investigation of this process as it operates in UK-based forecasting providers. This was carried out to enable comparison of actual practice with its theoretical counterpart, as hypothesised in and from the literature.

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accuracy in real estate. For instance, the term 'forecast smoothing' has been used in the forecast literature to describe the tendency of forecasts to be less volatile than reality.

3. Methodology

The subject under investigation was expected to involve at least some complex behaviours and relationships. It was therefore considered unlikely to be as effectively modelled by an approach based on traditional positivist assumptions as by an interpretivist approach (broadly termed). The latter was therefore chosen as a more suitable basis for the research design, and adopted in a pragmatic fashion, seeking a balance between the need for generalizability and participant authenticity.

The technique chosen for data collection was semi-structured interviews. Nineteen interviews, each approximately one hour long, were conducted with individuals who were either responsible for the production of property market forecasts and/or for the production of property market forecast advice that incorporated the use of such forecasts[2]. The individuals within this sample frame represent, in the view of the researchers, a very substantial sub-set of the property forecasting services available from UK-based organizations. The resulting quality of this sample lends support to the authenticity of the findings as representative of the UK property market forecasting "industry". It should be borne in mind, however, as expanded upon below, that this industry is itself relatively small in terms of the number of providers and, within this provision, diverse as to its intrinsic functions and its integration with other property services.

The interviews were guided by a common question framework that had been developed from the researchers' prior knowledge of the subject and from the review of the literature. The purpose of this framework was to ensure that, as far as possible, the data collection focused on the specific area of research interest, both across the sample and in relation to each respondent. The authors acknowledge that by controlling most of the interview agenda[3] this approach involves a potential compromise between generalizability and discovery. This is not, however, regarded as a significant problem in the study and is mitigated by the interviewees having been invited, at the end of the interview, to discuss any other issues not prompted by the interviewers' question framework.

Both researchers were present at all of the interviews. In order to facilitate reflection upon and analysis of the interview data, all interviews were, with the agreement of the interviewees, recorded and subsequently transcribed. The analysis and interpretation was further assisted by the use of textual analysis software.[4] This enabled selected passages of the transcribed interviews to be coded against particular concepts or themes. While this coding is possible manually, the software improves subsequent organization, retrieval, inspection and manipulation of the material covering these concepts and themes, including exploration of linkages, and efficient viewing of the context from which the passages are extracted. This aids the researcher in the task of developing a fuller understanding of the interview material.

In order for this coding to be carried out, it is necessary to identify the underlying concepts or themes. In the present study, these were identified by reference to the ideas that formed the initial interview framework, added to by the researchers' own reflections on what they recalled as salient issues emerging from the discussion. Further additions and refinements to the codes were made in the process of coding itself, as reading of the transcripts revealed new themes or modifications to existing ones. In strict methodological terms, the pre-coding of the data, even if only partial, imposes an element of the researchers' own structural understanding on the analysis. Providing the initial coding is treated as provisional, however, the approach adopted in this study is regarded as an acceptable strategy in the literature (Miles & Huberman, 1994).

Each code was given a name (in some instances cryptic, because of the naming limitations in the software) and an accompanying description. The description is important because what matters is the meaning of the concept, within its context, rather than its name. This led to the identification of 61 codes, shown in alphabetical order in Appendix 1 alongside their descriptions. The transcripts were accordingly coded. In order to achieve consistency across all the transcripts (i.e. to ensure maximum reliability in the use of the codes) the coding of all transcripts was carried out by one of the researchers. A check was conducted by having the second researcher code three randomly selected transcripts. The outcome of the resulting comparison pointed to substantial agreement across most codes but with a small

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[2] At four of the interviews an additional person was present. This was in each case someone with experience of property market forecasting, working with the interviewee.

[3] i.e. By excluding an invitation to talk about things which interviewees may have wished to talk about, but which were not prompted by the framework.

[4] QSR NVivo version 2.0.163.

number of differences[5]. However, since *interpretation* of the transcripts against these codes would be carried out by both researchers, inter-actively between themselves, the level of difference is contended to be acceptable.

The findings of the analysis are presented in the next part of the paper, preceded by a description of the interview sample. The presentation of findings is organised into three broad sections, covering forecast production, evaluation, and use. This is a somewhat simplistic categorisation, since it is clear that interactions are present across all three of these elements.

4. The interview sample

All nineteen main interviewees had current and prior involvement in the production of property market forecasts. The nature of this involvement varied across the sample[6]. While all had responsibility, mostly at a senior level, for some or all of the organization's forecasts, their role in production varied along a spectrum from detailed involvement in the mechanics of statistical modelling through to mere oversight of the process, the implementation of which was carried out by others. The term "forecaster", used in this paper to describe these people, must be interpreted taking this variability in function into account.

The organizational profile of the 19 interviewees was as follows. Six worked for organizations whose core business was property consultancy and agency ("agents" in the traditional jargon)[7]; six worked to support the fund management activities of their employing organization; two worked for banks; and one was responsible for forecasts in a large publicly quoted property company. Of the remaining four, two worked in organizations where the primary function was forecasting (although only one of these was focused solely on property); and two were in organizations offering forecasting advice as part of a broader investment advisory service. Within these broad categories, the actual role of the interviewees in forecasting varied. One obvious variation was in the geographical spread of the forecasting focus. Although all those interviewed were involved to some degree in forecasting of UK markets –

[5] Evaluation of the level of agreement was done intuitively rather than through the use of an inter-coder agreement measure, since the latter would require the adoption of a protocol for determining

though in some cases highly centred on key markets - several also had a strong European market focus. Another difference was in the extent to which those forecasting were involved in the process of investment decision-making. This was more likely to be the case within the fund manager category.

5. Forecast Production - Context

5.1 Variables forecast

In both the UK and Europe[8], the property market variable most frequently forecast is change in rental value. In large part, this is because information to support modelling of these rents is more widely available than for other property-specific variables. This rent forecast is usually for prime, "avoiding extreme locations". This was referred to as a "top rent" but also as "prime/average" and in one case "average rather than prime", indicating some variation in perceptions of this benchmark. Almost invariably, it is nominal rents that are being forecast, but one interviewee made the distinction between these and real rents:

> "Theoretically, any economist would say you ought to be modelling the rate of change in real rents but that does not necessarily mean that that is how real estate markets actually operate. Empirically, we find in most cases the rate of change of nominal rents works better than the rate of change of real rents".
> (Forecaster working for Bank)[9]

In some cases, these prime forecasts are augmented by forecasts for other grades of property, usually where the forecasting organization owns such property and wants to project returns for existing assets or funds. Where these additional forecasts are not produced, fund managers are expected to adjust the prime figures when applying them to different grades of property. An exception to the "prime" basis is the well-known alternative basis of the (now) CB Richard Ellis index: "we're forecasting the best building in the best location with the best tenant".

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agreement/disagreement. Given that this would have a degree of subjectivity, and given the nature of the material, the researchers do not believe such a quantitative measure would add to the credentials of the analysis.

6 In some cases the interviewee's experience had been gained in more than one organization.

7 A further three, not in this category, also had substantial experience of working as forecasters for property consultants/agents.

8 In Europe, the markets and sectors for which the key variables are forecast is more limited than in the UK – see page 12.

9 The attributions relate to the organization in which the forecaster was working at the time of the experience being described (and not always the organization in which they are currently working). The attribution is styled "Forecaster working for…" throughout to remind readers that it is the forecaster's views and experience that are being examined and not that of the organization, *per se.*

The forecasting of yields is also undertaken, to a lesser extent than rents, and usually in conjunction with total return forecasting. For total return, the yield forecasts were frequently done by reference to the Investment Property Databank (IPD) indices, at the all-property and major sector and segment levels. Alternatively they were performed to feed into valuation models, applied to the organization's portfolio to generate total returns going forward. One interviewee made the distinction being UK and US practice in this regard:

> "In the UK, we get total returns by forecasting value change, which is driven by rents and yields here, and income return, so you need to forecast the yield shift. In the US we don't disaggregate those components of change in value, we just value change."
> (Forecaster working for Forecaster/Investment Adviser)

As discussed in more detail below (section 5.8) a number of interviewees pointed to problems with yield forecasts, where their experience had been that they "were far too difficult" or had "been failing hopelessly".

Prime vacancy rates are also forecast by some, but by no means as extensively as rents. The same is true of depreciation forecasts, although this appeared to be done is a fairly rudimentary way, and generally expressed as long-term averages for different markets.

5.2 Markets and sectors forecast

The forecasting carried out by the interviewees varied widely in relation to the markets and geographical scope of coverage. For the UK, most are producing forecasts at national and regional level of the main market sectors - retail, office, industrial - with some doing (usually) selective sub-analyses of these either by type (e.g. retail warehouse, in-town retail) or location. Outside of London, the local forecasts go down to individual town-, or, in some cases, or county-level. The extent of the coverage and sub-sector analysis was naturally driven by the kind of service the forecasters were seeking to provide, which in turn was a function of the kind of organization in which they were working.

While providing a broad overall service, some focused on specific types in particular regions - the most obvious example being prime offices or retail in one or more of the central London sub-markets - because that is where the organization's or client's property focus lies. Conversely - for the same reason - some forecasters ignored some sectors or regions (with the example of Welsh industrials being cited more than once as holding little interest for clients). In a couple of cases, the view was put that

regional forecasts were sometimes of little use, justified in one of these cases because of the scarcity of suitable properties in some regions.

> ”We don’t often produce regional forecasts because the regions are of very little consequence and it becomes very location specific. We have to do London, Thames Valley, Scotland and the rest of the UK but we’ve abandoned doing regular forecasts of South West, East and East Anglia etc. It is really of very little consequence what you think of East Anglia when there are really only three of four centres or one regional head office location…so you have to get past the region.”
> (Forecaster working for Property Consultant)

This recognition of the importance of getting down to the local town or city level was repeated often, though practical considerations relating to the quality and long-run availability of data militated against its implementation. With large portfolios – one interviewee referred to clients with four or five hundred properties - another factor working against the production of local level forecasts was the scale of the task.

For Europe, and reflecting the relative immaturity of European property markets, the focus is on major cities or even centres within those cities. Most notable in the latter respect are the major office centres, although most interviewees who are involved in Europe described activity or plans to extend into retail (both “High Street” shopping centres and out-of-town) and into secondary office locations. All appeared to be in the process of extending the *number* of cities for which they prepared forecasts. A few were already well under way (e.g. one producing forecasts for 21 office markets, 11 retail markets and 11 industrial markets). This process, driven by investor demand for assets in these locations, appears constrained, however, at present, by the shortage of an adequate supply of robust data upon which to base forecasts.

5.3 Frequency of production and forecast horizon

Most forecasts produced by those in the interview sample were done so on a quarterly basis. This appears to be driven by the fact that the economic data, which constitute the most important inputs to most models, are themselves updated quarterly. Sometimes, this linkage was less strong, and so the frequency was bi-annual or even annual. This occurred, for example, where, rather than adopt directly economic data from an outside source, the forecast would utilise a “house view” on the economic inputs, with this being adjusted less frequently than quarterly. Another justification for less frequent up-dating is because of the perceived pace of normal property market movements.

> "We do bi-annual forecasts because in normal market conditions the property market isn't that fast moving, so that seems to work reasonably well"
> (Forecaster working for Property Consultant)

Local models are another exception, where they are cross-sectional in form and so by their nature are less tied to runs of economic data. These tend, in at least some cases, to be either updated only every six months or produced an *ad hoc*, rolling basis.

The most typical time horizon for forecasting is five years. The reasons for this are based on the typical time horizon over which forecasts of the economic inputs are available, coupled with a widespread view that at or beyond five years (or thereabouts) there is a strong likelihood of a reversion to a long term trend. This trend reversion was often described in terms of the property market cycle, although views differed as to whether this meant it was difficult to know where the cycle would be at the forecast horizon or, by contrast, that one could assume that the term of cycle was typically five years:

> "We will revert to that long term trend after the end of the forecast horizon and will make clients aware that we're not sure where we will be in the cycle at that stage."

> "When you start your forecast you're at a certain point in the cycle and if you take your objective as trying to plot how the market will move through the remainder of this cycle, five years seems reasonable."
> (Different Forecasters, both working for Property Consultants).

Three to five years was also justified as a suitable horizon for investors who are using the forecasts to plan trading or capital investment decisions. In some cases forecasters are producing longer term forecasts – typically ten, twenty or, in one extreme instance, 40 years - but generally solely for internal use, or at the specific request of clients (e.g., bank clients, because of the longer term nature of their loans). There was some scepticism, however, about the merit of going beyond five years: "after 10 years, it's a lifetime away".

In some instances the horizon is shorter, and one interviewee, working for a property consultant, suggested that a lot of clients sought forecasts with a two-year horizon. Others questioned the value of short-term forecasts, especially over the very short-term, given the investment horizons of most property investors:

> "Most real estate investors in our world, at least, aren't particularly interested in what is going to happen in the next six months since once

you've bought something, you're going to hang onto it for several years."
(Forecaster working for Bank).

5.4 The form of models

In the virtually all cases, rent forecasting was based on some form of econometric modelling. For all but local markets, this was based on time-series analysis, almost invariably using multiple-regression. Local market forecasting (with the notable exception of the London markets) was more likely to be based on cross-sectional models, typically built from assembling local market information or local economic information about a particular town. In some instances, an alternative approach was adopted, with local models derived in a top-down fashion from regional or national level forecasts. This necessitated the local forecast being driven by the historic relationships between, for example, a local authority area and its region, or a town and its region. Achieving consistency in the nesting of different levels of forecasts was described as sometimes problematic (i.e. the sub-forecasts did not add up to the whole).

For time-series regression models, office markets were the most developed. For these markets, forecasters appeared to have the same overall specification for time-series models across different markets, but work with different coefficients. The relationship between rents and vacancy rates was seen as central to understanding and prediction in office markets. Determining vacancy requires, in turn, separate models to forecast demand and supply variables.

> "For office markets the basic equation is the rate of change of rents as a function of the level of vacancy. There is a natural rate of vacancy and if vacancy is above that then rents will fall, and the more above it is, the faster they will fall. Retail markets are much more difficult, because we haven't got vacancy for most retail markets."
> (Forecaster working for Bank)

> "We take a multi-equation approach, using the relationship between net absorption or gross take-up, and historical demand drivers. We'd project that forward, with our assumptions based on local research projections of what's happening on the supply side. We'd then look at the relationship between vacancy and rents, which encapsulate the supply-demand conditions. This would feed into a vacancy rate projection….and that drives rents."
> (Forecaster working for Property Consultant)

This process has problems, because for not all markets are there time-series for supply and for demand variables, causing modellers to resort to proxies (e.g. take-up for demand). This was described as most acute on the supply side, where in some

markets the supply data, “of various degrees of plausibility”, only tends to go back for a short period, and in some markets doesn’t exist. Again proxies were used (e.g., change in rents at some point in the past as a proxy for current vacancy levels).

Macroeconomic variables (such as consumer expenditure, inflation and economic output) were considered to have limited use as inputs into models forecasting local markets, in that they appeared to show little historical correlation in general or at turning points in particular. The sophistication of these local models varied, depending upon the maturity of the markets. Where these local models were cross-sectional, they appeared more susceptible to change, attributed to their greater reliance on qualitative information.

Retail forecast models presented different problems to office market models. Vacancy rates were generally not available so retail models were described as largely a function of retail demand (a reasonable assumption, for high street retail at least, where supply may well be fixed). Modelling industrial markets was seen as combining the difficulties of suitable demand and supply data.

5.5 Model inputs - Data issues

Although quality of data and, particularly, data revision are commonly cited as a problems for economic forecasters (see Linden, 2003), data issues seem to be intensified in the real estate sector. Obtaining consistent and reliable data was reported by interviewees as a recurring problem. Respondents also repeatedly emphasised the definitional problems with particular emphasis on questions such as:

- What area is being measured? How are centres/districts defined?
- What is the quality of building being measured? Prime or average?
- Are rents and yields reported net or gross?
- Are rental values effective or headline rents? How have effective rents been calculated?
- Has the rental estimate been observed or is it a pure estimate?

There are clear variations in the availability of historic and current data between markets. This then causes problems for model specification, estimating coefficients and generating sufficient robustness.

> “It would be nice to think that we had time-series for supply for all markets and time-series for demand. Well, we very rarely have time-series for demand although we may have time-series for take-up, which is not quite

> the same thing, realised demand obviously. But what we do have is a reasonable proxy. The problem is supply. In some markets you do have supply data, of various degrees of plausibility, although very often if you've got it, it only goes back a couple of years and so it is very difficult to estimate models based on that. And in many, many markets, you just don't have supply data anyway.
> (Forecaster working for Bank)

In addition, some respondents lacked confidence in the quality of some of the data they received about *current* market rents and yields from some of their satellite offices. The remoteness of international offices could be a particular issue here.

> "On a European scale it's knowing what the hell you've got historically and really understanding what that data is when you do have it. Rents and yields. Are the yields net? Are they net of what? Are they really, really net? No, no, are they really, really net? It's quite difficult even with one organization like this and even with RICS trained valuers. Exactly the same with rents. Different measuring techniques, different additions to costs, etc."
> (Forecaster working for Property Consultant)

> "The problem is that much real estate market data, as opposed to the investment IPD-style data, is put together by agents who might be sort of just one person stuck in an office in Milan and that person changes every two or three years and it 's not their main priority. And, you know, there may not even be consistency, over time, in one market, let alone consistency between markets, in terms of what is meant by the CBD, what is meant by prime."
> (Forecaster working for Bank).

> "The one thing that I constantly struggle against is that some of the data coming out of the agents, changes. Every single quarter, I get historic revisions, saying, oh, you know, Paris rents didn't reach this level."
> (Forecaster working for Forecaster/Investment Adviser)

With the definitional problems referred to above, forecasters were often unsure of current level of rents. This is significant in that, in property markets, there is uncertainty at both ends of the forecasts. Not only are forecasters not sure about where they will arrive, they are also in doubt about where they are starting from.

> "I suppose the other issue is transparency, in equities you would never have an issue about finding out where the price is….In part it's the headline/effective problem, where the landlord will not give us full information on the transactions."
> (Forecaster working for Forecaster/Investment Adviser)

5.6 Model inputs - Macro-economic variables

As noted above (section 2, page4), a characteristic of property market forecasts is that they are very often dependent upon other forecasts. These are typically sourced from external bodies, and those interviewed typically rely on at least one of

- Oxford Economic Forecasting
- Cambridge Econometrics
- Consensus Economics
- Capital Economics
- National Institute for Economic and Social Research
- Experian BSL

However, the macroeconomic forecasts are not generally consumed passively, being frequently mediated by the forecasters. Introducing further judgement into the process, the interviewees were likely either to select a forecast which fitted with their own (or house) view of the economy's position, or would adjust individual forecasts to fit with this view.

> "Our internal economists will actually produce the forecasts though then they have access to consensus forecasts as well. In the last two, three years, their view of GDP has been different, from that of the consensus."
> (Forecaster working for Fund Manager)

> "We wouldn't use Cambridge Econometrics assumptions for the future, we'd have our own, that would be our economic house-view….our house view on economics, on unemployment, on GDP, retail sales, and stuff like that."
> (Forecaster working for Property Consultant)

> "We always look to see if we need to make adjustments, we always take the view of whether we will accept consensus. How far away we are, on average we're not very far away."
> (Forecaster working for Property Consultant)

In contrast, only one forecaster stated an unwillingness to adjust external forecasts of the independent variables.

> "Did we ever manually adjust their (macro-economic) forecast? No. They spend more time forecasting the economy than I ever could. I may disagree with them, but I would outline that in my commentary."
> (Forecaster working for Forecaster/Investment Adviser)

5.7 Forecasting Yields

Yield shifts are a key driver of property market performance. At the individual asset level, a forecast of the exit yield is a significant variable in estimating cash flows. Projections of total returns at the individual property, portfolio or index level require estimates of yield changes. A clear message from the respondents was that they were much less confident in the forecasts of property yields relative to their forecasts of property rents. Fundamentally, they were unable to specify robust models because they were dependent on reliable forecasts of changes in the capital market. Those who did forecast yields emphasised the increased importance of qualitative information, in particular, sentiment.

> "What we found, econometrically, was that we had a very good model (of yields), it explained a lot. But what you couldn't rely on was the one-year ahead gilt forecast. If you could forecast bond markets, a year down the line, then you'd be able to forecast property yields."
> (Forecaster working for Fund Manager)

> "No-one's actually achieved the right appropriate methodology to forecasting yields. I think yield forecasting is very, very difficult and I don't think anyone's really got it right."
> (Forecaster working for Fund Manager)

> "The forecasts of yields. I don't really think we should do it, because any forecaster who says that they can forecast yields is just barking"
> (Forecaster working for Fund Manager)

> "We do forecast yields but through different techniques. Time series analysis isn't a great deal of help… So the yield forecasting tends to be much more qualitative and it's just through a series of filters to arrive at a view and sensitivities really rather than a hard view or a hard forecast"
> (Forecaster working for Property Consultant)

It is clear that forecasters generally regarded yield forecasting as inherently more difficult than rent forecasting. As noted above, reliable forecasts of total returns at the individual property and portfolio level are a function of the reliability of forecasts of yields. The interviews strongly suggest that property market forecasters have little confidence in their ability to provide reliable yield forecasts. It is worth pointing out that judgement seems to be much more important element of yield forecasting due to the perceived lack of reliability of the models. This leads to an important, if somewhat obvious conclusion, that a major determinant of the level of expert intervention will be the perceived reliability of the model. Yields provide an acute case where poor model performance lead in some cases to a practically purely judgemental approach.

6. Forecast Production – Judgements and Modifications

6.1 In-house judgements and influences – internal feedback

For the producers of forecasts, the most immediate kind of feedback available within the producing organization is that received from people who may not use the forecast themselves, but who share some form of common interest with those who will use the forecast (e.g. agents). Where this advice is available from people actually working for the organization "on-the-ground" in the markets – something more likely in the property consultant/agent organizations - it can take two forms. First there are factual data that may be known to the people in the market, but are not typically or easily available to the forecaster. Second, there is a more qualitative kind of feedback, typically represented by market sentiment, or knowledge of the current preferences of market participants that have yet to be manifest in data or statistics.

Although this doesn't necessarily lead to adjustments, it appears valued by forecasters, because it reveals what the historic data patterns cannot always expect to reflect.

> "Econometric models are fine, they describe what has happened in the past, but sometimes there are dynamics in markets which it's useful to find out about in a sort of qualitative way and we will always talk through with people on the ground as to actually what is happening in their markets and that would add information to help and inform the forecasts."
> (Forecaster working for Property Consultant)

A third potential form of feedback is direct challenge to the forecast numbers, by the suggestion of alternatives. This doesn't generally appear to happen, unless it is accompanied by an argument based on factual accuracy or sentiment issues.

Capturing the first two forms of this feedback is usually done by the forecaster presenting the "draft" forecast to the market team. Usually this is face-to-face, although in some instances it is done by telephone, where the travel logistics (e.g. around European cities) make this more practical. The discovery of factual errors revealed by market feedback generally results in modification of the forecasts; although the scope for this kind of adjustment appears greater the more localised the forecasts are, because local market knowledge is likely to have a commensurately larger impact on the forecast assumptions.

> "We'd get feedback, such as oh no, they're not building that 20,000 square metre tower any more, or that guy who was going to relocate here is not coming anymore, or rents weren't that high in 1998, your historical data is wrong. So we'd feed all this in and think about how best to incorporate it. If it's hard factual information, we'd just run the models again and we get a different answer."
> (Forecaster working for Property Consultant)

> "With the draft forecasts we will then talk to our people on the ground and see whether there any short terms plans that we are missing, are there any specific deals that are happening in the market which we ought to be aware of, are there any other issues that they think the forecasts aren't picking up".
> (Forecaster working for Property Consultant)

Where the feedback is based on signals of sentiment or market mood, the response varies more widely. This form of feedback may result in changes, or may simply be set alongside the original numbers as commentary. The discretion on this appears to lie with the forecaster. In large part, the decision between change and just simply comment rests on the extent to which the forecasters are persuaded of the validity of the markets people's views. Merely adding the views as commentary to the forecast appears to be the line of least resistance, although this is tempered by forecasters'

recognition of the need to maintain good working relationships with the providers of feedback; relationships which may be prejudiced if the forecasters appear too rigid in their response and fail to take some account of their colleagues' views.

> "We'd question their judgement, and whether it was enough to think seriously about modifying the output of the model or, more likely, you would include that in your commentary, to go with the forecast"
> (Forecaster working for Property Consultant)

> "As far as the client is concerned, we would typically pass on the full reservations or praise, whatever it was that the agents said, even if it wasn't built into the model….so we will say here is our forecast, but you should be aware that there are some more positive views of the market locally or negative views of the market locally."
> (Forecaster working for Property Consultant)

> "The qualitative information will colour the forecasts in some way. It depends how solid we think the information is. So if we are not particularly happy that the message that they're delivering to us is supported by the information in the data, we won't modify the forecast very much."
> (Forecaster working for Property Consultant)

Some interviewees drew the distinction between adjustments for the short-term and longer-term forecasts, suggesting that it is only the short-term forecasts that would be changed as a result of feedback from those close to the market[10]. Forecasters' willingness to do this is strengthened, however, when the short-term forecast is problematic, as was generally acknowledged to be the case with yield forecasts.

> "We will take views from our economist, as to where he thinks the market is going to go, and will then adjust the forecasts for the whole five year period, but the front end will be done by talking to the markets guys".
> (Forecaster working for Fund Manager)

> ""The short-term picture, the agents know, but I'm not going to let the agent tell me what the medium term view might be."
> (Forecaster working for Property Consultant)

> "For yields, on the one-year view, you'll get a much better view from somebody in the market than you can from someone trying a statistical forecast."
> (Forecaster working for Fund Manager)

Overall, it is difficult to evaluate the contribution of this form of feedback with any precision, though for some it is certainly significant:

> "I suppose, I myself and my group probably have very few naive intuitions about what is wrong and what is right, and we sort of import feel from elsewhere, so we're always reading the agents' reports and any reports we can get our hands on, we are always talking to as many agents and as

> many other colleagues in the investment research community as we possibly can. We are always talking to people who are actually involved in the acquisition, closer to the market than we are. And I suppose we sort of import our feel about what's right and what's wrong from there."
> (Forecaster working for Bank)

6.2 User influences and adjustments

As well as seeking feedback from colleagues within their own organization whose interest in the forecast is tangential, most forecasters also periodically discuss their current forecasts with internal and external users (clients). Not surprisingly, this is more likely to occur where the forecaster-user relationship is strong, or even formalised, as for example, where the users are part of the same overall organization or the client relationship is of long-standing. Sometimes forecasters referred to these meetings as being an opportunity to persuade users of the robustness of their forecasts, or even correct users' misconceptions concerning data. Mirroring the feedback from in-house colleagues, however, some interviewees also conceded that the opposite might apply, with information valuable to the forecaster being revealed, as for example, where the market was undergoing fundamental change and the forecasting model becoming less valid.

Most who discussed this issue appeared to value the role of users in helping forecasters to better understand the workings of the market. Most were willing to accept that that their models might not be capturing everything and accordingly were prepared to show some flexibility in adjusting their forecasts to take account of users' insights.

> "I think it is very easy as an econometrician to pooh-pooh gut feeling, but actually gut feeling really means that they have their own models which they have built up over 30 years of experience and they can't articulate them very well but they probably have some validity."
> (Forecaster working for Bank)

> "This last session convinced me that econometrics won't do the job as we singularly failed to foresee the latest down-turn, whereas our (users) actually did see it, ahead of time. So it's somehow also trying to blend in a sort of high level insight that you can get from these people."
> (Forecaster working for Property Company)

A minority took a different view, being more inclined to stand by their models and generally resistant to much more than minor modification to their outputs.

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[10] The same appeared true of feedback from users (see section 6.2): "Generally, the people in the market, the deal-doers, will always have a slightly different view to the forecasters in the longer term. The shorter term has already been adjusted to their kind of view anyway, in terms of where we think the market currently is." (Forecaster working for Fund Manager)

> "Why bother with a model if you're then going to change the outputs"
> (Forecaster working for Property Consultant)

In one instance, with a forecaster whose role in the organization was wider than just forecasting, a different rationale for adjusting the bare forecast was advanced.

> "I want to focus on ensuring that our acquisition professionals are focused on the right markets where I think the best performance is going to come from. And if that means altering the rental growth numbers so that they believe them, while keeping those broad calls in place, then I will do that."
> (Forecaster working for Forecaster/Investment Adviser)

There was no evidence of users, including external clients, pressuring forecasters to modify their forecasts. In some instances, however, forecasters appeared to be anticipating client reaction and sometimes pre-adjusting their forecasts or advice to deal with this. This was generally linked to the issue of "extreme" forecasts.

> "Our models were certainly saying that there was the threat of declines in rental values in that market in 2000. Now I couldn't go out in a publication and put declining rental values, because nobody would believe me. So you have to present it in a way that makes it acceptable, there has to be an element of acceptability when you present a forecast."
> (Forecaster working for Forecaster/Investment Adviser)

There was support for arguments that in economic forecasting that forecasters have incentives to smooth performance by avoiding conspicuous forecasts (see Laster et al, 1999; Croushore, 1997). There was evidence from the interviews that forecasters were averse to releasing predictions of significant shifts, such as growth or return in double digits (even though examination of the historical data clearly shows that this happens, sometimes recurrently– e.g. all-property total returns in the late 1970s). The psychological barrier may also involve the transition from positive to negative, rather than just be a question of size.[11] To some extent, this form of cognitive dissonance appeared to stem from individual's prior experience, or from tacit understandings within the organization (the latter based on the relative worth of broad indicators of market direction against precise numbers).

> "I suppose you learn, and you're constrained by your own experience in that sense. I mean, if you see anything in double figures, you think, oh my God"
> (Forecaster working for Fund Manager)

> "Who the hell is going to put down forecasts of minus 20, or minus 10, it never happens. Forecasters tend to be conservative in their approach. I think they tend to limit the range of their forecasts. It's very rare to see big

> numbers, whether positive or negative."
> (Forecaster working for Fund Manager)

> "There are barriers to the size of forecasts, below 10 and you don't need to go anymore extreme. More importance is attached to getting the relative performance correct."
> (Forecaster working for Property Consultant)

Two interviewees, however, acknowledged that experienced had taught that extreme forecasts could turn out to be correct (the Spanish office market in the late 1990s being given as one example). In another,

> "I can remember when our rental growth figures were coming out for offices in double digits, and we thought "double digits, you've go to be joking!" Unfortunately, they did hit double digits, so it's dangerous to overwrite your model."
> (Forecaster working for Fund Manager)

The aversion does not necessarily appear confined to the forecasters, but may also be present in the behaviour of others who might, within the forecast production process, cause adjustments to be made.

> "I once came up with a forecast for the industrial market. The figure seemed high, something like minus 27%, rental growth. Anyway it was shaved down because, it's the real world. First of all, the research group shaved it down, to, 18% or something, because, well, we've never seen one of them before. Then it was shaved down again when it went through to the fund managers - that looks ridiculous, so I think it's got to be minus 12. Anyway, everybody had something to say because they felt uncomfortable with the number, basically, and a big number like that makes you feel uncomfortable."
> (Forecaster working for Property Consultant)

The reasons for this aversion appear complex. At one level it is tied to the doubt among forecasters that extreme output values are fundamentally credible, on the basis that their models have limited scope to generate extreme predictions. At another level, it may be a simple manifestation of the "anchoring" bias, first identified by Tversky and Kahneman (1974) and subsequently investigated across a range of contexts.

> "A lot of modellers will tell you, if they're honest, that in modelling rental growth they get very little variability in those rental forecasts, because if you look at a lot of these models, the output is fairly static. To get very wild swings in those numbers, you need very strange things happening to economic variables, which just does not happen. So there is a problem with a lot of models because that volatility isn't there."
> (Forecaster working for Forecaster)

> "There is one aspect though, which is that I do have a very strong feeling that they shouldn't look too different from what they were last time."
> (Forecaster working for Bank)

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[11] "It might only be minus two but to me there's a massive great red mark next to it" (Forecaster working for Fund Manager)

Where such predictions do occur, however, forecasters would scrutinise the forecast assumptions for supportive economic explanations, for co-occurring events that could help explain something as a valid indicator rather than just a statistical aberration.

> "If we see large numbers we probably won't believe them. If the model's generating double digit growth or double digit negative growth then you should really pay attention and say to yourself "well, why don't we believe it or why has the model done that" and then look at it, and say, right, the model's done that because supply is very much under control, or whatever. And really start investigating the series."
> (Forecaster working for Fund Manger)

Forecasters appear more likely to expend effort on such investigation if the forecast is being "applied", as for example for valuation purposes or for stock selection, than if it is simply providing background on trends for some wider purpose, such as overall strategy (in which case it *would* be regarded as an aberration and simply excised).

As noted above, some attributed the aversion to assumptions about user reaction to such figures, and especially to the resulting credibility of those producing figures, with one interviewee suggesting that the property market data underlying the forecast are never sufficiently robust to take a chance in this respect. Echoing the speculation of Nordhaus (1987) on the causes of forecast smoothing, the fear of getting it wrong – and the consequences to credibility - appeared to be a strong justification for adopting a conservative stance.

> "Big numbers are not necessarily a problem for me but certainly are for my clients. You have to present something that you think that your client base is going to accept, because if you don't present it in that way, they just don't pay regard to it."
> (Forecaster working for Forecaster/Investment Adviser)

> "What we tend to do is, the range tends to be squeezed a bit to make it look, not so much more appealing but, it's because then you can be maybe less wrong."
> (Forecaster working for Fund Manager)

> "Very few forecasters that are prepared to put their head above the parapet and say no, we actually think it's 20% this year, or it's minus 20%. Their name rides on the back of it, and if they get it horribly wrong and they call 20%, and it's actually minus 20%, then it will discredit their forecast and they don't do that, what they do is say it's going to be 10%. That's the way the forecasts are done, they're not calling extremes, no forecaster will."
> (Forecaster working for Fund Manager)

This loss of credibility issue was not wholly confined to the reaction of external clients, with one interviewee referring specifically to in-house organizational tensions as a contributory factor to the forecasters' cautious approach:

> "It had to be flattened off at zero or something like that, because there was political rumbling within companies, with the relationship between research and the agents not particularly good at that time."
> (Forecaster working for Property Consultant)

In contrast, some of the interviewees – although a minority – appeared more relaxed about forecasting extreme values, citing markets (e.g. City of London offices) where such patterns were not atypical, or stressing the subsidiary role of forecasting within broader investment advice and the need to meet clients' expectations that advisers will take a strong view - "it's appalling if you say everything is going to be average, it can't add value" (Forecaster working for Bank). However, in a different institutional context, exceeding the average appeared to be more problematic.

> "With the local forecasts, it was hard to get anything above average. If you had a very strong result they'd want to temper it down to the average, but the ones below the average weren't tempered up. I have no problem with extreme forecasts but other people don't like it."
> (Forecaster working for Fund Manger)

6.3 The scale of impact of qualitative adjustments

Although there was a wide difference of opinion on the extent to which the forecast from the quantitative model would change before release of the final figure – and the reasons for doing this - it appears that with most, though not all, forecasters' adjustments are always made. An important factor in determining this appears to be the nature of the markets, with market size and market maturity tending to make the quantitative forecast more resistant to qualitative modifications.

> "For some of our European forecasts where our data is less comprehensive, slightly lower quality and the model is not quite so robust, we will take account of what the people on the ground are saying a little bit more."
> (Forecaster working for Property Consultant)

The importance of making these adjustments becomes greater at turning points in the market, which the qualitative inputs may capture much better than the statistical data driving the models. Not surprisingly, reaching agreement between the forecasters and the market informants as to when the turning point was approaching or had arrived was "incredibly difficult".

Only three of the interviewees expressed views on the impact of typical adjustments, in terms of the relative contributions of the quantitative and qualitative dimensions of the process. These views varied, but in each case the contribution of the qualitative adjustment appeared substantial. One interviewee, working for a fund manager, put the qualitative contribution at 50%, possibly less on occasions. He contrasted this with his experience working for a property consultant, where the quantitative contribution was "much more significant". A second, working for an investment adviser, put the qualitative contribution at 30%, which he contrasted with the impression given by the academic forecasting literature, from which "you would get the perception that the quants are more important than they actually are". The third, working for a property company – and using a broader range of techniques than most of the interviewees – felt that "econometric modelling is only about 20% of the process."

6.4 Herd Behaviour?

Most of the forecasters who were interviewed were interested in what other forecasters were predicting. A minority were not, other than perhaps to enable them to tell clients their stance in relation to others forecasters. For those who *were* interested, the availability of others' forecasts, and the quality of what they could see, naturally varied. Sometimes availability only came with a lag, with suppliers unwilling to widely release detailed versions of their forecasts until some time had elapsed. Availability depended not least on the resources or influence of the "receiving" organization, with some faring better than others.

> "In addition to our two our two main providers, we also get forecasts from the likes of Jones Lang, Richard Ellis, DTZ, Healy and Baker, Hillier Parker, King Sturge, and we take it all on board"
> (Forecaster working for Fund Manager)

> "I get reports from a variety of people. But it's sometimes difficult to get hold of what other people say or what other people think. Some will provide you with the numbers, for a *quid pro quo*, but other organizations are very secretive and want to keep their numbers to themselves."
> (Forecaster working for Fund Manager)

Frequently, interest in other people's forecasts was justified as effectively helping to improve the forecaster's understanding of their own forecasts. It appeared to be helpful to know the views of the property market consensus, of the agents and of specialist forecasting houses, on the basis that it was possible via these to seek an understanding of why they held their views. Achieving this understanding is not always possible and it was not wholly clear just how well other forecasts could be

interpreted, given that there is a degree of secrecy about the underlying models. This interpretation of reasons for differences and similarities appears to be based at the level of broad views or arguments rather than through detailed scrutiny of the models themselves.

> "You work out why you are out of line, and if you think your reasons for being out of line are good ones then you remain out of line. But it's difficult to do that unless you can get access to the models that they are using and they are often quite secretive about how exactly they generate the numbers."
> (Forecaster working for Bank)

> "Without knowing the insides of their models we're not able in detail to judge the reasons why other forecasts may differ. You can make inferences, that they must be making different assumptions about this and that"
> (Forecaster working for Property Consultant)

> "It's hard to actually investigate and understand why those forecasts are different, because we only anecdotally get information on the other forecasts. So we don't get a lot of detail."
> (Forecaster working for Forecaster/Investment Adviser)

Where close analysis of others' forecasts was not feasible, inspecting these forecasts still held attractions, but more to give a fuller picture of what others were doing. For example, a forecast incorporating a radical view might draw attention to an insight previously overlooked. But beyond perhaps broad improvement of forecasters' own insights, it is difficult to discern quite what the consequences of awareness of other forecasts are. According to the interviewees, they appear rarely, if ever, to result in direct changes to forecasts. Some interviewees, however, implied that there may be an underlying herd affect, or at least that the wish not to be too extreme may be a shared one.[12]

> "The major private practice firms that produce forecasts tend to be very similar in their approach. I can almost guarantee most of the forecasts…will be kind of clustered because, from experience, people who do forecasts tend to look at other people's forecasts."
> (Forecaster working for Fund Manager)

> "If you are right people say, well done, and they forget about it, but if you are wrong, people may never forget. So there is this incentive to sort of huddle together"
> (Forecaster working for Bank).

Others gave reasons why such similarities might not be surprising.

> "The major private practice firms are all using the same kind of systems as producers, the software is generally the same, they tend to do the forecasts the same way, and they will use similar sources of inputs for the economics."
> (Forecaster working for Property Consultant)

> "Other people's forecasts are similar to ours, and I suppose that is because we all look at the same data and we all have the same basic understanding of how markets work. You can see how a group of people who have a basic understanding of economics and real estate markets and a basic understanding of how to build models are probably going to come up with similar sort of forecasts."
> (Forecaster working for Bank).

7. Forecast Evaluation

7.1 Reviewing performance

The interviews with forecasting professionals indicated that they view forecasting success as multi-dimensional. Getting to the "correct" figure was not necessarily regarded as the key criterion. Indeed, *systematic* evaluation of forecasts against actual outturns was typically carried out only sporadically. There was a trade-off between devoting scarce resources to such performance monitoring and regarding it as a useful quality assurance and public relations exercise, with only a small minority doing it regularly.

> "We have a forecasting accuracy exercise every two years. It's an important discipline. It has a marketing element to it but also from my point of view it has a forecasting process element to it."
> (Forecaster working for Forecaster/Investment Adviser)

> "We do, intermittently, write what we call accuracy analysis papers or we do analysis of our forecasts, compared with the outturn"
> (Forecaster working for Forecaster/Investment Adviser)

More usually, performance measurement of forecasts was *ad hoc* and informal.

> "We occasionally check the accuracy of the economics inputs and the accuracy of the outputs. But we've never gone through to check if we've got the economics right, on a formal basis"
> (Forecaster working for Fund Manager)

> "It's not formalised particularly, it's just a learning process"
> (Forecaster working for Forecaster/Investment Adviser)

> "I don't do anything formally, it's more just looking, whether they pick up the right turning points, whether they come out with the right sort of area"
> (Forecaster working for Property Consultant)

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[12] By contrast, this was not the experience of an interviewee with experience of the US, who found it "fascinating how at the same point in time two forecasting houses can have very different views of the world."

This reflected the majority's doubts about the value of the process. It was argued that, since models were continually being updated, it was not necessarily useful to evaluate models that had been changed.

> "I would have to say it is something we normally don't do. But, in another sense, the ultimate value of doing that is limited, by the fact that over those three years, the model itself has evolved. To discover that the model you had five years ago was actually mis-forecasting, even under reliable economic assumptions, is not terribly relevant."
> (Forecaster working for Property Consultant))

These arguments from forecasting practitioners in real estate markets resonate with many of the points in Hendry and Clements' (2003) review of the potential range of dimensions to forecast evaluation discussed above.

7.2 Criteria for Forecast Success

The same was also with case when the question of *how* forecasts should be evaluated was discussed. The findings tend to support researchers who argue that measures of error relative to actual outcomes provide a limited indication of forecast success and that there should be a closer link between decision and forecast evaluation (see Granger and Paesaran, 1999). Essentially the criteria should be the 'usefulness' of the forecast. It was found that a common (although sometimes implicit) view was that the forecasts were good if they generated good investment decisions rather than generating the 'correct' numbers i.e. whether investors were directed towards 'winners' rather than 'losers'.

> "In terms of looking at the past, how well they've well done, etc? To be honest we don't do it. It all comes down to whether we got it all wrong in the investment advice that we give. When we first started, we used to spend a lot of time validating and looking at the past performance etc but it just became something that took up a lot of time for no apparent gain, because it isn't that often that somebody asks."
> (Forecaster working for Property Consultant)

> "Just getting the number right isn't a good forecast, necessarily, if you get it right for the wrong reasons"
> (Forecaster working for Forecaster/Investment Adviser)

The key for most forecasters was getting the relative rankings of buildings, sectors and regions correct rather than matching the absolute performance figures. Forecasters were aware that economic shocks were an important source of forecast error and reduced the validity of forecast versus outturn as a test of forecast quality.

> "Getting the direction of change and the relativities is probably where it is reasonable to expect that you'd be if you'd got a reasonable and robust set of models. They ought to be coming out with right answers in that respect, rather than getting the actual numbers precisely right."
> (Forecaster working for Property Consultant))

> "The forecast inherently will be wrong in any one year, what you are looking for is some kind of pattern, or relative pattern between the sectors, from the forecast, over a three to five year term."
> (Forecaster working for Fund Manager)

> "It comes back to the issue of the value of any forecast and why people buy forecasts and I think the big value really is in helping facilitate decision-makers, and think through, this or that assumptions, in the future. That's the real value, and, as such, the actual outturn isn't necessarily that important."
> (Forecaster working for Forecaster/Investment Adviser)

> "You hope to be right most of the time, unless…there's been a major event in the market, but I'm not going to beat myself up why we didn't get it right or wrong, because there was a war in Iraq etc."
> (Forecaster working for Property Consultant)

There were only two dissenting views on this. One interviewee stressed that accuracy was important if the forecasts were being used for development decisions.

> "Developments will come on the market at some time or other, and you'll be right or wrong. So it's not the process, the process is irrelevant, it's being right that counts. Timing is everything is developments. I suppose you might get a different view of this sort of thing from an investor."
> (Forecaster working for Property Company)

In the other case the forecaster's remuneration was based on the accuracy of their forecasts in absolute terms. Not surprisingly, their opinion was that getting the absolute numbers correct was important.

Although interviewees appeared not to be obsessed by ex-post evaluations of forecast accuracy, they nevertheless keep their models under review as part of the updating process. A range of factors determine how often a model is re-estimated in this process. While earlier research on forecasting (see Mankiw and Reis, 2002) highlights the costs of re-estimating models as being a source of smoothing in forecasts, the issue of costs or resources was rarely mentioned by the interviewees.

> "The model is re-estimated every quarter, but the equation doesn't necessarily change. I would monitor the coefficients, once a year, once every six months. It depends on the market. The model would be more consistent in somewhere like Paris, or somewhere like the City of London, or the West End, than it would be in Lisbon. So it depends on the quality of the data."
> (Forecaster working for Forecaster/Investment Adviser)

> Every two years you'd go right through the remodelling, from general to specific. So generally you'd just re-run the models and keep an eye and make sure the coefficients were the same, roughly the same, which they usually would be with just one or two more bits of information had been added. And then every couple of years, you check what dummy variables you're using, the lags, the main coefficients, etc. And redo the whole thing."
> (Forecaster working for Forecaster/Investment Adviser)
>
> "We look at them every six months but we sort of re-do the models every year based on new annual data."
> (Forecaster working for Fund Manager)
>
> It depends what we think is causing it. If we think that the failure is caused by the model not being very robust, then we will re-estimate the model. But if we just think that it is caused by something that the model couldn't expect to capture anyway, then we wouldn't."
> (Forecaster working for Bank)

Whatever the nature and extent of forecasts evaluation, failure to forecast accurately was attributed to sources familiar from the forecasting literature such as shocks, structural breaks and input data problems.

> "Usually the reason is either some particular event that was unforeseen, has completely changed, the input variables on economics.
> (Forecaster working for Property Consultant)
>
> "Oh, it's gone completely wrong in the past. Well, the econometrics has broken down in offices, all triggered by September 11th„
> (Forecaster working for Fund Manager).
>
> "If you haven't got the supply side variables, the equations are actually totally useless because you've got missing variable problems which means the estimates are all biased. And I suspect everybody, apart from at the local level, have got biased estimates in their regression, without realising it. It's a well-known econometric problem."
> (Forecaster working for Forecaster)
>
> "One other is what I would call the discontinuities. The fact that what it is that you're trying to forecast, the market itself evolves and changes over time and the relationships within it change over time, and variables or parts of the environment in which the market operates"
> (Forecaster working for Property Consultant))

Clearly, the fact that there could be numerous sources of forecast failure unrelated to the specification of the econometric models provides limited incentives to focus on continuous improvement of the model. However, the interviews suggest that there was periodic updating of models.

8. Forecast Use

8.1 The purpose of forecasts

The variety of reasons for producing forecasts matched the variety in the forecasts themselves. For those forecasters working within investing organizations, one of the primary purposes is to predict the future performance of existing or prospective asset groups, to assist in making decisions about what to buy or sell (including spotting current mis-pricing, by comparing the returns based on the predicted cash flows with the returns implicit in current market pricing) or what allocations to put into funds. Investing organizations may also use internal forecasts to support specific acquisitions; although this may be reinforced by external forecasts when, for example, the size of investment demands it.

Where the question in an organization is the extent of the allocation to property, rather than whether to invest in property, the focus for the forecasting is to determine the relative performance of different sectors and/or assets.

> "We get given the money, we have money in property, that's it, end of story. So what we need to do is make the most out of that money. What we are therefore concerned about is, are the forecasts getting the relativities right?"
> (Forecaster working for Fund Manager)

Where property consultants are responsible for managing funds, they may use their own forecasts as inputs into strategic investment decisions for clients' portfolios. Forecasts produced by property consultants may also be used to support specific cash flow analyses undertaken on behalf of clients, at varying levels of detail and transparency: They are also used to support more general client-specific requests for advice on specific markets. This work may often precede the more detailed cash flow forecasting later applied to specific assets in that market. In this sense forecasting is viewed not as an end in itself, but rather as part of larger package to provide the level of advice clients require to enable them to make informed decisions and enhance those decision processes.

> "Once they have then gone into the market and they've got three different buildings to look at, then you will start doing some cash flows. What they want to know is, yes, Brussels is going to outperform Paris, now is a good time to go into the market, is it going to be driven by yield compression, what sort of building should they use. So it's not numbers, it's advice, forecasts are part of what leads to."
> (Forecaster working for Property Consultant)

> "We do have direct income from forecasting but also it supports internal clients in fee-bearing work that they're doing, in holistic property advice of which a small part could be the property forecasting side or could be the property forecasting side going into the strategic side, with a separate investment strategist actually building on the work that I do."
> (Forecaster working for Property Consultant)

In one instance, this advice was being formulated in a “brokerage” fashion, being combined with market based data on transactions and deals to arrive at definitive buy-sell-hold recommendations. For forecasters such as this, whose service offer included broader investment advice, credibility was important and forecasting was an important means of securing this.

> “If I go into meetings with clients and link the results of my forecasting analysis to deals, to my understanding of what actually drives the market, then I will be taken seriously and will be able to influence decisions which is the be-all and end-all of why you are forecasting.”
> (Forecaster working for Fund Manager)

Forecasts are sometimes regarded in some sections of the industry as produced largely for general profile-raising of producers with current or prospective clients or investors. With some exceptions, however, this did not figure prominently in the interviews.

8.2 The use of forecasts

While the main focus of the interviews was on the process by which property market forecasts were generated, the forecasters also provided some interesting insights into how they felt the forecasts were used, with the prominent distinction being between decision-making support for the individual assets and for portfolio strategy. Most interviewees described their forecasts as central to the strategic decision process. This may be done by overtly integrating the forecast information into such decisions; or, as was described by one interviewee to be the case for “consulting clients”, the forecasts may “subconsciously and slowly permeate their decision-making but they won’t tend to force change in their decision-making”

> “We get involved at a strategic level with some clients and particularly at their strategic review, so it will be an external view that goes into their strategic planning. ….we’re using it as an external view, the clients can take a look at it they can decide what they like about it and maybe what they don’t like about and it will be used in that way certainly for an external check at the very least.”
> (Forecaster working for Fund Manager)

> “The forecasts are used in creating strategic decisions at the structural level. We need our judgement to assess whether we should be overweight or underweight in a particular sector….. So it‘s used at the stock level to actually determine what each asset or how each asset is going to perform, and at the strategic, structural level to determine what sector we should be in and to what level.”
> (Forecaster working for Fund Manager)

> “The forecast gives them an interesting backdrop, against which they formulate their own views and opinions.”
> (Forecaster working for Forecaster/Investment Adviser)

8.3 Individual Assets

When forecasts are used for individual buildings, further judgement is introduced, in applying what is almost invariably a forecast for an average or typical property to a specific asset. The forecasters themselves are generally not involved in this kind of judgement.

> "My team wouldn't actually get involved in stepping that down to a specific asset. We give general directions for national, regional, local markets based on economic and supply information that we have. Then it's down to surveyor judgement to decide whether the buildings they are looking at are better or worse than the market average."
> (Forecaster working for Property Consultant)

This requirement to adjust market forecasts to individual buildings generates some dilemmas. Forecasters recognised that the investment professionals had valuable asset specific knowledge which would add value to decision-making. However, they can use this discretion to ignore non-supportive forecasts.

> "I suppose if they didn't want to accept what we've told them, one thing that they would do, and in fact they do, is to say this building is different and therefore we'd expect a bigger uplift in rent, from what the economists were saying. I have actually seen that happen. This is a special building. It isn't going to follow the market. And it's very difficult for me to argue against that."
> (Forecaster working for Bank)

> "What we'll do is produce market forecasts, and they would be arguing that their building - and we might be forecasting portfolio returns in the market - they might be arguing that their building is prime, top quality, a huge amount of demand, that it doesn't follow the same profile"
> (Forecaster working for Forecaster/Investment Adviser)

> "Taking it from the town to the property, there's an awful lot of scope for the property to be doing far better than the town, and that's really where they (investment professionals) should be focusing."
> (Forecaster working for Fund Manager)

In addition, it was recognised that uncertainties generated by issues such as lease structure and thin trading can outweigh the contribution of forecast.

> "In getting down to individual buildings it is very important that people recognise that when they are doing the performance of an individual building that the performance of that building is only partially impacted by the forecast. We might forecast rents and yields, but that building will have so many specific factors that drive its performance, that they're almost, well they are more important, they're the ones to really concentrate on."
> (Forecaster working for Fund Manager)

> "On individual buildings it's principally, all qualitative, really. My experience when you do modelling on individual buildings, is that things like rent review cycle, i.e. where the building is in its rent review cycle in relation to

> the market place, review assumptions and re-letting assumptions, are far more important in determining performance than whether or not your forecast is 1.2% or 2.5%."
> (Forecaster working for Forecaster/Investment Adviser)

There were interesting variations in how different organizations controlled the use of the forecasts by surveyors and professionals responsible for investment acquisition and disposal. While several organizations had quite rigid systems in place, others simply emphasised the limitations of the forecasts regarding, in particular, applications to individual buildings.

> "Nothing gets purchased, without reference to approved numbers, which are built into our internal appraisal system. That includes our growth numbers. The only way they can change the numbers is to go to a committee of the great and the good"
> (Forecaster working for Fund Manager)

> "We have quite stringent controls……They'll get supplied with the forecasts for particular sectors and they will be allowed to flex that, up or down by a certain amount, and that amount is of a percentage of the original forecast."
> (Forecaster working for Fund Manager)

> "We have a very formal asset analysis process which steps them through everything they've got to think about. You've got to think about, for example, how volatile will rental growth might be, so they have to do a matrix which shows, right, this is average rental growth which I have assumed for this property, then plus or minus the standard deviation of rental growth."
> (Forecaster working for Fund Manager)

Forecasters working for consultants generally had little control over how their forecasts were used and were sometimes unhappy where they felt their use was inappropriate. In some cases, users were said to ignore internal forecasts that did not support their transaction and could even seek more accommodating forecasts.

> "It's frequently the case that if there's a particular deal going on, and somebody's put a projection in that shows 2% a year and your forecasts show 1% a year, there will be a lot of digging around out there, in other places, to try and find a view that concurred with the view that they wanted."
> (Forecaster working for Fund Manager)

> "In terms of how they are used, like I say, it's deal support, once the deal's done, they don't care"
> (Forecaster working for Property Consultant)

Beyond this, controls within consultancies upon other kinds of use and dissemination appeared quite relaxed.

> "The forecasts would disappear into black holes and would appear in all sorts of places."

(Forecaster working for Property Consultant)

"If they wish to use any of the forecasts, they can. All the usual health warnings about using forecasts….but if they don't wish to have any regard to them well, that's up to them."
(Forecaster working for Property Consultant))

"We put house-warnings on them. Just in terms of, taking care in how you use them, really, and if you have any questions come back to us. I suppose I'm not too precious about them. If people want to chuck them around, or people want to use them to put a case together, then hopefully they will use them in the light that they are presented."
(Forecaster working for Property Consultant)

8.4 Communicating Uncertainty

It is undisputed that there are numerous sources of uncertainty and hence potential error that are inherent in forecasts. Clearly, all the interviewees were aware of such uncertainty. However, it was also clear that expressing uncertainty to clients could be problematic. Clients or users were often not interested in uncertainty and "just wanted a number" or, alternatively, did not appreciate the inevitability of uncertainty. Highlighting this uncertainty might undermine the credibility of the forecast and the forecaster. The need to be credible seems to be an important factor for forecasters.

"Presenting uncertainty is a big problem, people want numbers, they want individual figures".
(Forecaster working for Forecaster/Investment Adviser)

"We're not doing something that's just sort of saying the standard error and so on, just say, you know, there's a certain probability it's going to be within these bounds. It's not very easy for people to work with that, they are not very comfortable with working with that sort of thing."
(Forecaster working for Fund Manager)

"If you see the standard error of some of the models that we've got, and use that to project confidence intervals, you can get, four years hence, very wide confidence intervals. And so this you can almost undermine yourself, by doing that. So, you want to try and be credible and sometimes you've go to think about how it will be received."
(Forecaster working for Fund Manager)

"Well if you bang on about forecast uncertainty too much you'll do yourself out of a job. Business people don't understand standards errors around…you know, if you showed them confidence intervals they'd say, you know, what the hell do we pay you for. So you have to be a bit careful how you present it"
(Forecaster working for Fund Manager)

"When you start talking about, well I can give you a forecast and give you some confidence intervals around that, they go, what do you mean, and then they start saying, well are you not very confident about your forecast?"
(Forecaster working for Property Consultant)

Forecasters frequently appear to overcome these problems by expressing uncertainty as part of a commentary, either in their presentations to clients or in their

reports, rather than try to capture it in some quantitative form. Generally, this is done in terms of scenarios reflecting the upside and downside outcomes.

> "I usually give numbers with some commentary as to vis-a-vis the assumptions that we are making in respect of this forecast, which is what comes out. We would highlight where we saw, there'll be something about the size of the downside risks, scenario. We would present the forecasts in quite different ways in different contexts, there isn't a standardised way in which we would always present."
> (Forecaster working for Property Consultant))

> "What you tend to do is say, look, there is a upside risk here, or a downside risk. They understand that. And you can give them some sense of the uncertainty by talking about upside and downside risks."
> (Forecaster working for Fund Manager)

Only one respondent discussed a formal approach to incorporating forecast uncertainty in decisions

> "I present my numbers as a central case plus a standard deviation, and the standard deviation is related to the required return. So the bigger the standard deviation the higher the required return"
> (Forecaster working for Forecaster/Investment Adviser).

More fundamentally, it was argued that the nature of the modelling process and the data rendered the standard errors of econometric techniques largely untrustworthy

> "The problem is that the standard error is unreliable. Since essentially the process involves forecasting off forecasts, there are complex techniques for estimating standard error. However, macro-economic forecasts providers do not provide their standard error."
> (Forecaster working for Forecaster)

> "Any stuff that we get bought in has been tinkered with. You know, it's not pure model output. So any sort of standard error, model standard error, is not appropriate."
> (Forecaster working for Property Company)

> If you're making manual adjustments, and taking a range of things on board, then it becomes more difficult to put those statistical confidence intervals around it".
> (Forecaster working for Property Consultant)

9 Conclusions

The demand for forecasts from investors demonstrates their central role in decisions about property investment. Uncertainty, however, is inherent in the forecasting process, due to (a) the intrinsic nature of the estimate (as a point drawn from a probability distribution); (b) the problems of data availability and reliability in property markets; and (c) the inherent limitations of econometric methods due, in particular, to

the effects of structural shifts and unanticipated events. This uncertainty creates the opportunity and the justifiable motive for forecast modification by both users and producers. The wider literature on forecasting confirms that these issues are not confined to property forecasting.

Some of the findings from this investigation are not surprising. Although forecasters are using some common tools (most notably a five year forecasting horizon and a multiple regression approach), and there are embryonic attempts to agree common definitions, property forecasters are using a range of inputs and data sets to form models to predict an array of variables for a range of locations. Given the range of choices to be made about the identification and measurement of these variables, at the model formation stage the use of judgement is inevitable.

The findings clearly point to widespread respect from forecasters for input from expert market participants, whose contribution to the process is valued beyond that of market scanning for missing or erroneous data. At the same, and because of the nature of forecasts as frequently part of a wider advice package, forecasters are acutely aware of the importance of maintaining client confidence and credibility. Forecasts need to be acceptable to their users (and purchasers) and consequently forecasters generally have incentives to avoid presenting contentious or conspicuous forecasts. There is clear evidence of these tendencies among a number of the forecasters in this study, with forecasts being adjusted to reduce this kind of risk.

There is little compelling evidence of herd behaviour, other than that manifest via the aversion to extreme forecasts, which appears embedded in the forecast process, if not always necessarily in the forecasters as individuals. Where extreme forecasts are generated by a model, forecasters often engage in “self-censorship” or are “censored” following in-house consultation. This distrust of large numbers may be a rational bias given the range of uncertainties about the inputs and the models – in addition to the reputational risks referred to above. There may also be an “irrational” dimension to this, reflecting the operation of a form “anchoring”. In either respect, however, it is not surprising that research has found that forecasts are often smooth relative to the underlying market.

Overall, it is clear that the property forecasting process is vastly more complex than merely the carrying out quantitative econometric modelling, and that the impact of the influences within this process vary considerably across different organizational

contexts. The findings in this paper provide a detailed depiction of the many facets of property forecasting, revealing in particular the nature and extent of the critical role performed by human judgement.

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Appendix 1

Code Name	Description of what code refers to	Code No.
Big numbers	The nature of the forecaster's reaction to forecast outputs which are extreme in relation to the "normally" expected range	**1**
Communicating with clients	Discussion of the forecast with clients (excluding discussion in its production), including identification of the quantitative and qualitative components and their robustness.	**2**
Cycles	Discussion of aspects of the cyclical nature of markets	**3**
Data consids	A general code for data considerations not covered by the more specific data consideration codes.	**4**
Data consids - availaibility variatn	The variations in the availability and/or qualityof data across different markets and sectors.	**5**
Data consids - base to fcast off	The problem of correctly identifying the current level of rent (or yield) off which to base future forecasts.	**6**
Data consids - data measurement	The problem of consistency in the way data is measured, expressed and recorded (for example, differing definition and interpretations of prime, CBD etc).	**7**
Ease-difficulty	The relative ease or difficulty of property market forecasting in comparison to forecasting other economic variables (excluding the particular problems of yield forecasting).	**8**
Ease-difficulty - Yield forecasts	The particular problem of yield forecasting and reasons attached to this.	**9**
Ec'metric models	The general issue of the use of econometric models as a model form in property forecasting, including their nature and attributes.	**10**
Ec'metric models -Re-est or restruct	The particular issue of how often and for what reason(s) econometric models used in property forecasting are re-estimated, recalibrated or more radically restructured.	**11**
Fcast context	A general code for contextual forecasting issues not captured by any of the specific contextual codes.	**12**
Fcast context - others role in Produ	The role of non-forecasters in the production of forecasts.	**13**
Fcast context - what form of models	A description of the form of model(s) used in property forecasting.	**14**
Fcast context - what markets&sectors	A description of the markets and/or sectors covered by the forecaster's forecasts.	**15**
Fcast context - what vars forecast	A description of the output variables produced and/or published from the forecaster's forecasts.	**16**
Fcast context - who are the clients	A description of the external or in-house users of the forecasts.	**17**
Fcast context- F's non-F role	Discussion of any aspects of the forecasters role that extends beyond pure forecast production.	**18**
Fcast context- why R fcasts produced	The reasons why forecasts are produced and/or the purposes to which they are applied.	**19**
Fcast failures	Descriptions of circumstances when forecasts have been significantly incorrect, and possible discussion of reasons why (but excluding specific instance of structural breaks and the London downturn).	**20**

Fcast failures - Lond downturn	Discussion of the specific problem of forecasting the London downturn of recent times.	**21**
Fcast failures - reliance on MEFs	The specific problem of the reliance of property forecasts on macro-economic forecasts (NB this links to the node: Mac-econ fcasts - Nature of vars.)	**22**
Fcast failures - structural breaks	Discussion of structural break as a reason for a model failing or becoming unsuitable in its existing form.	**23**
Fcast horizon	The future time horizon(s) over which forecasts are produced.	**24**
Fcast horizon - Mean reversion	The nature of the assumptions about mean reversion.	**25**
Freqcy of production	How often the forecasts are produced and/or updated.	**26**
From market to building	Discussion of issues relating to the transfer of forecasts of markets/market sectors/geographical sectors to specific buildings.	**27**
Get fcast right	A general code for issues relating to getting the forecast right that are not captured by the more specific codes relating to this.	**28**
Get fcast right- feeling right	Interviewees' explanations of what makes a forecast "feel" right or wrong when it is first produced.	**29**
Get fcast right- rules4acceptability	The rules, checks or procedures adopted to evaluate the robustness (generally statistical) of the model before it is finally agreed upon and prior to wider dissemination	**30**
Herd behaviour & others' forecasts	The extent to which forecasters are aware of other people's forecasts of the same variables, the perceived usefulness of this knowledge and its impact on forecaster behaviour.	**31**
How fcasts used	The forecaster's view as to the general appropriateness of the use to which the forecasts are put.	**32**
How fcasts used - by clients	Description of the specific uses to which forecasts are put by clients.	**33**
How fcasts used - by others	Description of the specific uses to which forecasts are put by users other than clients or valuers.	**34**
How fcasts used - by valuers	Description of the specific uses to which forecasts are put by valuers.	**35**
How fcasts used - control	The nature of the forecaster's control, or lack of control, over the use by others of his/her/their forecasts.	**36**
Interaction between models	The linkages between models that cover different markets (e.g. regional-national, regional-local) and between different types of model (i.e. times series vs cross sectional).	**37**
Mac-econ fcasts - Nature of vars	Discussion of the nature of the variables used as inputs to macro-economic forecasts, the problems associated with this and the implications for the use of macro-economic outputs as inputs to property forecasts.	**38**
ac-econ fcasts-sources & usefulness	Sources of macro-economic forecast data and general discussion of their usefulness (but excluding specific discussion relating to any adjustments to such data - see code "Q adjusts to inputs").	**39**
Other behavioural factors	Catch-all code for behavioural factors and not covered by other codes.	**40**
Prop-cf-Econ fcasts	Discussion of the similarities and/or differences between forecasting of property variables compared to forecasting of other economic variables.	**41**

Q adjusts 2 inputs	Discussion of whether outputs from macro-economic models are adjusted before being input to property forecasting models and reasons for any such adjustments.	**42**
Q adjusts2outputs	Discussion of qualitative adjustments to forecasts and not captured in any of the related more specific codes.	**43**
Q adjusts2outputs-clients aghast	Specific instances of where outputs adjusted prior to publication because they are perceived as unacceptable to clients and/or markets.	**44**
Q adjusts2outputs-Inhou consultation	The nature of in-house consultation prior to finalisation or publication of the property forecast and the nature of any consequent adjustments to the forecast prior to its adoption.	**45**
Q adjusts2outputs-initial is final	The frequency with which the initial forecast output is adopted as the final figure and discussion surrounding this (and not covered by other related codes).	**46**
Q adjusts2outputs-market sentiment	The particular influence of market sentiment upon adjustments made to initial property forecasts before their finalisation.	**47**
Q adjusts2outputs-user consultation	The role and nature of consultation with users of forecasts as it relates to adjustments of initial forecasts prior to finalisation and also to ongoing adjustment of forecasts models over time.	**48**
QuantQual balance	Discussion of perceptions of the respective contributions of the quantitative and qualitative dimensions of the process to the final figure.	**49**
Reviewing success	Discussion of the concept of success in forecasting not captured by related more specific codes.	**50**
Reviewing success - procedures	Description of any formal procedures used to compare past forecasts with actual outturn and discussion around this.	**51**
Reviewing success - timing it right	Perceptions of the importance of the timing aspect of "success" in forecasting.	**52**
Reviewing success-Absol vs Rel	The relative importance of absolute predictive success compared to success in predicting the relative performance of assets.	**53**
Role byond fcasting	The role or activities of the forecaster additional to the pure forecast production.	**54**
Role byond fcasting-Sellg the fcast	The presence or not, nature and importance of, selling the forecast as a necessary part of the forecasting process.	**55**
The house view	The concept of the house view and discussion about its role and importance in forecasting.	**56**
The story	The concept of the story and its role and importance in forecasting.	**57**
Uncertainty	A general code for aspects of uncertainty in property forecasts for issues not captured by the related more specific codes.	**58**
Uncertainty - means of expressing	The methods, if any, adopted to convey the uncertainty inherent in property forecasts and discussion of problems related to this.	**59**
Uncertainty-Communicating to clients	Discussion of the methods adopted, if any, to convey to clients the uncertainty inherent in property forecasts, and discussion of the problems surrounding this (including the risks to forecaster credibility of raising this issue with clients).	**60**
Unexpected shocks	How forecasts are modified following significant and unexpected events.	**61**