



## Equity and fixed income markets as drivers of securitised real estate<sup>☆</sup>

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### ABSTRACT

This paper re-examines the sensitivity and importance of interest rates and stock market price behavior on securitised property by decomposing their long-run impact between transient and permanent effects. This is achieved in a framework that accounts for endogenously determined structural breaks within the data. The results provide a different perspective on the relationship securitised property has with these markets and sheds new light on their long-run interaction. Once structural breaks are accounted for the results show that securitised property is driven by both interest rate and stock market changes, regardless of the type of securitised property being examined. Evidence also points to companies with increased debt-to-asset ratios and companies that are tax-exempt entities are still all influenced by both the equity and fixed income markets over the long-run period, although the influence these factors have do vary across time.

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### 1. Introduction

Current academic literature has produced a wealth of information on the inter-relationships that securitised property has with the fixed income and general equity markets. Given that securitised properties are listed on the stock exchange, one would expect the equity market to be driving property shares like all other common stocks. However, due to the underlying physical asset, arguments have regularly been put forward that securitised property will be more affected by interest rate changes than other types of equity holdings. Mortgage and loan rates set in the fixed income market, for example, can have a large effect on demand for both residential and commercial properties, and thereby prices. This will invariably lead to changes in securitised property value, which may otherwise behave very much like general stocks. Therefore, for securitised property, one might ask the question whether it more closely follows the fixed income or equity markets?

This paper analyzes the above issue from a different contextual setting than has previously been attempted. By decomposing securitised property price behavior into components that are driven by interest rate and stock market price changes, an exact picture can be developed as to the importance that both of the explanatory factors have in driving the long-run trend of securitised property. Essentially, it will be possible to determine the relative importance of stock and interest rate movements in driving property price behavior. This will provide a unique outlook on the permanent and transient determination of prices for securitised property. In order to achieve this, cointegration tests that account for structural breaks by Inoue (1999) are combined with the methods proposed by Gonzalo and Granger (1995) to test for permanent and transitory components among error-corrected vector autoregressive systems. This is performed on several categories of US securitised real estate, including Equity Real Estate Investment Trusts (REITs) and Mortgage REITs, as well as property management companies (REMD). Consideration is also made for the debt-to-asset ratio of companies plus whether the company is a tax-exempt entity as these factors may all have a bearing on the relative significance the interest rate and stock markets have on the series.

The rest of the paper is structured to first provide the reader, in the following section, with the background literature on previous research that examines the relationship the property market has with interest rate and stock market behavior. After this, Section 3 reviews the data and preliminary statistics, and contains details of the econometric methods

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applied in this study. Section 4 will discuss the empirical results along with showing a variance decomposition. This is followed by Section 5 which draws out some implications of the results for portfolio fund managers, investors and policy managers for securitised property companies.

## 2. Literature on the sensitivity of interest rates and stock market movements to the securitised real estate market

The question on whether securitised real estate follows the bond or stock market has led to a wealth of research work exploring the varying sensitivities securitised property displays to changes in various economic and financial factors. As a start, it is generally assumed that securitised real estate does have an obvious link with non-securitised property. McMahan (1994) defends this point by highlighting the fact that income flows from securitised property are derived from the physical property asset. This relationship will invariably tie the performance of property listed company stock to factors affecting the physical assets, such as general demand/supply shifts due to such items as rents and demographic changes. This may also have an effect on the relationship between securitised real estate shares and the overall stock market. A number of papers have highlighted that there are, seemingly, factors other than general stock market trends that determine securitised real estate stock price movements. In particular, there exists a mounting body of evidence that suggests some categories of securitised real estate act as yield-bearing instruments. REITs in the US are required to payout 90%<sup>1</sup> of their taxable income as a form of dividend. Even though they may not be passively managed as a fixed income instrument, the payout features of these REITs may lend itself to follow the bond market more closely than the actual stock market<sup>2</sup>.

On top of this, there has been a growing amount of literature that examines the impact of interest rates on securitised property prices. Swanson, Theis, and Casey (2002) find that real estate returns are sensitive to the spread between short and long-term treasuries. Glascock, Lu, and So (2000) find that REITs are now less sensitive to interest rate movements than prior to 1993. They reasoned this was as a result of the securitised real estate market maturing and REITs taking on more general stock market features. Allen and Madura (2000), who also consider various REIT characteristics, such as asset structure and financial leverage, show both Equity and Mortgage REITs are sensitive to short and/or long-term interest rate changes. They also provide evidence that REITs with lower financial leverage can minimize the influence from stock market changes, thereby suggesting that the financial makeup of the company can impact their sensitivity to these determinants. In addition, a number of papers (e.g. Chen & Tzang, 1988; Liang, McIntosh, & Webb, 1995; Devaney, 2001; He, Webb, & Myer, 2003) have illustrated that the interest rate sensitivity of REITs is actually time-varying.

The methodology employed in the above papers, and in other related literature, does vary considerably, and this may partially explain the differing results that emerge. For example, Liang et al. (1995) utilized a two-factor model to determine the relative sensitivity of stock market risk and interest rate risk. They find that the sensitivity of the two risk factors differ between Equity and Mortgage REITs, with interest rate movements being insignificant in determining Equity REIT price changes. Similarly, Mueller and Pauley (1995) find Equity REITs are not significantly related to interest rate changes. Swanson et al. (2002) ran regressions over individual years to measure the time-varying sensitivity of the stock market and interest rate factors. The majority of their results support evidence that interest rate changes have become less important over time. Allen

and Madura (2000), however, applied a two-step procedure to analyze this same topic and show interest rates still to be important.

The application of cointegration analysis applied to this research is also prevalent. Glascock, Lu, and So (2001) examined the relationship REITs have with inflation. If REITs are a good inflation-hedge, then it also would support evidence that REITs follow less the physical real estate market and more so the fixed income market, which can also act as an inflation-hedge. Using Granger-causality tests within an error-correction framework they show inflation does not Granger cause REITs returns. However, they still find a long-run negative relationship between inflation and REITs, which they argue is due to more fundamental economic relationships that bind the two series together. Glascock et al. (2000) also use cointegration analysis to explicitly examine the long-run relationship property has with the bond and stock markets, showing evidence of REITs increasingly behaving more like stocks than bonds.

The cointegration analysis that has up to now been conducted on securitised property does not, however, provide sufficient evidence on which of the markets drive real estate stock price movements. This paper decomposes the long-run relationship that may exist between real estate, interest rates and stock market prices into permanent and transitory components in an attempt to determine the primary driving force behind securitised real estate returns. In particular, the decomposition will be able to distinguish the contribution of the bond and stock markets to both long-run behavior and short-term cycles within the securitised property market. This will allow for an explicit consideration of the relative impact that the bond and stock markets have upon securitised property market behavior.

Moreover, there is evidence from a number of papers (see Glascock et al., 2000) that there has been a shift in the sensitivity, of REITs in particular, to interest rate changes. This may be due to structural shifts in the relationship securitised property has with other economic variables. Unfortunately, this is not accounted for in standard cointegration analysis. The current study, therefore, proposes an extension of the standard cointegration procedure to deal with the issue. We will adopt the methodology developed by Inoue (1999) for determining a potential structural break endogenously within a multivariate cointegrated system. The Inoue (1999) procedure allows for a test of cointegrating rank within the presence of a mean- and/or trend-break. A significant advantage from an analyst's viewpoint here is the fact that this is a Johansen (1988, 1991) type test and does not require prior specification of the structure of a cointegrating system. That is, a whole portfolio can be analyzed in one run to examine the number of common trends that may exist among assets given the presence of an unknown structural break. This is then combined with a decomposition of the components of the cointegrating model following the methods of Gonzalo and Granger (1995). These procedures are more formally detailed in the following section.

## 3. Data and methodology

### 3.1. Data and preliminary statistics

In order to observe the long-run driving forces of REITs returns, a long span dataset is desirable. For this study, monthly data is extracted from both DataStream International and the National Association of Real Estate Investment Trusts (NAREIT) from January 1990 to September 2005. Specifically, Equity and Mortgage REITs data was extracted from NAREIT. The proxies for the market index (NYSE) plus ten-year government bond yields over the time horizon were taken from Datastream. Also, one additional real estate index was constructed from Datastream data for Real Estate Management and Development<sup>3</sup> companies (REMD) in the United States.

<sup>1</sup> The required income payout was adjusted from 95% to 90% on the 1st January 2001 (REIT Modernization Act).

<sup>2</sup> Past research indicates that high dividend yield stocks, for example utilities, are sensitive toward interest rate movements (see Bower, Bower, & Loguie, 1984; Sweeney & Warga, 1986).

<sup>3</sup> Global Industry Classification Standard code 40401020.

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