

# Are REITs real estate?

## Evidence from international sector level data

The article below is a summary of the authors' research paper 'Are REITs Real Estate? Evidence from International Sector Level Data', which has been awarded the inaugural Nick Tyrrell Research Prize. The Prize, established by industry associations INREV, IPF and the SPR to commemorate Nick Tyrrell's major contribution to the industry's thought leadership, recognises innovative and high-quality, applied research in real estate investment.

**Direct real estate investments have been shown to provide significant diversification benefits in a portfolio containing stocks. However, direct real estate assets have several disadvantages such as relatively low liquidity, high transaction costs, and lumpiness. The securitised real estate market circumvents these complications but does it offer the same diversification benefits as direct commercial real estate? The aim of this research is to examine whether securitised real estate returns reflect direct real estate returns or general stock market returns.**

The study also considered the effects of the interdependences between asset returns and economic fundamentals, such as economic growth, economic sentiment, short-term interest rates, term structure of interest rates, default risk premia and inflation rates.

In contrast to previous research, which has generally relied on overall real estate market indices and neglected the potential long-term dynamics, this evaluation is based on sector-level data and caters for both the short-term and long-term dynamics of the assets, as well as for the lack of leverage in the direct real estate indices.

### Data

Unlike nearly all earlier research, this study uses sector-level data for the US (the FTSE/NAREIT Equity REIT indices and the NCREIF TBI indices for the direct market covering apartments, offices, industrial and retail) and the UK (office and retail, based on the company-level price, dividend and market cap data provided by EPRA for REITs and the IPD indices for direct real estate) to negate the impact of any portfolio composition effects that may mask the linkages between asset classes. The study also uses the S&P/ASX 200 A-REIT index and IPD data covering the Australian REIT and direct markets as a whole as no sector data is available. All asset indices employed in the analysis are total return indices. The availability of real estate data on a quarterly basis limited the sample periods for the US and Australia to 1994-2010 and 1991-2010 for the UK.

Since the previous literature has shown that REIT performance may be more closely linked to small cap stocks than the overall stock market, the small cap indices were also considered in the analysis.

### Taking account of leverage

The direct real estate indices comprise unleveraged properties, while the REITs indices include the impact of leverage, which can affect the mean and volatility of returns. To ensure comparability, leverage was 'added' to the direct real estate data, using the following formula:

$$r_{eit} = (r_{uit} - r_{dt}LTV_{it}) / (1 - LTV_{it})$$

where  $r_{eit}$  = the levered direct real estate return of sector  $i$  in period  $t$ ,

$r_{uit}$  = the unlevered direct market return,

$r_{dt}$  = the cost of debt in period  $t$ , and

$LTV_{it}$  = the loan-to-value ratio of sector  $i$  REITs in period  $t$ .

In the US, the average leverage of REITs during the sample period was 48% in the apartment and office sectors, 43% in the industrial sector, and 51% in the retail sector. The leverage was quite volatile, being at the lowest around 30% in the mid 1990s and, at its highest, some 70-75% in 2009.

In the UK, the leverage was less volatile and 50% on average, while in Australia it varied between 9% and 50%, being 30% on average. The cost of debt used in the computations was the corporate bond middle rate for the UK and Australia and the Moody's Baa-rated corporate bond yield for the US.

### Research methodology

From earlier research undertaken by the authors and others, there are sound theoretical reasons to expect that the securitised and direct real estate markets might be cointegrated over the longer term. There may also be cointegrating relationships between the real estate and stock market return indices. Since cointegration between the variables would have important implications regarding the asset return dynamics, the research looked for the existence of such long-term relationships by employing the Johansen (1996) Trace test for cointegration. Where a stable long-run relation was not detected between the assets (this was the case only in two out of seven tests), the tests were re-run incorporating fundamentals in the cointegration analysis.

### Innovation accounting

Vector error-correction models (VECMs) were estimated, using the cointegrating long-run relationships, in order to look at the dynamics of the asset returns more carefully by way of innovation accounting, based on the Choleski decomposition. If two assets are good substitutes for each other in the long horizon, their long-term reactions to shocks in various factors should be similar or, less restrictively, the relative reaction

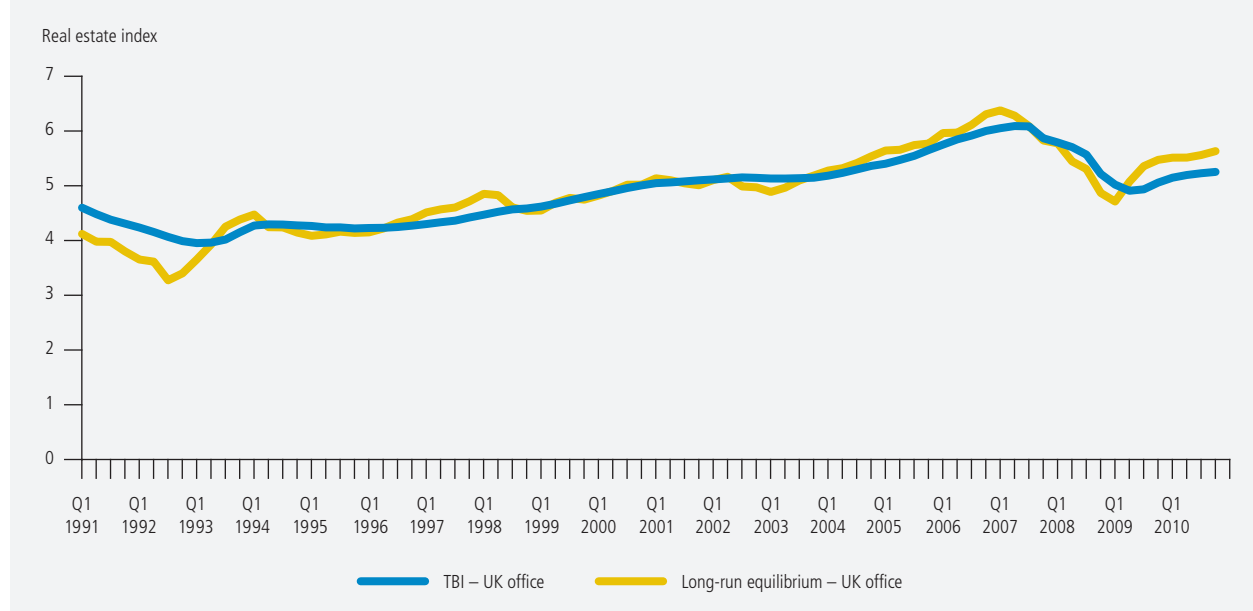


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Figure 1: Comparison of direct property indices and estimated long-run relationships (UK office)



magnitudes between the two assets should be similar regardless of the shock. So, for instance, if the change in REIT prices was twice that in direct real estate prices after any shock in the fundamentals, 50% leveraged direct real estate investments would create similar reactions to those of REITs, and REITs and direct real estate would appear to be good substitutes for one another. In contrast, if the relative reaction magnitudes notably differed between different shocks, REITs would not appear to correspond that closely to direct real estate investments.

It also follows that if the long-term accumulated responses of two markets are similar, then they are integrated in the sense that the risk premia for various factors are the same in both markets. Furthermore, if the forecast error variance decompositions show that a notable share of the long-term forecast error variance of securitised real estate returns is explained by innovations in the direct real estate market returns, and that only a small share is explained by stock market innovations, this indicates that the long-term influence of the direct real estate market on the securitised real estate market is greater than that of the general stock market. The causality can, of course, also run in the other direction.

## Empirical findings

### Long-term relationships

The Trace test statistics imply that cointegrating long-term relationships are present between REIT and direct real estate performance in all the markets except for the US office sector and the Australian market. The last two markets are more complicated. With respect to the US office sector, there is some evidence of long-term dynamics between the assets when the risk

premia is added to the model. The inability to detect cointegration in the Australian case may be due, at least partly, to the aggregated nature of the data, i.e. lack of sector-level indices.

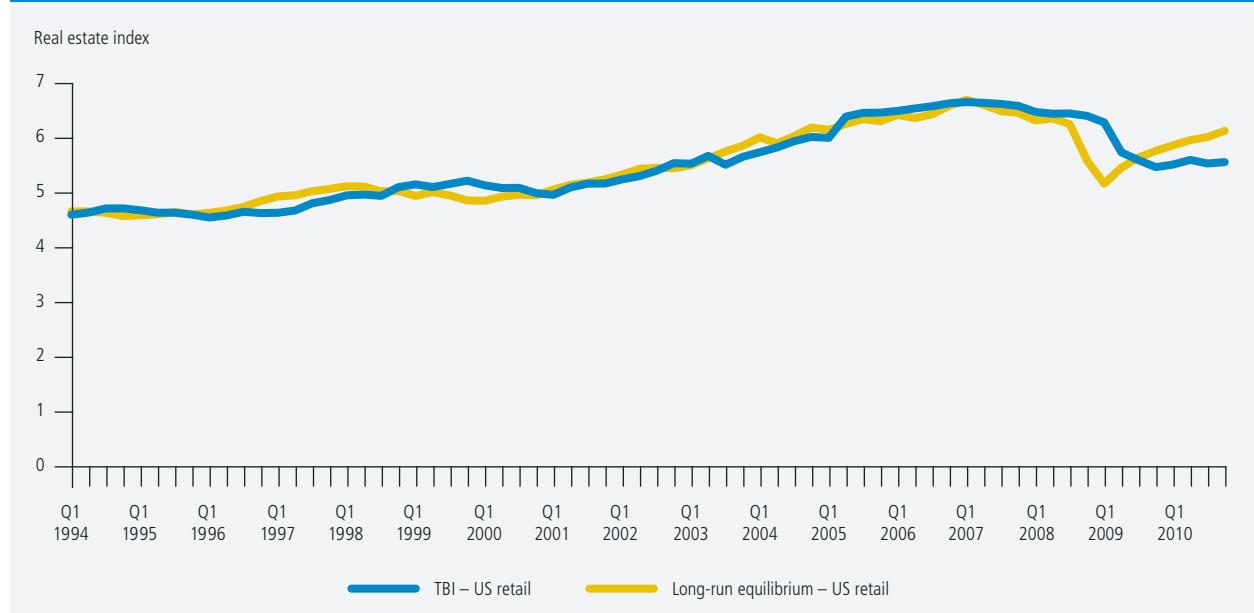
In each of the five estimated long-run relationships, all of the parameter estimates are highly statistically significant, and the estimated relationships appear generally to be stable. The indices tend to track closely the long-run equilibrium relationships. However, the apparently slow reaction of direct real estate prices to shocks in the fundamentals induced notable deviations from the long-run relationships after the outbreak of the financial crisis. Figure 1 shows the direct real estate index and estimated long-run relationship for the UK office sector and Figure 2 the same for the retail sector in the US.

### Variance decompositions

The forecast error variance decompositions and impulse response functions based on separate VECMs for each of the markets and sectors were also studied. The analysis suggests that the variance decompositions converge close to the eventual long-horizon values in approximately three years. The convergence speeds vary only slightly across assets and markets.

The decompositions of the asset return indices derived from the baseline models at the 12-quarter (i.e. three-year) horizon makes it clear that direct real estate market shocks do not drive REIT market performance. Nevertheless, the linkages between the direct and securitised markets appear to be close, since a major part of the long-horizon forecast error variance of the direct real estate indices can be explained by REIT return shocks. There are no similar strong relations between shocks in the stock market and either of the real estate markets.

Figure 2: Comparison of direct property indices and estimated long-run relationships (US retail)



### Impulse response analysis

The study considered the relationships between the asset market dynamics based on impulse response analysis. If securitised real estate fully reflects the underlying private real estate performance in the long run, and is thereby a close substitute for direct real estate in a long-horizon investment portfolio, it follows that the long-horizon accumulated reactions of REIT and TBI returns to various shocks should not deviate notably from one another.

Similar to the variance decompositions (above), the impulse responses converge within three to four years from the shocks. Also, not unexpectedly, in the cases where pair-wise cointegration is detected between REITs and direct real estate, the long-run accumulated responses of REITs and direct real estate closely resemble each other and the relative magnitudes of the responses are the same, regardless of the origin of the shock, even though the short-run reactions typically differ substantially.

In the Australian market and in the US office sector, where such pair-wise cointegration was not found, the relative reaction magnitudes of the assets vary substantially across different shocks. In the Australian market, it is hard to see whether REIT reactions resemble more those of stocks or direct real estate. However, in the US office case, the REIT reactions generally appear to be closer to those in the stock market than in the direct real estate market (in terms of standard deviation of the relative reaction magnitudes). This finding is not robust to the model selection (between VECM and vector autoregressive model), though.

### Implications regarding the financial crisis

The outbreak of the financial crisis had a notable adverse influence on asset prices in all of the markets. In the US and the UK, the REIT market was the first to react in the early months of 2007. It is not surprising that the UK appraisal-based direct market index reacted later than REITs, but the UK stock market drop started even later than that of the IPD indices. By contrast, the US TBI drop started approximately at the same time as the stock market fall, i.e., one to two quarters later than the REIT market reaction. The decline in the TBI indices was not as steep and lasted longer than that of REITs. The patterns suggest that, especially in the UK market, real estate indices could have been used to predict the forthcoming substantial drop in stock prices.

Interestingly, the REIT and leveraged direct real estate index declines were of much greater magnitude than those of the stock market (except for the Australian direct market index, which is likely to be partly due to the appraisal-based nature of the IPD index). Therefore, it appears that the financial crisis hit the real estate sector more than the overall stock market, possibly as a result of the low market liquidity of direct real estate. Also the liquidity of REITs is typically somewhat lower than that of the overall public stock market.

With respect to portfolio allocation implications, the lesson to be learnt from the aftermath of the crisis is that an investor should not reallocate its portfolio from REITs to direct real estate after a drastic drop in REIT prices due to deteriorating market fundamentals: the direct market is likely to follow the REIT market fall, and the expected returns for REITs are therefore greater than those for direct real estate.

### Conclusion

The research findings, based on sector-level REIT and direct real estate indices for the US and UK, suggest that securitised and direct real estate markets are closely linked in the long run. It appears that REIT returns are largely independent with respect to shocks in the other asset classes – neither direct real estate nor stock market shocks appear to be driving REIT market performance. However, a major part of the long-horizon forecast error variance of the direct real estate indices can be explained by REIT return shocks. This implies that 'real estate shocks' take place first in the REIT market, after which the direct market adjusts to these shocks.

The resemblance between REITs and direct real estate is substantially greater than that between REITs and the general stock market. Therefore, while the short-term co-movement

between REITs and stocks is stronger typically than that between REITs and direct real estate, REITs are likely to bring a similar exposure to various risk factors as direct real estate into a long-horizon (three years or more) investment portfolio. REITs are also expected to have similar attractive diversification properties as direct real estate investments in the long horizon, at least in the US and the UK.

**A copy of the full report may be downloaded from the following:**

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