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Forecasting Property Market Cycles:
An Application Of The RICS Model To The Sydney CBD Office Market

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In May, 2000 the RICS Research Foundation published "Forecasting Office Supply And Demand". The publication included a multi-equation office market forecasting model based on office market cycles for the City of London (the "RICS Model").

The RICS Model adopted variables intended to be common to all office markets around the world and so may be expected to be capable of application to the Sydney CBD office market.

Using data sourced by Jones Lang LaSalle, the RICS Model was applied to the Sydney CBD office market and the results observed.

Through a review of the differences arising from UK and Australian data sources and structural differences between the City of London and Sydney CBD office markets, the results of the RICS Model are analysed and suggestions made to improve its future use in Australian property markets.

Introduction

The RICS Research Foundation was launched in January 2000 to make a real contribution to the development of the property profession and to the support and encouragement of a dynamic research community. The clear mission and strategy of the RICS Research Foundation are to deliver focussed business solutions and to develop innovative solutions to problems being faced by the profession. Many issues affecting property markets are global in nature, such as the challenge of urbanisation, how to use scarce land resources and the relationship between economic cycles and the property and construction markets.

In May, 2000 the RICS Research Foundation published "Forecasting Office Supply And Demand" detailing the findings of research commissioned by the Corporation of London and the RICS Research Foundation and conducted by Dr Neil Blake of Business Strategies Limited, Dr George Matysiak of City University Business School and Professor Colin Lizieri of the University of Reading. The RICS Research Foundation made available copies of both the full report (Blake et al (2000a)) and the summary report (Blake et al (2000b)) for this study.

Blake et al (2000a) contend that the ability to model the future supply of and demand for office space may, at the least, provide a powerful tool to mitigate the amplitude and effects of the property cycle. The publication included a multi-equation office market forecasting model based on office market cycles for the City of London (the "RICS Model") which was intended for application to other world office markets.

However, the authors acknowledge that the City of London office market has the best data availability in the United Kingdom, with such a level of data possibly not existing in other markets and so potentially limiting the applicability of the RICS Model.

The purpose of this paper is to apply the methodology of the RICS Model in an Australian setting. For this purpose, the Sydney CBD office market was chosen because:

- it is the largest office market in Australia;
- it is a mature market;
- it has a deep pool of available data; and
- it has exhibited cyclical movement similar to that of the City of London.

The principal issue for consideration is whether the RICS Model is capable of effective application to a market other than that of the City of London.

To address the principal issue requires consideration of a range of secondary issues including:

- whether the Sydney CBD office market displays similar characteristics to the City of London market;
- whether that data available for the Sydney CBD office market is comparable to that for the City of London office market;
- whether the web based model is user friendly or requires significant redesign for application to an alternative market; and
- the results derived from the use of the RICS Model for the Sydney CBD.

The present paper builds on earlier work (MacFarlane et al, 2001) utilising data from Jones Lang LaSalle which is more extensive and consistent than that previously available. Recent discussion of the "RICS model" (notably Damesick, 2001) has also been included.

The RICS Model
Figure 1 summarises the structure of the RICS Model which essentially comprises two halves being the supply side and the demand/price side. The model was developed using general concepts of office market dynamics and specific data for the City of London office market with the aim of creating a model, consistent with the mission and strategy of the RICS Research Foundation, that was capable of application in other global office markets. This section draws heavily on Blake et al (2000a) which is generically attributed herewith.

In designing the model, the authors had particular regard to previous studies of the central London office market (Wheaton et al (1997) and Hendershott et al (1999)), identified the similarities and differences in each together with the gaps and developed enhancements and extensions to address same. Damesick (2001), in an otherwise critical review of the RICS Model, acknowledges it is "logically structured and technically sophisticated" and that the inclusion of a direct link to the capital markets through the influence of gilt yields on development is advantageous.

On the supply side, the RICS Model addresses the interaction between rents and the amount of space made available. Supply is considered as largely a lagged function of rents. An increase in rents leads to additional starts but with a significant lag of 2 or more years until the new space is completed. This creates a recursive system where demand and rents interact with a pre-determined supply situation and where supply subsequently adjusts. Such a delayed reaction means that large fluctuations in rents are possible before the market clears. New building starts are influenced not only by rents, but also by planning policies and the capital gains anticipated. The lag of 2 or more years to complete new office space means that the expectations of future market conditions (rents, yields, vacancy rates, etc.) play a key role in the decision to develop new sites. Hence, the ability to more accurately forecast these future market conditions is all the more critical.

On the demand side, the RICS Model addresses the amount of space taken up at a given rent. The main driver of demand is employment. Essentially, in the short term, available stock is given as is the level of employment that needs to be accommodated in the City's offices. This means that if the ratio of demand to available stock increases, real effective rents will increase and vacancy rates will fall.

The authors deliberately chose a stock intensity variable (being the employment to stock ratio) rather than a vacancy rate to avoid definitional issues and under-enumeration of the vacancy rate due to vacancy or under-occupation of space within a firm's corporate property portfolio. The employment to stock ratio accounts both for stock that is available (i.e.: formally on the market) and for changing levels of intensity of occupation. As demand for space falls, stock will be released onto the market and firms, unable to sub-let or assign surplus space, will under-occupy. This will be reflected in a lower employment to stock ratio. Conversely, in tight markets available space will be absorbed and firms, unable to expand or unwilling to pay higher rents, will use their existing space more intensively by reducing floorspace per worker ratios. Thus the employment to stock ratio overcomes the inherent sensitivity of a vacancy figure based on availability.

As shown in Figure 1, the RICS Model uses ten equations where supply and demand components are estimated:

Equation 1   Stock/available space
The available stock of office space in square metres at the end of the period is equal to the stock at the end of the previous period (start of the current period) plus any newly completed office space during the period less any depreciation/withdrawals from the stock during the period.

In the RICS Model, data for the available stock and new completions was sourced from the City Corporation with that for depreciation/withdrawals being derived;

Equation 2   Starts
The level of starts in the current period is a function of the expected change in capital values (approximated by real effective rents divided by the gilt yield plus an assumed constant risk premium), real effective rents in the current period and the amount of planning permission for new space in the previous period but which is not currently being developed. This reflects the two principal drivers for office development being rental returns and the prospect of capital gain, subject to the impact of planning policy.

In the RICS Model, data for starts was sourced from the City Corporation, gilt yield was that for nominal zero coupon yields medium dated 10 years sourced from ONS, real effective rents were derived and data for the amount of planning permission for new space but which is not currently being developed was sourced from the City Corporation;

Equation 3   Completions
The level of newly completed office space in the current period is a function of the level of new starts in previous periods. The authors derive data for completions by assuming that all starts are eventually completed with a development period from start to completion of eighteen months to three years (3 to 6 semi-annual periods);

Equation 4   Expected rents
The expected rent two years ahead is forecast as the product of the real effective rent in the current period (being nominal effective rents deflated by the GDP deflator) and a function of the change in office based employment in the City in the current period and gilt yields in the current period.

In the RICS Model, data for office-based employment in the City was sourced from Business Strategies and ONS;

Equation 5   Expected yield on gilts
The expected gilt yield two years ahead is forecast as the gilt yield in the current period plus a function of the change in the price level (GDP deflator). Effectively, a change in the rate of inflation is used as a predictor of future gilt yields or, more practically, an indicator of how market participants might form a view on future gilts movements. Effectively, when inflation is going up, market participants think that gilt yields will increase and vice versa and beyond that they do not know. It is considered particularly interesting that the RICS Model should find a variable which reflects such a behavioural limitation to be significant.

In the RICS Model, data for the GDP (at market prices) deflator was sourced from ONS;

Equation 6   Depreciation/withdrawals
The level of depreciation or withdrawals from stock in the current period is a function of the available stock of office space in the previous period and the level of new starts in the current period. This reflects withdrawals because of obsolescence relative to the size of the stock and withdrawals through demolition in order to create space for new starts.

On average, this was found to equate to a withdrawal of about 1% of the stock every six months which was noted to be consistent with market perceptions;

Equation 7   Amount of planning permission for new space but which is not currently being developed
The amount of planning permission for new space but which is not currently being developed in the current period is equal to that for the previous period plus the level of new planning permission given in the current period less the level of new starts in the current period.

In the RICS Model, data for net new planning permission granted was derived;

Equation 8   Real effective rents - short term and long term
Real effective rents in the current period are driven by the level of office based employment in the City in the current period and the available stock of office space in the previous period. The authors also use a "dummy" variable to account for the change in office-based and non-office-based employment in the City of London over the data period (1980 to 1998).

The RICS Model focuses attention on prime rents, rather than secondary rents, on the basis that it is the prime end of the market that drives decisions on new supply and demand with the secondary market acting as a residual.

In the RICS Model, data for effective rents was sourced from the author's calculations;

Equation 9   Headline rents
Incorporated for completeness, headline rents are a function of effective rents, average rent free periods in months, average lease lengths in years and gilt yields.

In the RICS Model, data for headline rents was sourced from CB Hillier Parker with that for average rent free periods and for average lease lengths from the authors estimates. From this, effective rents were derived; and

Equation 10   Rent free periods
Average rent free periods in the current period are a function of average lease length in the current period, average rent free periods and lease length in the previous period and real effective rents in the current period.

The RICS Model is configured as an Excel spreadsheet workbook comprising eight linked worksheets with navigation by user-friendly buttons:

Model Overview	- describes the equations and identities used;
Baseline Forecasts	- detailed forecasts and workings of the Model;
Simulation 1	- scenario forecasts;
Simulation 2	- scenario forecasts;
At A Glance	- graph showing expected rents;
Source Data	- list of variables used;
Coefficients	- coefficents generated by equations;
Residual Feedback	- historical data and residual effects from equations.

The RICS Model is available free of charge on the Internet at

www.rics-foundation.org/officemodel.html

and is designed to be applied to other global office markets following the loading of relevant data.

Damesick (2001) identifies several "reservations", "quibbles" and concerns with the RICS Model, including:

- modelling the City of London market as a completely closed system with no interaction with or influence from other parts of the London office markets, citing the impact of Canary Wharf as an invalidating example;
- the inevitably strong reflection of the last major market cycle on the RICS Model, noting that City of London office development activity in the late 1990's was very different in both scale and nature to the 1980's;
- consequently, the RICS Model implies that there is no difference to the impact on supply if office development is speculative or pre-let;
- accordingly, the RICS Model further implies that there is no impact arising from the difference between movement into pre-let office space or speculative office space on the timing and quality of the refurbished vacated office space included in supply;
- that it is debatable whether the RICS Model offers significant new insights into the dynamics of the City of London office market;
- that the RICS Model makes no direct reference to the US literature on modelling and forecasting office markets nor the (often proprietorial and confidential) work of research consultancies and commercial property advisors; and
- that Blake (2000a) does not include any forecasts of office market activity, merely "simulations of re-written history."

To operate effectively for the Sydney CBD office market, it may be contended that the RICS Model will require:

- considerable commonality of market characteristics;
- availability of closely comparable hard data inputs; and
- capacity to support the derived, assumed and author sourced soft inputs,

as those for the City of London.

Similarity of Office Market Characteristics

The Sydney CBD office market has many structural similarities to the City of London office market. It is a clearly defined area, being compact and bounded by water and Central Station, such that cluster analysis to define the area is not required. The Sydney CBD is administered by one Council, being a market relatively independent of and not significantly influenced by other adjacent markets. As a large office market, it is of sufficient scale to generate local effects and exhibit common internal patterns of behaviour.

The Sydney CBD is the highest order centre of the urban hierarchy for New South Wales, being a global city where financial and professional services dominate, rather than having a manufacturing or other base. It has a specific nature of dense existing development, significant size, functional sophistication and a high cost of new development. It is, in many respects, the Australian equivalent of the City of London.

Similar to the City market, the greatest period of growth in office stock took place in the very late eighties through to the early nineties in response to substantial increases in rents (and capital values) driven by earlier financial deregulation in the mid-eighties. In both markets, this late eighties/early nineties new supply in office stock coincided with a significant global economic downturn resulting in a massive decline in rents and capital values causing unprecedented havoc in the office space markets and associated areas of property investment.

The main difference, however, between the City of London and Sydney markets is that while the growth in office stock over the 20 year period to the late 1990s represented an increase of about 12% in the City of London, it represented a 40% increase in the Sydney CBD.

Further differences include lease lengths being significantly shorter, on average, with average building height and construction periods being greater in Sydney together with the prevalence of effective rent structures in Sydney following a period of volatile face rent and incentive structures. These factors, particularly the larger individual buildings and the longer construction periods, mean that timing is possibly more critical in the Sydney market than in the City of London with a greater potential for extremes in the cycle and for mis-timing development decisions.

Though it is also likely that idiosyncratic differences will arise between the Sydney CBD and the City of London office market at different points in time, the construction of the RICS Model has a compelling logic which suggests it should be capable of application to the Sydney CBD office market.

Comparability of Available Data

In addition to considerable commonality of market characteristics, to operate effectively for the Sydney CBD office market, it may be contended that the RICS Model will also require:

- availability of closely comparable hard data inputs; and
- capacity to support the derived, assumed and author sourced soft inputs.

Damesick (2001) also identified several concerns with the data required for the operation of the RICS Model, including:

- the reliability of employment data, given that the demand side of the RICS Model (and any forecasts arising

therefrom) are heavily dependent on such data which appears inherently deficient;

- the need to predict how much floorspace will be included in planning consents in the future in order to produce a forecast using the RICS Model; and

- that the RICS Model dispenses with "intermediate" market variables such as office take-up, availability or vacancy rates.

To apply the RICS Model to a market other than the City, the user is required to replace the City data with locally relevant, closely comparable, hard data inputs for:

- available stock (STOCK - Equations 1, 3, 6 and 8);
- completions (COMP – Equation 1 and 3);
- starts (ST - Equations 2, 6 and 7);
- gilt yields (Y - Equations 2, 4, 5 and 9);
- office based employment (N - Equation 4 and 8);
- GDP deflator (P, PDGDP - Equations 4, 5, 8 and 10);
- level of planning permissions for new space not currently being developed (PM, PIPPM - Equations 2 and 7); and
- headline rents (HRENT - Equation 9).

and to modify the worksheets for Baseline Forecasts (update with historical data for both exogenous and endogenous variables and forecasts for the exogenous variables plus future values for the residuals), Coefficients (entering new estimated coefficients which have been separately derived in an appropriate software package) and Residual Feedback (replace historical data with local data).

In addition to the required hard data inputs, above, the following derived, assumed and author-sourced soft inputs require support in the local market:

- depreciation/withdrawals (DEP - Equations 1 and 6);
- nominal/real/effective rents (R, ERENT - Equations 2,4,8,9 and 10);
- net new planning permissions granted (NP, NPM - Equation 7);
- average rent free periods (RFP - Equations 9 and 10); and
- average lease lengths (LL - Equations 9 and 10)

These various aspects of data integrity are considered, sequentially, below.

Data Availability and Time Period
The base data used by the current authors (which, it is considered, is the best available, having been compiled by Jones Lang LaSalle's Sydney office) is significantly different to that available to Blake et al (2000a) in a number of areas. Firstly, semi-annual (half-yearly) data is not available on a number of factors (notably starts and planning permissions) until recent times (mid 1990s onwards) and could not easily and practically be reconstructed on most other factors (stock, completions, etc.) from the historic record of some 30 years of data. Hence, the authors have only used annual data. This data is confidential in nature and has not been reproduced in this paper in a form which reveals the underlying data. Further, the lack of historic data on starts and planning permissions has meant that these factors could not be used in the models for the Sydney CBD office market. Data on office based employment is available from the City of Sydney Council from their Floorspace and Employment surveys (1976, 1986, 1991, 1997) and has been interpolated into an annual series using annual New South Wales employment data (by industry) from the ABS.

Hard Data Inputs

Table 1 summarises the hard data input requirements of the RICS Model and the data available for use in application to the Sydney CBD:

RICS Variable Name	Description	Comment on Sydney Data Availability*
STOCK	Stock of office space	Available
COMP	Completions	Available
ST	Starts	Not historically available
Y	Nominal Zero Coupon yields (10 year)	Available (Reserve Bank)
N	Office Based Employment	Available but not highly reliable as it is largely interpolated between 5-yearly surveys (City of Sydney and ABS)
PDGDP	GDP (at market prices) deflator	Available (ABS)
PM/PIPPM	Level of planning permissions for new space not currently being developed	Not available
HRENT	Headline Rent	Available

* Data from Jones Lang LaSalle unless otherwise indicated

RICS Model - Data Requirements and Availability - Sydney
Table 1

Significantly, of the eight hard data inputs required to operate the RICS Model for the Sydney CBD, two are not available and one is available but of dubious quality.

The lack of availability of net new planning permissions data and the difference in frequency of the data make it virtually impossible to use the RICS Model and spreadsheets directly. It is eminently possible, however, to use the underlying RICS methodology (with some amendments to allow for these differences).

Soft Inputs

Six soft inputs, being either derived, assumed or author-sourced, were identified, above, within the RICS Model. Whilst such inputs may not have been available as hard data in the data set for the City of London, Table 2 details those four for which hard data is available for the Sydney CBD:

RICS Variable Name	Description	Comment on Sydney Data Availability*
RERENT (R)	Real effective rents	Available
ERENT	Prime effective rent	Available
RFP	Average rent free period	Available[##]
LL	Average lease length	Available[#]

- Data from Jones Lang LaSalle unless otherwise indicated.
- [#]Assumed to be 10 years – anecdotal evidence suggests a recent trend to less than 10 years is emerging.
- [##]Expressed on a 10 year lease.

RICS Model - Data Requirements and Availability - Sydney
Table 2

Thus, the only soft input to the RICS Model for which hard data is not available for the Sydney CBD is net new planning permissions (NPM).

On the other hand, Blake et al (2000a) do not use "vacancy rate" as a variable in their model, giving a number of reasons why the available data on vacancy rates is an unreliable indicator of supply-demand market dis-equilibrium. While some of these concerns relate to all markets, some are more specific to UK market and particularly the City of London, where longer leases (of the order of 25 years) have historically been the norm. This impacts markedly on "hidden" vacancy.

For the Sydney CBD office market, accurate hard data on vacancy rate is available. It is also generally acknowledged, locally, that vacancy rates are a key factor in the Sydney CBD office market, having a very strong, inverse relationship with real effective rents and acting as a trigger for office space decisions on individual sites. The vacancy rate (often lagged) has been incorporated into a number of the equations for the Sydney office market and is a very significant factor in these equations.

Interestingly, two of the concerns identified by Damesick (2001) with the data required for the operation of the RICS Model have proved to be significant for the Sydney CBD, being the reliability of employment data and the role of "intermediate" variables.

The absence of data for net new planning permissions and the amount of planning permissions for new space not yet developed, the availability for the Sydney CBD of hard data for which there was only soft inputs in the City of London and the inclusion of vacancy rate as a variable contribute to substantial operational differences when applying the RICS Model to the Sydney office market.

Summary Statistics For Sydney CBD
Table 3, provides summary statistics for the variables used in the model for the Sydney CBD office market. Comparable figures for the City of London (Blake et al (2000a)) are also given (on the line below). While the RICS report indicates that these are either "level or annual percentage changes" it is not abundantly clear that this is always the case given that the City of London data is semi-annual.

Variable Name	Start:End	Mean	Std Dev	Max	Min
COMP('000m2)	1970:2000	130	79	313(90)	13(80)
		98	84	325(89:2)	2(83:1)
DEP ('000 m2)	1970:2000	46	45	157(97)	0(various)
		69	75	392(98:1)	1(83:1)
ERENT (% ch.)	1975:2000	9	18	46(94)	-33(92)
		6	18	35(96:2)	-31(92:1)
HRENT (% ch.)	1975:2000	8	13	36(81)	-15(92)
		5	14	28(97:1)	-29(92:1)
LL (years)	1970:2000	10	0	10(various)	10(various)
		17	3	25(90:1)	14(94:2)
N(% ch.)		1.2	2.8	6.1(94)	-4.4(91)
		0.4	4.9	8(95:2)	-8(91:2)
NPM ('000 m2)	n.a.	Not available			

		147	145	605(87:2)	-16(91:1)
PDGDP(% ch.)	1970:2000	7	4	16(74)	-0.2(97)
		5	2	7(90:2)	1(94:2)
PIPPM ('000 m2)	n.a.	Not available			
		9	27	110(86:2)	-23(98:1)
RERENT (% ch.)	1975:2000	2	16	43(94)	-33(92)
		2	18	31(96:2)	-34(92:1)
RFP (months)	1980:2000	16	17	56(93)	0(various)
		21	11	36(94:2)	6(98:1)
ST ('000 m2)		Not available			
		119	114	515(87:2)	3(93:2)
STOCK(ch.'000m)	1970:2000	85	90	317(92)	-104(97)
		126	118	515(87:2)	3(93:2)
Y (% yield)	1970:2000	10	3	15(81)	5(98)
		9	2	14(82:1)	5(98:2)
VAC (%)	1970:2000	8	7	22(92)	1(87)

RICS Model – Summary Statistics
(Upper Line Sydney – Lower Line City of London)
Table 3

In comparing the Sydney and London summary data in Table 3, it needs to be remembered that the Sydney data is annual while the London data is semi-annual. A number of the differences can be attributed to the relative sizes and age of the two office markets (in 1997, the London office market was approximately 7 million m^2 compared to approximately 4 million m^2 in the Sydney CBD). In both markets, the most significant events of the last 20 years have coincided (over-construction in the late 1980s, general economic downturn of the early 1990s and the emergence of the office markets from these setbacks in the mid-1990s).

As a result, many of the extremes indicated in Table 3 have coincided in the two markets (most notably in the rental variables and in office market employment). Also, bond/gilt yields are now part of the global economy and large differences in bond yields between Australia and the UK would not be expected.

User Friendliness of RICS Model
While the spreadsheets incorporating the RICS Model are quite easy to use and follow, the substantive differences in the available data for Sydney compared to City of London rendered the RICS Model unusable for the current study. Even given greater similarities in the available data, differences in market fundamentals (lease length, construction time) and differences in the behaviour of the two markets are very likely to generate different equation specifications to those for the City of London. These, in turn, may require complex re-write of the formulae in the Base, Simulation and Residual Feedback spreadsheets.

The fact that another package needs to be used (Eviews by the current authors) to estimate the coefficients for the local model - which could be incorporated into the RICS spreadsheet together with the local data – means that it is probably easier to build a separate set of spreadsheets for the local data and model or to do any simulation or forecasting in the package used for the estimation.

Results Derived From Application of RICS Model to Sydney CBD Office Market

The following results were obtained for the dynamic equations (those equations requiring the estimation of parameters as opposed to being simple identities arising from definitions – Equations 1, 7 and 9). A number of the equations for the London market incorporate forecasts (or 'expectations') of market factors (bond yields, effective rents, capital values) four periods ahead as four half-years (two years) is the approximate average construction period. For the Sydney model, this has been converted to two or three periods (years in the Sydney model) as the comparable period ahead that developers are attempting to anticipate. For the Sydney office market with its generally larger buildings and longer construction period, there is a valid argument that the model should incorporate a three year horizon over which to anticipate critical market conditions when currently starting projects will come on stream.

Equations 2/3

Equation 2/3   Completions (estimated equation)

Specification:

$$COMP_t = \beta_1 \, DEP_{t-1} + \beta_2 \, DEP_{t-2} + \beta_3 \, DEP_{t-3} + \beta_4 \, VAC_{t-3}$$
$$\beta_5 \, \ddot{A}VAC_{t-3} + \beta_6 \, RERENT_{t-3} + \beta_7 \, \ddot{A}RERENT_{t-3} + r_t$$

Data: 1979 - 2000

Coefficient	Estimated Value	Estimated t-statistic
β_1	0.564	1.99
β_2	0.195	0.62
β_3	0.699	2.67
β_4	-5033.759	-3.41
β_5	-6431.484	-1.47
β_6	200.882	3.68
β_7	-372.098	-1.30

$R^2 = 0.86$ DW = 1.84
Adjusted $R^2 = 0.81$

Equation 2/3 varies from that in the RICS model due to the lack of data on starts requiring completions to be estimated directly from other factors (withdrawals of stock, vacancy rates and rents). Data on planning approvals was also not available. The signs of the estimated coefficients in the forecasting equation are as expected with the exception of the change in rent variable (which is not significant at the 5% level). The first three variables indicate that withdrawn stock is returned to the office market at a rate of in excess of 1.4 m^2 for every 1 m^2 withdrawn. The most significant of these variables correspond to a one or three year lag and could be interpreted as largely refurbishment (one year lag) or new construction (three year lag). The four year lag term was also tested but was not significant. It is notable that the most

significant variables in the above equation are the vacancy rate and the real effective rent (both lagged three years).

Equation 4

Equation 4   Expected Change in Rents (estimated equation)

Specification:

$$\ln(R_{t-2}^{e,t}/R_{t-2}) = \beta_0 + \beta_1 \ddot{A}Y_{t-2} + \beta_2 \ddot{A}VAC_{t-2} + r_t$$

With R_{t-2} the Real Effective Rent at time (t-2) and
$R_{t-2}^{e,t}$ the expected Real Effective Rent at time t, forecast at time (t-2)

Data: 1977 - 2000

Coefficient	Estimated Value	Estimated t-statistic
β_0	0.023	0.51
β_1	0.010	0.34
β_2	-0.059	-4.22

$R^2 = 0.49$ DW = 1.31
Adjusted $R^2 = 0.44$

Equation 4 is not a very good fit with only the variable on change in vacancy rate ($\ddot{A}$ = first difference) being significant.   The RICS model used change in workforce numbers in place of the vacancy rate, but the vacancy rate works much better in the Sydney models. According to equation 4, bond yields are not a relevant factor in predicting future rental movements. This model produces results which are only slightly inferior if three year lags are used in place of the two year lag. This is relevant as the equation is concerned with expectations of future real effective rent levels at the time construction is about to commence. The comparable equation in the London model had $R^2 = 0.78$.

Equation 5

Equation 5   Expected Gilt (Bond) Yields (estimated equation)

Specification:

$$Y_t \; = \; \beta_0 + \beta_1 \, Y_{t\text{-}2} + \beta_2 \, \ddot{A} \, \dot{P}_{t\text{-}2} + r_t$$

Where $\ddot{A}\dot{P}$ = change in the rate of inflation, $\dot{P} = 100(P_t / P_{t\text{-}1} - 1)$

Data: 1972 - 2000

Coefficient	Estimated Value	Estimated t-statistic
β_0	2.345	1.75
β_1	0.666	4.82
β_2	0.143	1.55

$R^2 = 0.59$ $DW = 1.03$

Adjusted $R^2 = 0.56$

Equation 5 relates changes in bond yields (two years ahead compared to current yields) to current changes in the CPI. The equation here will forecast only somewhat better than anticipating that bond yields in two years' time will be the same as they are currently.

Equation 6

Equation 6   Depreciation/Withdrawals (estimated equation)

Specification:

$$DEP_t \; = \; \beta_1 \, VAC_{t\text{-}1} + \beta_2 \, STOCK_{t\text{-}1} + \tilde{n} \, e_{t\text{-}1} + r_t$$

Data: 1972 - 2000

Coefficient	Estimated Value	Estimated t-statistic
β_1	-3972.799	-2.28
β_2	0.025	4.62
$\tilde{n}$	0. 513	3.09

$R^2 = 0.54$ $DW = 1.91$

Adjusted $R^2 = 0.51$

Due to the limited data on STARTS, this variable has been omitted from Equation 6 and replaced by the variable VAC (lagged one period). The fitted model indicates

annual withdrawals of the order of 2.5% of current stock. This figure is comparable to that from the London model (about 1% of current stock every six months). The model also indicates that more stock is removed from the office market when vacancy rates are lower – as would be expected in view of the high rents achievable on new office space at that time.

Equation 8

Equation 8   Real effective Rents (estimated equation)

$$R_t = \beta_0 + \beta_1 \, VAC_{t-1} + \tilde{n} \, e_{t-1} + r_t$$

Data: 1976 - 2000

Coefficient	Estimated Value	Estimated t-statistic
β_0	517.312	11.87
β_1	-13.470	-5.50
$\tilde{n}$	0.799	6.73

$R^2 = 0.91$ $DW = 1.26$
Adjusted $R^2 = 0.90$

Equation 8 indicates the strong relationship in the Sydney office market between rents and the vacancy rate. Inclusion of the stock intensity ratio, as per the RICS formulation, adds nothing to the model and nor is it a suitable alternative to the vacancy rate.

Equation 10

Equation 10   Average rent Free Period (estimated equation)

Specification:

$$RFP_t = \beta_1 * VAC_t + r_t$$

Data 1984:2000

Coefficient	Estimated Value	Estimated t-statistic
β_1	2.370	25.87

$R^2 = 0.94$ DW 1.53

In the Sydney office market, rent free periods stem from the mid-80s office market in which landlords induced tenants into office space while trying to maintain, as far as possible, the face rent. Over the period since the mid-80s, the average lease length in the Sydney office market has not changed significantly, which differs from the London office market where a significant proportion of recent leases have been made

for lease periods considerably less than the traditional 25 year norm. Equation 10 uses a very simple linear model to estimate the rent-free period in a standard 10-year lease. Over this period, the model indicates that the rent-free period has increased by over two months for each 1% increase in the vacancy rate.

Summary

As can be seen from the above discussions of the individual forecasting equations, while the spirit of the RICS model flows through, the significant difference in available data and factors specific to each particular office market (London or Sydney) result in somewhat different specifications of the overall model.

In its current form, the model of the Sydney office market can now be used to examine alternative policies or market conditions against the historic data, just as the RICS model is used to examine a number of different scenarios commencing in 1986 and examining their impacts through to the present time. While this is a very useful form of market examination, it provides only a partial indication of the impact of current planning policies/decisions or the future impact of current market conditions.

Conclusions

Damesick (2001) notes Blake (2000b) makes the following "ambitious claim":

> "Imagine a world … where we can be more certain of what the
> future holds for us … this report explains what you need to do
> to start converting fantasy into reality" (page 1)

and that whilst Blake (2000a) seeks the "true prize" of being able to replicate the approach in other markets, no attempt to do so is conducted.

This paper contributes an attempt to replicate the approach of the RICS Model in another market and, by so doing, substantiates that phrase omitted by Damesick (2001) from within the second trio of dots in the "ambitious claim" of Blake (2000b), being:

> "Imagine no longer. This new research from the Corporation of
> London and the RICS Research Foundation allows us to take
> the first steps towards a world where this will be possible"
> (page 1)

The RICS methodology provides an extremely useful basis for studying office markets, bringing together the key factors which impinge on the supply and demand sides of the market.

The "first steps" taken in this paper serve to highlight the enormous challenges to the operation of a single model posed by differences in office market structures and data availability and quality between the Sydney CBD and the City of London. Such challenges are compounded in the operation of the RICS Model which was found to be relatively user unfriendly, requiring significant redesign for application to the Sydney CBD office market.

Whilst the current study has successfully applied the RICS methodology to produce a forecasting model (a set of equations) for the Sydney CBD office market, it was unable to use the accompanying spreadsheet due primarily to the significantly different data available on the Sydney office market.

While the City of London and Sydney office markets are similar in many ways, the differences between them in lease structures, average construction time and the occasional market-specific perturbations necessitate changes to the basic model of sufficient magnitude so as to make it extremely difficult to incorporate into a generally applicable spreadsheet.

Accordingly, data issues and differences in market structure preclude the effective application of the RICS Model to the Sydney CBD office market.

It is likely that such differences between market circumstances and differences in available data would also be found elsewhere when comparing markets in different countries. This is regrettable since the development and application of a reasonably simple, generally applicable and universally accepted model would greatly help in allowing key decision makers (such as developers, investors, bankers, planners and so forth) to better understand the dynamics of their office market and the collective impact of their individual decisions, so potentially mitigating the amplitude and effects of the property market cycle.

The RICS methodology does, however, draw attention to the significance of the role of expectations in the operation of the property market by endeavouring to mirror the behaviour of market participants looking forward and making explicit many issues that are implicit in decision making.

Further, it underscores the pressing need for consistent global standards and terminology in property analysis and valuation to ensure comparability of data in each global office market. Such comparability needs to be not only in form (a common name for the same variable) but also in time (a common period of collection – such as semi-annually), preferably being supported by an historic time series data set on the same basis and being comprehensive across all markets. Ideally, a global body would set standards and terminology and provide a clearing-house for both historic and current data to ensure the widest possible distribution. The absence of such global consistency potentially inhibits the growth in global property investment relative to other asset classes.

Since at least two complete cycles of data are necessary to produce acceptable forecasts, the length of the property cycle in the city under analysis is critical. Australian office market cycles are of the order of 15 years or longer resulting, effectively, in data only being available for the last two cycles

From the viewpoint of the Sydney CBD, further refinement of the RICS Model to address issues identified by Damesick (2001) may be helpful, such as:

- allowing for the impact of the health of adjacent major
  markets (such as North Sydney);
- reflecting the scale and nature of past office market cycles;
- distinguishing between the impact of pre-let and
  speculative developments on supply; and
- the impact of new development on refurbished office
  accommodation as contributors to supply,

in addition such issues as:

- having regard to the impact of nominal and effective rental
  levels in non-prime CBD office accommodation on prime
  CBD office accommodation levels;

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- considering the behavioural drivers of development, leasing and investment;
- considering the impact of differing lengths of office market cycles in different cities;
- reflecting influences on the propensity for development, such as availability and cost of equity and debt;
- incorporating an allowance for the impact of momentum or the herd mentality on the participants in the CBD office development, investment, leasing and financing markets; and
- amending the model to better forecast future office market activity as opposed to exploring the impact of alternative historic scenarios.

It is considered interesting that, whilst Blake (2000b) invites the reader to "imagine a world" (page 1) and the RICS Model is universally available on the internet, the author then cites cities such as Reading and Leeds, asserts a belief the "equivalents can be found for virtually all of the data required in most town and cities" (page 12) and refers to an improvement in "our understanding of the operation of UK markets" (page 9).

Perhaps, as the above findings suggest, the RICS Model may be potentially more effective for other UK office markets than for other global office markets. Development of a base model with plenty of adjustable variables to describe an office market of pristine purity in economic theory, without adjustment to suit the practicalities of the City of London office market and it's data set, may have provided a preferable template for application in non-UK office markets.

However, despite the limitations noted above, there is still a great deal which can be accomplished in individual markets through the application of methodology along the lines of that developed in the RICS sponsored research into the City of London office market.
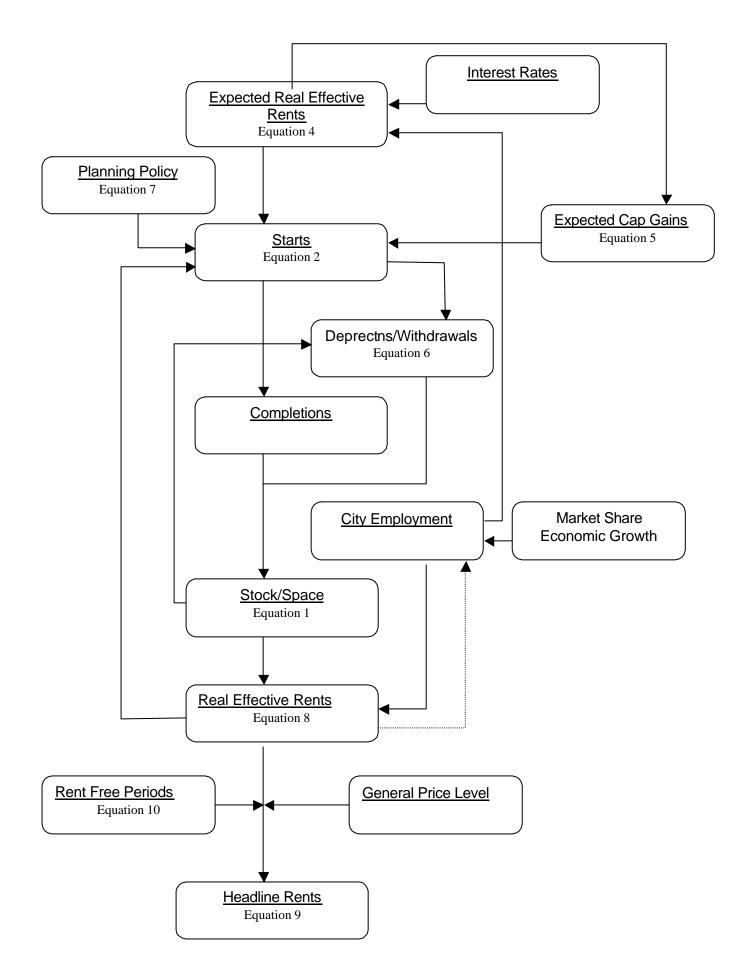
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**Model of the City Office Market
Figure 1**