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THE ACCURACY OF PROPERTY FORECASTING

GRAEME NEWELL* and PETER ACHEAMPONG
School of Construction, Property and Planning
University of Western Sydney

and

ANGELO KARANTONIS
Property Research Unit
University of Technology, Sydney

* Contact author for all enquiries
Phone: 61-2-98524175 Fax: 61-2-98524185 Email: g.newell@uws.edu.au

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INTRODUCTION

Property forecasting is an important component within the property investment decision-making process for institutional investors, supporting asset allocation, property fund strategy and stock selection in a mixed-asset portfolio (Chaplin, 1999; Mitchell and McNamara, 1997). While all forecasting is subject to some degree of uncertainty, a high degree of sophistication has been developed over recent years, with a range of advanced quantitative and qualitative procedures now used by institutional investors in property forecasting, including judgemental procedures, causal/econometric procedures and time series/trend analysis procedures (Higgins, 2000; Rowland and Kish, 2000).

This has seen numerous studies in:

- forecasting property rents, stock levels, returns, yields and cash flows (eg: Benjamin et al, 1993; Brooks and Tsolacos, 2001; Chaplin, 1998, 1999, 2000; D'Arcy et al, 1999; Gardiner and Hennesberry, 1988, 1991; Jones Lang Wootton, 1992; Kummerow, 1997; Malizia, 1991; McClure, 1991; McGough and Tsolacos, 1995; Sivitanides, 1998; Wheaton and Torto, 1988)

- econometric and structural modelling (eg: Chaplin, 1999; D'Arcy et al, 1999; Gardiner and Hennesberry, 1988, 1991; Malizia, 1991; McClure, 1991; McGough and Tsolacos, 1995; Tsolacos, 1998; Tsolacos et al, 1998)

- comparison of forecasting procedures (eg: Brooks and Tsolacos, 2001; Chaplin, 1998, 2000; Wilson and Okunev, 2001; Wilson et al, 2000).

Despite this increased sophistication in forecasting methodologies, differences in property forecasts still 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 many instances, simple forecasts (eg: via naïve predictors) have been found to be more accurate than using complex econometric models (Chaplin, 1999, 2000; Higgins, 2001; Wilson et al, 2000).

While many institutional investors produce their own property forecasts, the production of economic and property forecasts (often by subscription services) by external organisations (eg: BIS Shrapnel, JLL, ANZ, Westpac) has become increasingly evident. Similarly, a number of reports on economic and property forecasts by leading property players are now readily available. These include:

- "Australian Property Directions" survey (Australian Property Institute, 2001)
    - six-monthly since September 1998
    - economic forecasts (6 months, 1, 3, 5 year forecasts)
    - commercial property forecasts (1,2,3 year forecasts)

- Jones Lang LaSalle "investor sentiment" surveys
    - Australian commercial property forecasts (JLL, 2001a); six monthly since June 1991
    - Australian retail property forecasts (JLL, 2001b); six monthly since November 1999
    - New Zealand commercial property forecasts (JLL, 2001c); six monthly since August 2001.

Assessing the accuracy of economic forecasts has been regularly conducted; for example, IMF forecasts (Arora and Smyth, 1990) and OECD forecasts (Ash et al, 1990), with professional forecasters often seen to add little to forecasts generated by simple models (Leitch and Tanner, 1995) or to perform poorly (Chumacero, 2001; O'Connor, 1997). The equivalent analysis of the accuracy of property forecasts in Australia has not been conducted, as well as there being a need for the better disclosure of the historic accuracy of economic and property forecasts in Australia (Higgins, 2001).

Given the 11-year timeframe of the JLL "investor sentiment" survey, the purpose of this paper is to utilise this JLL survey to compare these property forecasts with actual property performance to assess the accuracy of property forecasting in Australia over 1991-2000; and in particular, with the increased sophistication of property forecasting methodologies, to assess whether the accuracy of property forecasting has improved in recent years.

METHODOLOGY

Property forecasting data

Property forecasts (six-months ahead) were obtained from the Jones Lang LaSalle "Survey of Investor Sentiment" (JLL, 2001a) on a six-monthly basis over the ten-year period of June 1991-December 2000. Property forecasts were obtained for:

- office markets (6): Sydney, Melbourne, Brisbane, Canberra, Perth, Adelaide
- property sectors (6): prime CBD office, suburban office, CBD retail, regional retail, neighbourhood retail, prime industrial.

The JLL survey is conducted six-monthly, with over 300 surveys distributed to property investors (largely institutional). Respondents per survey typically account for approximately $60 billion in property portfolios.

To determine the six-month property forecasts, respondents are asked to indicate whether they would buy, hold or sell in the property markets for the above six cities and six sectors. A 'net balance" for each of these markets is determined as the percentage of respondents who respond "buy" minus the percentage of respondents who respond "sell". The larger the "net balance", the more positive is the specific market outlook or forecast. In this study, the property market forecasts are taken as the resulting market ranking (1 to 6) based on these net balances. Full details of this "net balance" methodology are given in Jones Lang Wootton (1991).

These property forecast ranks are then compared with the respective Property Council of Australia actual returns (PCA, 2001), which are also ranked for comparison purposes with the JLL forecasts.

RESULTS AND DISCUSSION

Comparison of forecasts and actuals

Table 1 presents the correlations between the forecasts and actuals for the six office markets and six property sectors over 1991-2000. Key issues in this comparison are:

(i) office market forecasting ability was best for the Sydney office market and to a lesser extent for the Melbourne office market; other cities' forecasts were poorly correlated with actuals

(ii) ability to forecast property sectors was better than for capital city office markets

(iii) property sector forecasting ability was best for prime industrial

(iv) only market that saw improved forecasting ability from 1991-95 to 1996-2000 was the Brisbane office market

(v) best forecast markets over 1991-2000 (Sydney office, industrial) were also seen to be consistently forecast over 1991-95 and 1996-2000.

Table 2 presents the average ranks for the forecasts and actuals for the various office markets and property sectors over 1991-2000. Key issues in this comparison are:

(i) forecasters tended to over-estimate the expected performance of the Sydney and Melbourne office markets and under-estimate the expected performance of the Canberra and Adelaide office markets

(ii) forecasters tended to over-estimate the expected performance of prime CBD office and CBD retail sectors and under-estimate the expected performance of neighbourhood retail and regional retail.

Overall, these results indicate some degree of variability in the ability of forecasters (in general) to forecast specific office markets and specific property sectors. In particular, those markets that were over-estimated tended to be those with the highest level of property market information available.

Forecasting accuracy analysis

Table 3 presents the analysis of forecasting accuracy over 1991-2000. Forecasts were considered to be "correct" if the ranking of forecast and actual coincided or only differed by one rank position. Key issues in forecasting accuracy are:

(i) Melbourne (65% correct) and Sydney (65%) were the most accurately forecast office markets, with Perth (30%) being the least accurately forecast

(ii) suburban office (92% correct) and prime industrial (75%) were the most accurately forecast property sectors, with CBD retail (50%) being the least accurately forecast

(iii) property sectors (72% correct) were generally more accurate forecasts than for the office markets (48%)

(iv) accuracy of forecasting of office markets improved over time, with 45% correct in 1991-95 compared to 50% correct in 1996-2000

(v) accuracy of forecasting of Sydney and Adelaide office markets improved over time, whereas accuracy of forecasting of Melbourne and Canberra decreased over time

(vi) accuracy of forecasting of property sectors decreased over time, with 91% correct in 1991-95 compared with 58% correct in 1996–2000

(vii) accuracy of forecasting of prime CBD office and prime industrial decreased over time.

Forecasting ability analysis

Table 4 presents an analysis of the forecasting ability using the accuracy measures of mean absolute error, mean absolute percentage error and the Theil U-statistic (Makridakis et al, 1998). Importantly, Theil's U-statistic allows a comparison of the forecasting ability against a "naïve" forecasting method. In this case, the "naïve" forecasting method simply used the previous actual value as the forecast for the subsequent period.

Key issues from this forecasting ability analysis were:

(i) using mean absolute percentage error, Sydney and Melbourne office markets were the most accurately forecast office markets, with Perth and Adelaide being the least accurately forecast

(ii) using mean absolute percentage error, suburban office and regional retail were the most accurately forecast property sectors, with CBD retail and CBD office being the least accurately forecast

(iii) in general, the property sectors were more accurately forecast than the capital city office markets

(iv) using Theil's U-statistic, all forecasts of office markets (with the possible exception of Melbourne) were worse than the naïve strategy of simply using the previous period's actual value; this was most evident for Sydney and Perth office markets

(v) using Theil's U-statistic, suburban office and neighbourhood retail were the best forecasts against the naïve method, with prime industrial, CBD retail and CBD office being the worst forecasts against the naïve method

(vi) in general, the property sectors were more accurately forecast than the capital city office markets, relative to the naïve method of simply using the previous period's actual value.

Property forecasting implications

Each of the four property forecasting accuracy procedures used in this paper do not necessarily provide the same definitive result regarding the accuracy of forecasting the various capital city office markets (6) and property sectors (6). However, they do help in assessing the overall accuracy of property forecasting across these various property markets.

Similarly, whilst recognising that the results are "averages" and do not denote individual forecaster's specific ability, and that the "level" of property data used in this analysis involved ranks of forecast and actual performance rather than forecast and actual returns, this paper has highlighted a number of key issues regarding the accuracy of property forecasting in Australia. These issues include:

- forecasting of capital city office markets was not as accurate as forecasting of property sectors
- most accurate forecasts tended to be for those markets for which most property information was available
- overall, the Melbourne and Sydney office markets were the most accurately forecast capital city office markets, while suburban office, neighbourhood retail and prime industrial were the most accurately forecast property sectors
- forecasting ability has generally not improved in 1996-2000 compared to 1991-95; in some markets, it has decreased
- naïve forecasts generally performed better than the current forecasting procedures used.

Given that property forecasting is an essential (and often expensive) function for developing property investment strategies amongst institutional investors, the current level of accuracy of property forecasting has room for considerable improvement to enhance the stature of property investment decision-making, particularly relative to the other major asset classes.

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Table 1: Correlation analysis (JLL forecast versus PCA actual): June '91-Dec '00

Property markets	1991-2000	1991-1995	1996-2000
Office Markets			
Sydney	.41	.40	.38
Melbourne	.29	.63	-.39
Brisbane	-.42	-.23	.61
Canberra	.35(1)	.12	-.72
Perth	-.37	-.76	-.02
Adelaide	.27(1)	.43	-.75
Property Sectors			
Prime CBD office	.04	-.07	-.01
Suburban office	.53	n.a.*	.51
CBD retail	.84	1.00*	-.38
Regional retail	.48	.90*	-.22
Neighbourhood retail	-.22	n.a.*	-.21
Prime industrial	.62	.41	.48

*: did not cover full 5-year period of analysis
(1): did not meet requirement of beta regression coefficient equals 1

Table 2: Comparison of property forecasts (JLL) versus property actuals (PCA)*

Property markets	Property forecast average rank	Property actual average rank	Significant difference
Office Markets			
Sydney	2.35	3.45	Yes
Melbourne	2.95	3.70	No
Brisbane	2.50	2.95	No
Canberra	4.45	3.35	Yes
Perth	3.85	4.40	No
Adelaide	4.90	3.15	Yes
Property Sectors			
Prime CBD office	2.15	2.70	No
Suburban office	2.33	2.08	No
CBD retail	2.81	4.06	Yes
Regional retail	3.87	3.33	No
Neighbourhood retail	5.80	4.45	Yes
Prime industrial	2.50	2.25	No

*: property forecasts and actuals are ranked on a 1-6 basis.

Table 3: Forecasting accuracy analysis: June '91-Dec '00

Property markets	Percentage of "correct" forecasts 1991-2000	1991-1995	1996-2000
Office Markets			
Sydney	65% (2)	50% (3)	80% (1)
Melbourne	65% (1)	90% (1)	40% (5)
Brisbane	40% (4)	30% (4)	50% (3)
Canberra	40% (5)	60% (2)	20% (6)
Perth	30% (6)	20% (5)	40% (4)
Adelaide	45% (3)	20% (5)	70% (2)
Overall	48%	45%	50%
Property Sectors			
Prime CBD office	74% (3)	89% (4)	60% (4)
Suburban office	92% (1)	100%* (3)	90% (1)
CBD retail	50% (6)	100%* (2)	20% (6)
Regional retail	73% (4)	80% (5)	70% (3)
Neighbourhood retail	73% (5)	0%* (6)	80% (2)
Prime industrial	75% (2)	100% (1)	50% (5)
Overall	72%	91%	58%

*: did not cover full 5-year period of analysis

Table 4: Forecasting ability analysis: June '91 - Dec '00

Property markets	Mean absolute error	Mean absolute percentage error	Theil U-statistic*
Office Markets			
Sydney	1.50	7.50%	1.76
Melbourne	1.45	7.25%	1.05
Brisbane	1.95	9.75%	1.21
Canberra	1.90	9.50%	1.49
Perth	2.25	11.25%	1.58
Adelaide	2.25	11.25%	1.48
Property Sectors			
Prime CBD office	1.25	6.25%	1.42
Suburban office	0.25	1.25%	0.59
CBD retail	1.10	5.50%	1.60
Regional retail	0.70	3.50%	1.06
Neighbourhood retail	0.75	3.75%	0.87
Prime industrial	0.85	4.25%	1.88

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

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

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