Predicting Behaviour in Australian Securitised Property Markets*

By Patrick J. Wilson, John Okunev, Tiffany Hutcheson

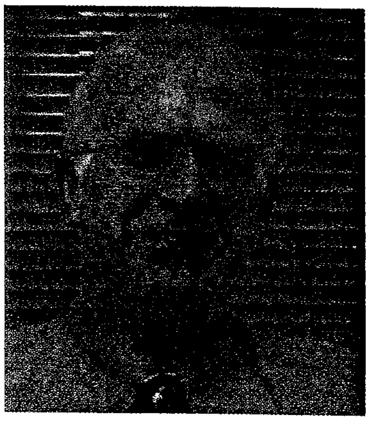
Abstract

The manner in which property market participants alter their pattern of activity under different economic climates is a matter of considerable interest to professionals and academics. Changing patterns of investment returns above the risk free rate (i.e. the risk premium) might provide some clues as to this market behaviour. If this is true then there are two important questions to be considered: (i) what is an appropriate value of the market risk premium in Australian property markets and, (ii) how can the risk premium be modelled so as to provide useful information on the behaviour of Australian securitised property markets? To deal with the first issue, estimating the risk premium, this paper models the ex ante risk premium implied from the information contained in the price of Listed Property Trust shares traded on the Australian stock exchange. To consider the second issue, a normal (Gaussian) distribution is explored for both risk premium and market price. Under the assumption of a normal distribution, the standard deviation of the risk premium and price series are analysed to determine whether there is useful information to predict market behaviour. The general findings of the paper are: risk premium vary widely under differing economic climates; the long term risk premium in Australian securitised property is about six and a half percent; and a simple normalisation methodology when applied to market price provides information that may be used to predict property market behaviour.

Introduction

The manner in which property market participants alter their pattern of activity under different economic climates is a matter of considerable interest to professionals and academics. Changing patterns of investment returns above the risk free rate (i.e. the risk premium) might provide some clues as to this market behaviour[1]. If this is true then there are two important questions to be considered: (i) what is an appropriate value of the market risk premium in Australian property markets and, (ii) how can the risk premium be modelled so as to provide useful information on the behaviour of Australian securitised property markets? To deal with the first issue, estimating the risk premium, this paper models the out of sample risk premium implied from the information contained in the price of Listed Property Trust shares traded on the Australian stock exchange. To consider the second issue a normal (Gaussian) distribution is explored for both risk premium and market price. Under the assumption of a normal distribution, the standard deviation of the risk premium and price series are examined to determine whether there is useful information to predict market behaviour.

The dynamics of the risk premium process in financial assets markets has been of some interest over a long period and there have been a number of studies aimed at determining the factors that are important in explaining the risk premium. Papers by Copeland (1982), Fama and French (1988), Finnerty and Leistikow (1993), Reichenstein and Rich (1993), Kairys (1993) and Boudoukh, Richardson and Smith (1993) have all adopted different approaches in attempting to study the risk premium.



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Since there are cyclical patterns in securitised property prices (cf. Wilson and Okunev (1998)), analysing the risk premium might provide leading information on such patterns. In this paper the risk premium is modelled from implied information contained in listed property data. Using a conventional discounted dividend model, and making certain assumptions on growth in dividends, the expected risk premium is inferred (cf. Peirson, Bird and Brown (1990)).

What relationship might be expected between risk premium and such cyclical behaviour? Rich and Reichenstein (1993) argue that a rise in the risk premium for common stock (generated by some shock in the market place - i.e. changed economic circumstances) provides a signal that the stock is overpriced thereby leading to an ensuing fall in this stock price. That is, when the risk premium is high relative to its long term average the market is concerned about the security of the investment and therefore an extra return is demanded. Wilson, Okunev and Hutcheson (1998) argue there is no reason to suppose that risk premium provide signals that are any different in securitised property markets. That is, cyclical patterns in property markets are being driven by underlying economic forces that are reflected in the market's assessment of the risk of real estate investment. If this is true then risk premium estimates may be viewed as an indicator of anticipated price change in the market.

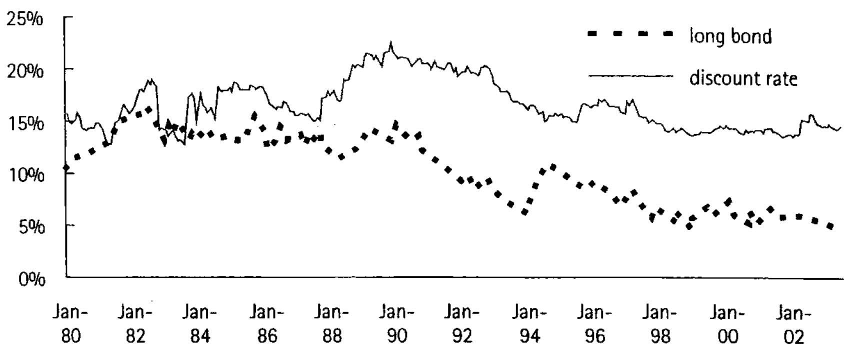
This raises the question as to how it might be possible to take advantage of this information - how can risk premium estimates be used to indicate when the property market might change its behaviour? One approach is to consider a conventional Gaussian distribution for both the risk premium and market price, and examine movements outside bounds established by the standard deviation. The remainder of the paper is as follows: Section 2 presents the data and the methodology; section 3 considers some results; while section 4 offers some conclusions.

Data Description and Methodology for Modelling the Risk Premium

Nominal monthly data for Australian Listed Property Trusts developed by Datastream International with a base set to 1980 are used for the analysis. Risk premium estimates from January, 1980 through to mid-2003 are presented, although data from earlier periods back to 1973 are used for 'windowing' as described later.

It is well established that the share price for common stock represents the discounted value of the expected future dividend stream. So, following Wilson, Okunev and Hutcheson (1998), the initial assumption is made that

Figure 1: Implied Discount Rate, Australian Property plus 10 Year Bonds



> ‘the dynamics of the risk premium process in financial assets markets has been of some interest’

units in Listed Property Trusts (LPTs) trade in a similar manner to common stock[2]. Figure 1 displays the implied discount rates for Australian Listed Property Trusts if investors use available information on the growth in dividends from initial investment to the current period. Figure 1 also displays the Australian government 10-year bond rate (used as the risk free rate). Here it can be seen that, throughout the '80s and '90s, the implied discount rate was mostly above the long term bond rate, which suggests that the risk premium in the Australian securitised property market was mostly positive. This means that investors required an extra incentive to invest in property compared with long term government bonds due to the extra risk associated with property.

The implied risk premium is obtained by subtracting the risk free interest rate (long term government bond rate) from the implied discount rate. Figure 2 presents these risk premium estimates through the eighties and nineties, along with the long term average of about 6.4%[3]. This figure very clearly indicates that, from about 1990, the market considered property investment as a more risky proposition (requiring higher compensation) compared with the previous decade.

As a potential means of predicting property market behaviour standardised risk premium and standardised price were estimated on the basis of a five year moving window[4]. A five year window was deemed a reasonable period to permit capturing the dynamics of risk adjustment behaviour on the part of investors.

Figure 2: Risk Premium Estimates vs Long Term Average

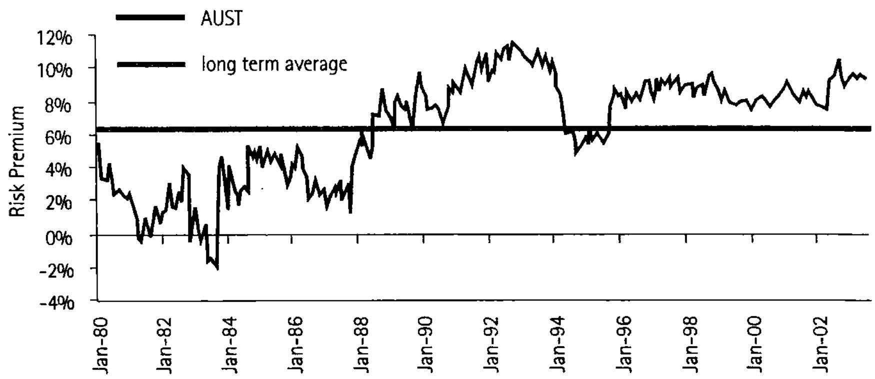
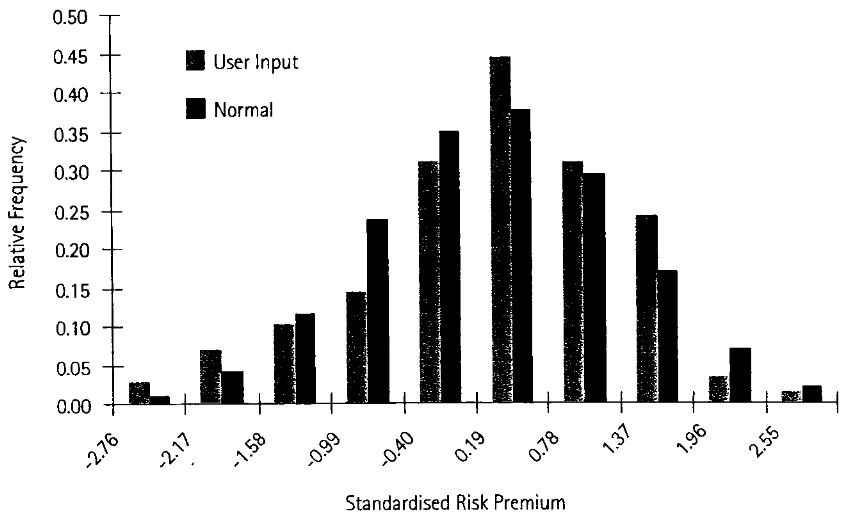


Figure 3: Comparison of Input Distribution and Normal Australia



Three established statistical procedures were used to test whether the frequency distributions were approximately normal[5]. All three tests supported an approximately normal distribution for both risk premium and price[v6]. Figures 3 and 4 show these data distributions in comparison with the theoretical normal distribution.

> 'a Markov switching model of risk premium does indeed provide useful information on likely market price behaviour'

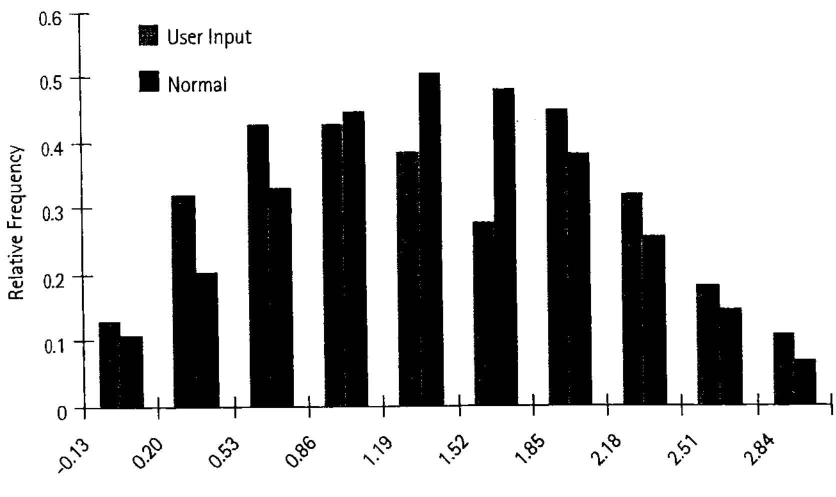
Results

The standardised risk premium is shown in figure 5 and overlayed on this are the one and two standard deviation boundaries. It is interesting to note the relatively narrow bounds placed on property risk by the market. Whenever property risk moved outside the two standard deviation boundaries (shown by the heavy 'chains') it was brought back by market forces within a relatively short period, usually within one or two months. When the risk premium moved outside the one standard deviation bounds (the light 'chains') market pressures brought this premium back within a three to six month period, and often sooner. This fluctuation may have been caused by flow of funds from bonds to property and vice-versa as the financial markets assessed and re-assessed relative movements in risk.

The standardised price index is shown in figure 6 and overlayed on this are the one standard deviation boundaries as given by the 'heavy chain' horizontal lines above and below the zero axis, which represent Gaussian distribution ±1 standard deviation from the five year mean for the standardised market index[7]. It would appear that a movement of the standardised price index outside these bounds conveys useful information about likely market behaviour. In figure 6, it can be seen that when the index moved outside ±1 standard deviation the market changed direction within a relatively short time (usually within a month or two month) of this movement.

Is there a flow of information from movements in the standardised risk premium to price behaviour? This is not clearly evident from the figures. While there is a negative correlation in the movement of the two series, this correlation is not significant. Examination of the movement outside the standardised boundaries within the price index itself provides far more useful information on likely market behaviour. While standardisation of the risk premium provides information on the way the market views property risk in different economic climates, it does not provide the expected flow of information on price behaviour. Wilson, Okunev and Hutcheson (1998) found that a Markov switching model of risk premium does indeed provide useful information on likely market price behaviour.

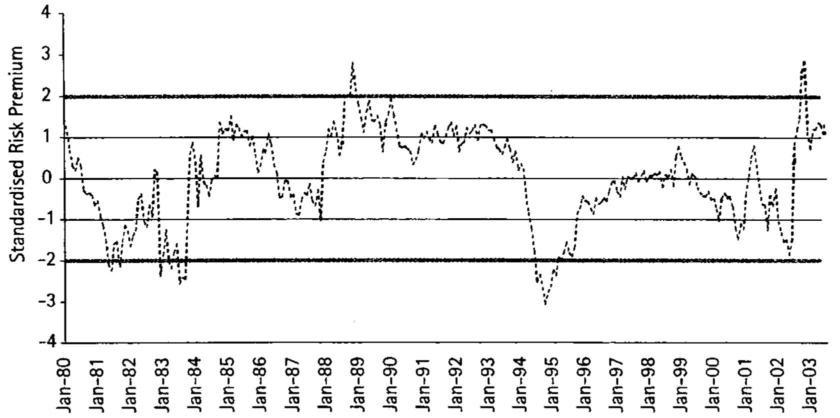
Figure 4: Comparison of Input Distribution and Normal Australia



Conclusions

There are a number of useful conclusions that can be drawn from this analysis. First, a potentially important outcome for the portfolio manager is the estimate of the long term risk premium (average) for the Australian secu-

Figure 5: Standardised Risk Premium



ritised property market. The estimation procedure used here suggests that investments in securitised property would need to generate a long run average return of about six and a half percent above the risk free rate (as indicated by the ten year government bond) to make asset allocation to this sector attractive. This is certainly very different from the 'conventional wisdom' of a property risk premium between two and four percent and this outcome warrants further investigation. Second, a simple normalisation methodology of market price provides useful lead information on market movements, while the expected flow of information from normalised risk premium to market prices was weak and suggests the need for a more sophisticated technique.

' there are a number of useful conclusions that can be drawn from this analysis '

References

Boudoukh J, Richardson M. and Smith T, "Is the Ex ante Risk Premium Always Positive", Journal of Financial Economics, Vol. 34, 1993.

Campbell J and Shiller R, "Stock Prices, Earnings and Expected Dividends", Journal of Finance, Vol. 43, 1988.

Copeland Jr., B.L "Inflation, Interest Rates and Equity Risk Premiums", Financial Analysts Journal, May/June, 1982.

Fama E and French K. "Dividend Yields and Expected Stock Returns", Journal of Financial Economics, 22, 1988.

Finnerty J and Leistikow D, "The Behaviour of Equity and Debt Risk Premiums", Journal of Portfolio Management, Vol. 19, No.4, 1993.

Kairys J. "Predicting Sign changes in Equity Risk Premiums Using Commercial Paper", Journal of Portfolio Management, Vol. 20, No.1, 1993.

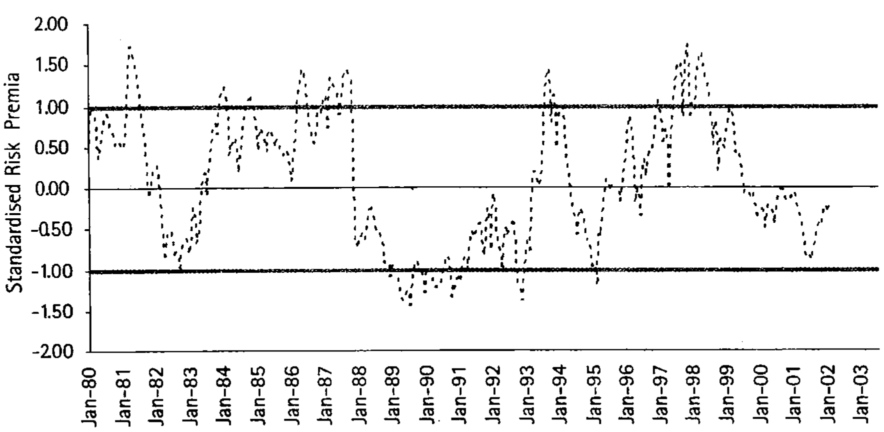
Peirson G, Bird R and Brown R, Business Finance , McGraw-Hill, Sydney, 1990

Reichenstein W and Rich S, " The Market Risk Premium and Long Term Stock Returns", Journal of Portfolio Management, Vol. 19, No.4, 1993.

Wilson P and Okunev J, "Cycles and Regime Switching Models in Real Estate and Financial Assets Markets", 14th ARES Conference, Monterey, California, 1998.

Wilson P, Okunev J and Hutcheson T, "Regime Switches in Property Market Risk Premiums: Some International Comparisons" School of Finance and Economics Working Paper Series, WP no.80, 1998.

Figure 6: Standarised Price



Footnotes

[1] Here property risk premium represents the extra return that investors require for assuming the additional risk of investing in property compared with long term government bonds

[2] Using this definition, and under the assumption of similarity, the price for LPTs can be represented by:

$$P(t) = \sum_{i=1}^{n} \frac{D\leftrightarrow(t+i)}{(1+k)^i} + \frac{P(t+n)}{(1+k)^n} \quad (1)$$

where P(t) is the price at time t, D(t) is the dividend paid at time t and k is the cost of capital (the discount rate).

To implement part of the analysis it is further assumed that the growth in dividends from initial investment to the current period will be maintained. Call this a current information model. Consider this for a conventional (perpetuity) discounted dividend model where, if the price at time *t* is known, and under the dividend growth assumptions above, the discount rate is easily extracted:

$$P(t) = \frac{D_0\leftrightarrow(1+g)}{(k-g)} \quad (2)$$

$$K = D_0 x \frac{(1+g)}{P(t)} + g \quad (3)$$

[3] Long term here being from 1980 to the present. Throughout the 1980s the average was 3.4% while in the 1990s it was 8.6% based on the estimation method used in this paper.

[4] The standardised values were estimated on the basis of:

(4)

where m and s are the respective mean and standard deviation for the sixty month 'window' and the x_i is the given value.

[5] The three tests being the Chi Square, Kolmogorov-Smirnov and Anderson-Darling. The Chi-square test for goodness-of-fit is a measurement of how well the sample data fit a hypothesized probability density function. The test requires that the data be put into specific class intervals and the choice of class intervals can affect the outcome from the test. The Kolmogorov-Smirnov test for goodness-of-fit works by comparing an empirical distribution function with the distribution of the hypothesized function. The Anderson-Darling test for goodness-of-fit is designed to detect discrepancies in the tails of distributions. The Bestfit programme from Palisade was used in estimations. The frequency of occurrence corresponds to probability.

[6] Although there is a slightly bimodal appearance in the price data.

[7] As is evident from figures 3 and 4 it was also necessary to shift the distributions to ensure a zero mean.

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