

# Real Estate and Diversification

## *Part I*

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# Today's Objectives

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- It is a commonly held belief that Real Estate is a good diversifier
- Indices seem to confirm that RE is a universal diversifier
- We seek to examine that common belief and find the conditions under which it holds or does not hold
- We also want to find risk management tools that work well in light of our findings about RE's diversification properties

# Overview of Index Methodology

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*DISCLAIMER: Differences may vary across Index providers. This is a general and broad description. For example, some indices include leverage, while other do not.*

- Indices are released by both membership organizations such as NCREIF and NAREIT or by commercial firms such as CBRE and IPD using both private and public data sources. In the U.S. quarterly releases are typical.
- They are screened for minimum occupancy, size, location, land use, and other hedonics to meet submission requirements, and must also have some acceptable valuation which may or may not be a formal appraisal or sale.
- Depending on the index leverage may or may not be included and depending on the sample size further geographic and land use disaggregation may also be possible.
- Traditionally these indices are found to be negatively correlated with interest rates because appraisers use 10-Year Treasuries as a key component of capitalization rates. As Treasuries increase, *ceteris paribus*, values fall.

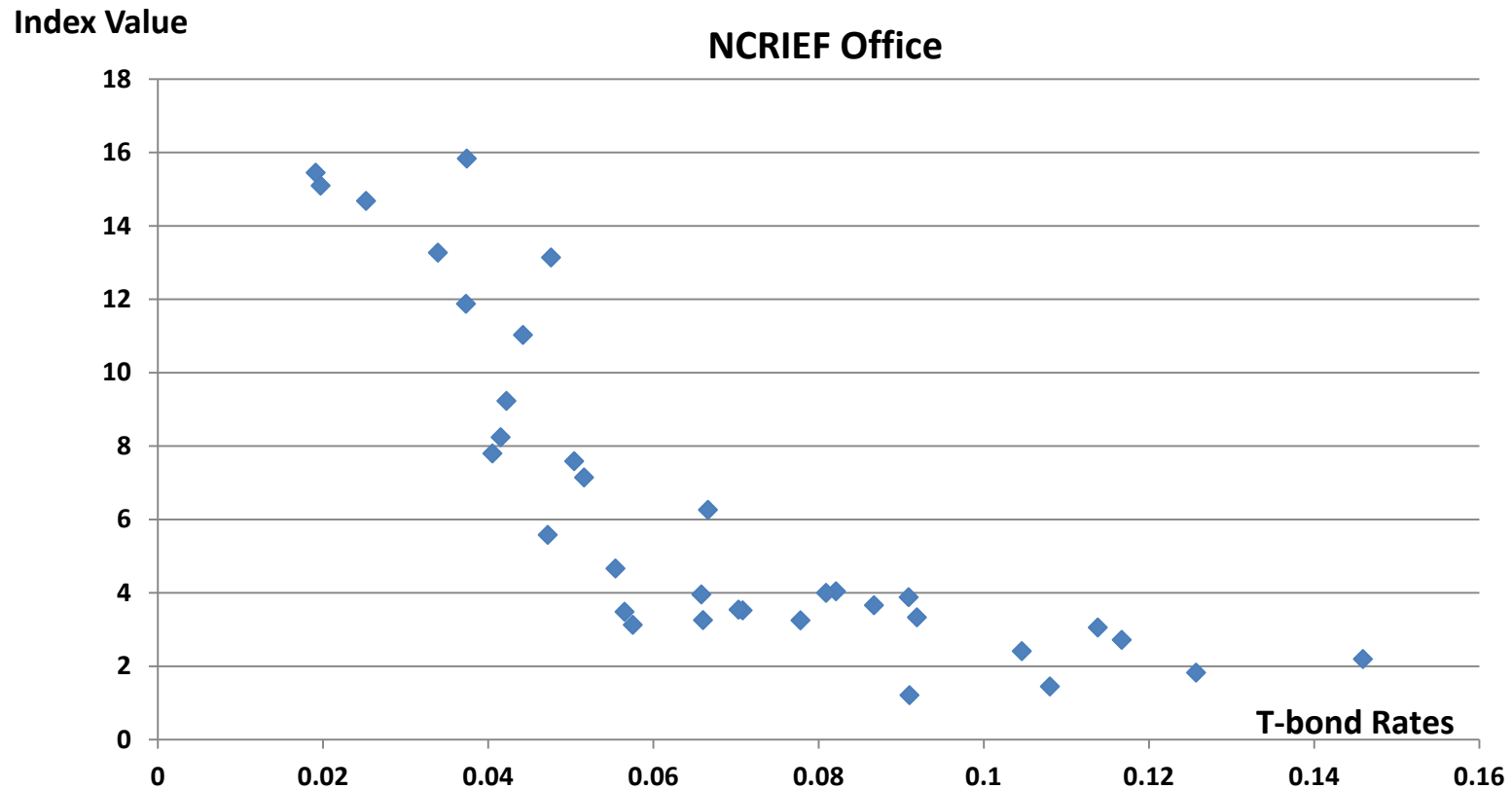
# Examples of Previous Correlation Findings

- Since the passage of ERISA, the purported low/negative correlation of real estate with other asset classes has been the impetus for adding property to investment portfolios laying the foundation for the leap by institutional investors into direct real estate.
- A publication by Merrill Lynch in 2012 indicated that using quarterly returns, the correlation between direct real estate was -.14 with the Barclays Agg Bond Index and .19 with the S&P between 2002 and 2011.
- This was also the same conclusion drawn by studies by Clarion Partners in 2011 and similar to earlier results from Pepperdine University in 2009.
- The Pension Real Estate Association's own study using annual data showed the following results:

**Pension Real Estate Association - 2005Q1**  
**Annual Correlations - 1978 to 2014**

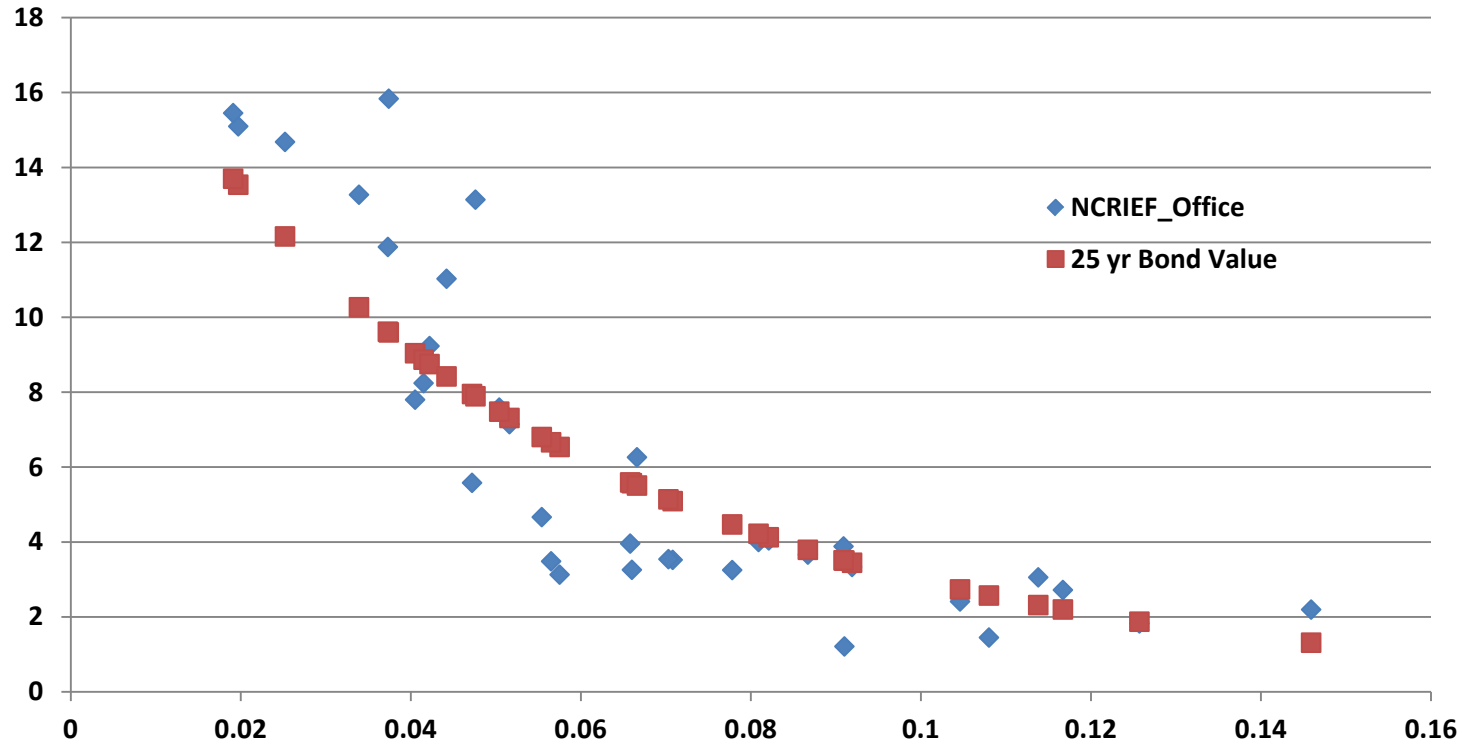
	Large Cap	Mid Cap	Small Cap	Treas	Invest Gr.	High Yield
NCREIF	.15	.07	.07	<b>-.03</b>	<b>-.26</b>	<b>-.37</b>

# NCRIEF Index\* and 10 Year Treasury Rates

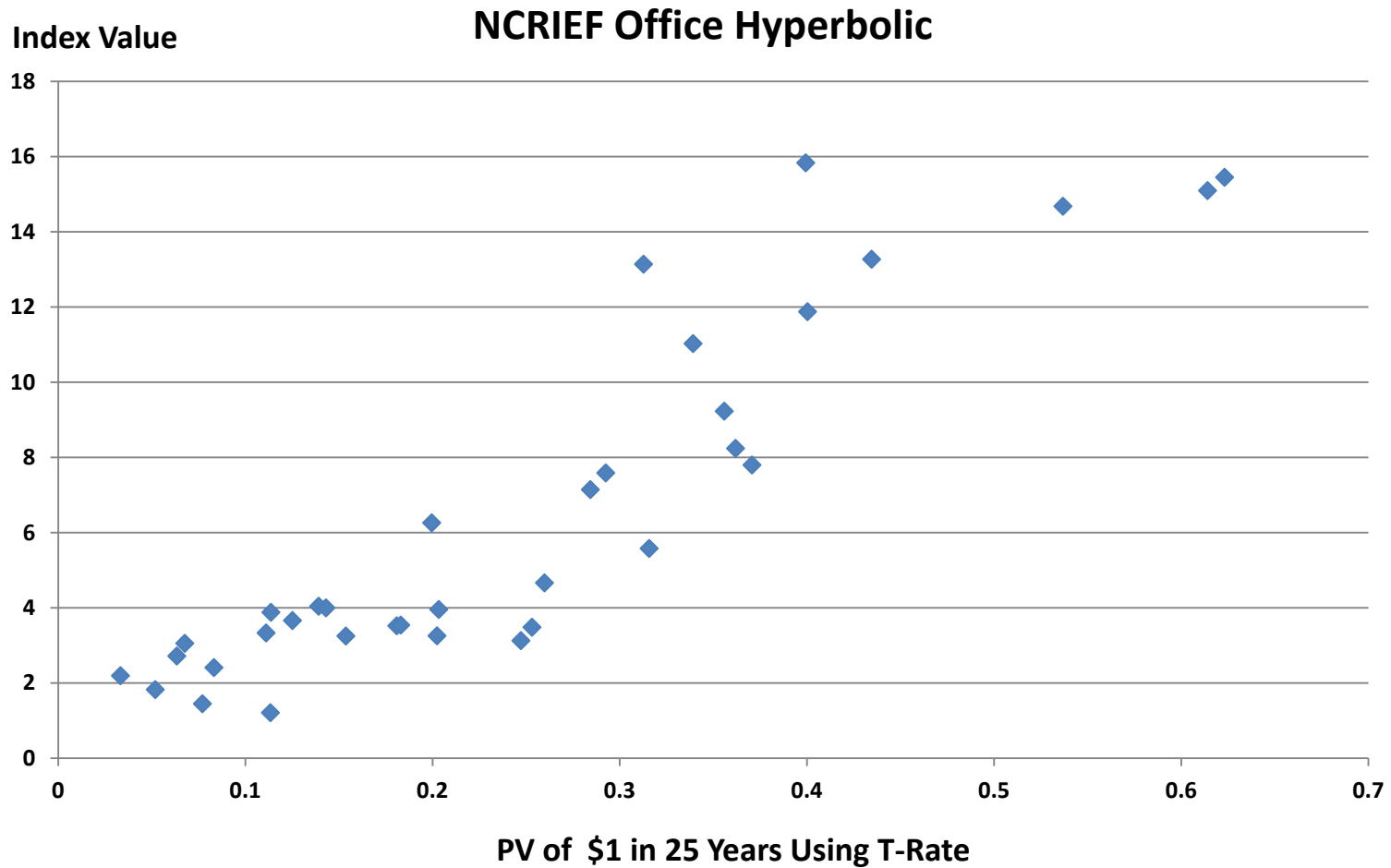


\*Imputed values from published return series 1978 – 2014

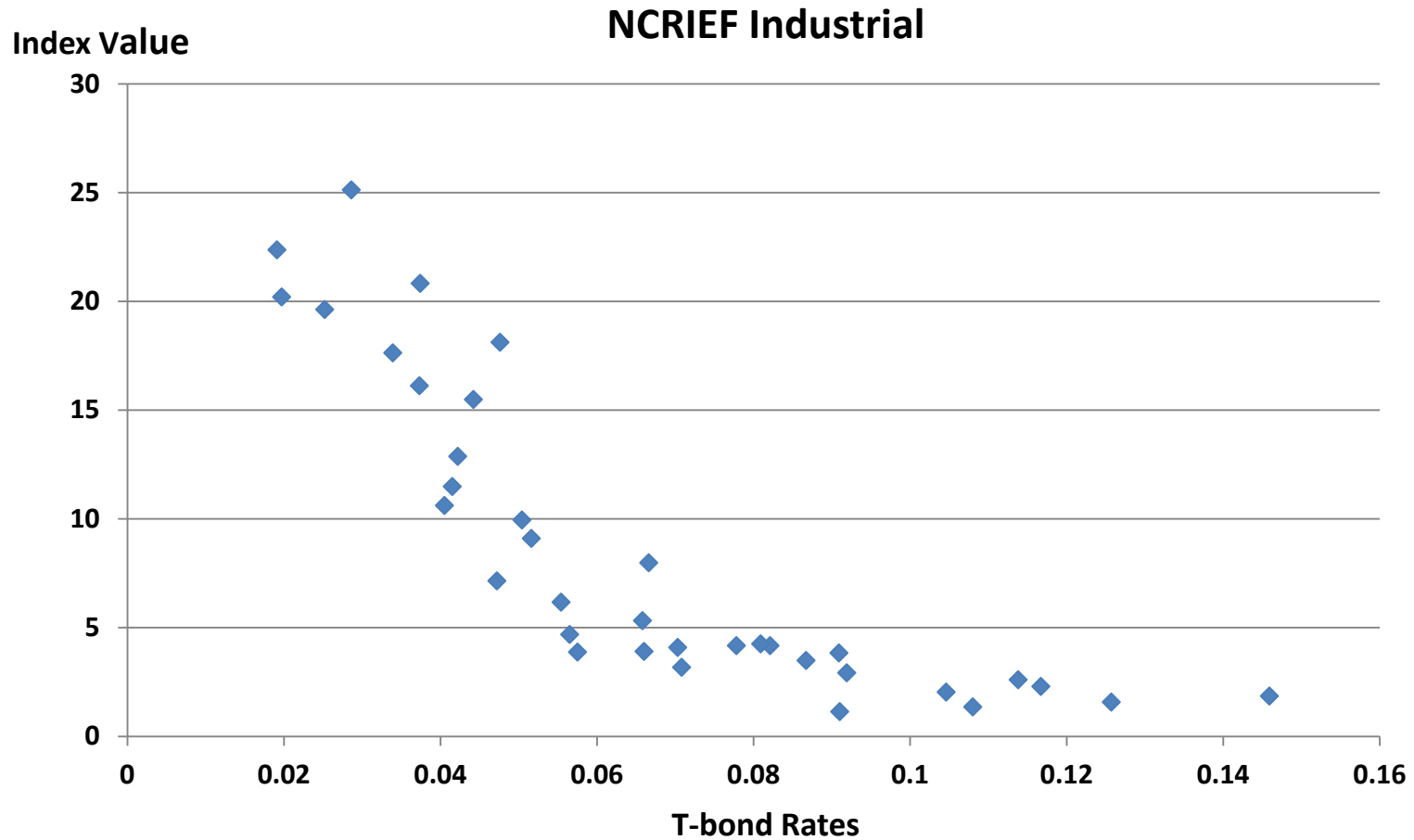
# NCRIEF Index\* and 10 Year Treasury Rates



# NCRIF and T-Rates (cont'd)

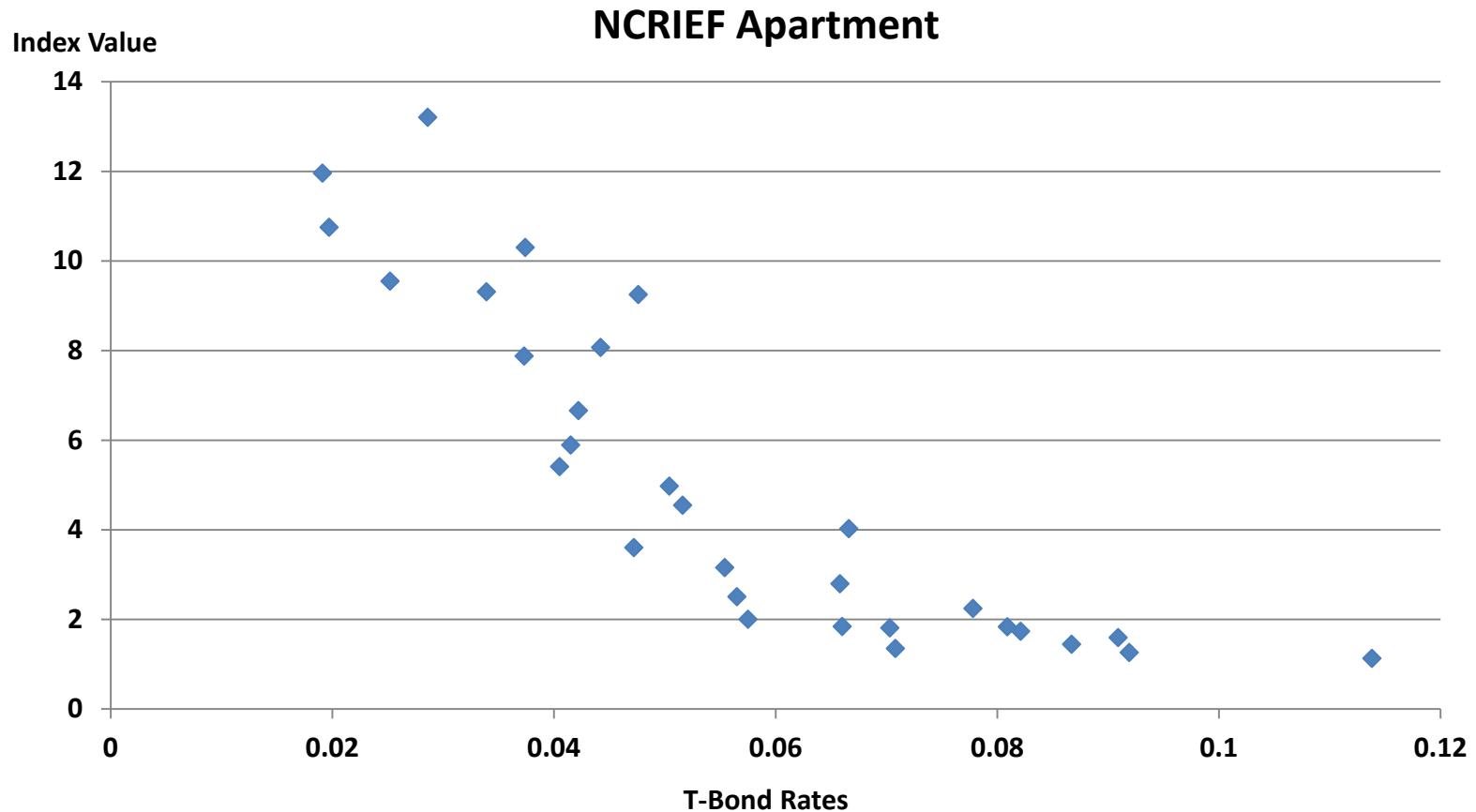


# NCRIF and T-Rates (cont'd)

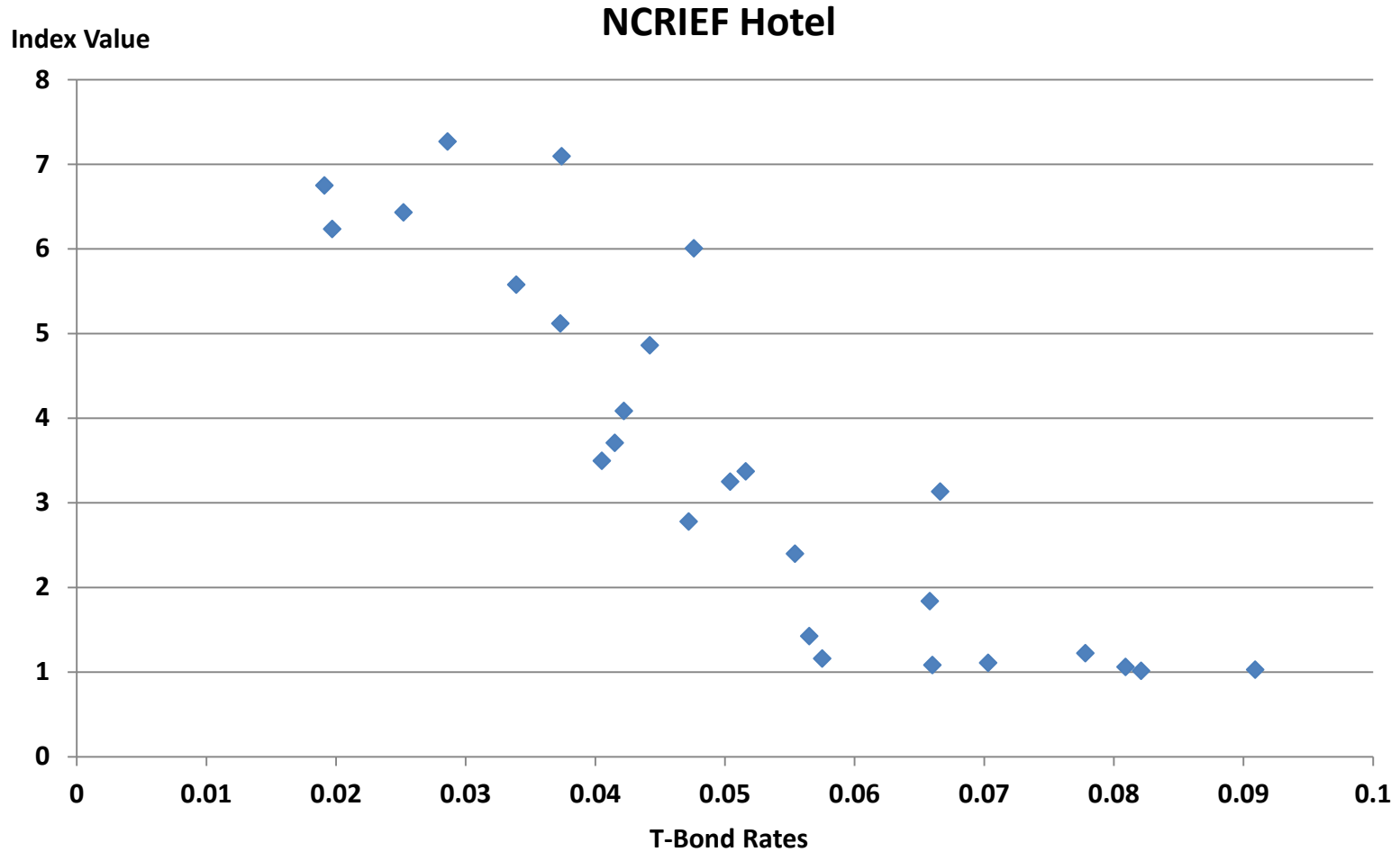




# NCRIF and the T-Rates (cont'd)

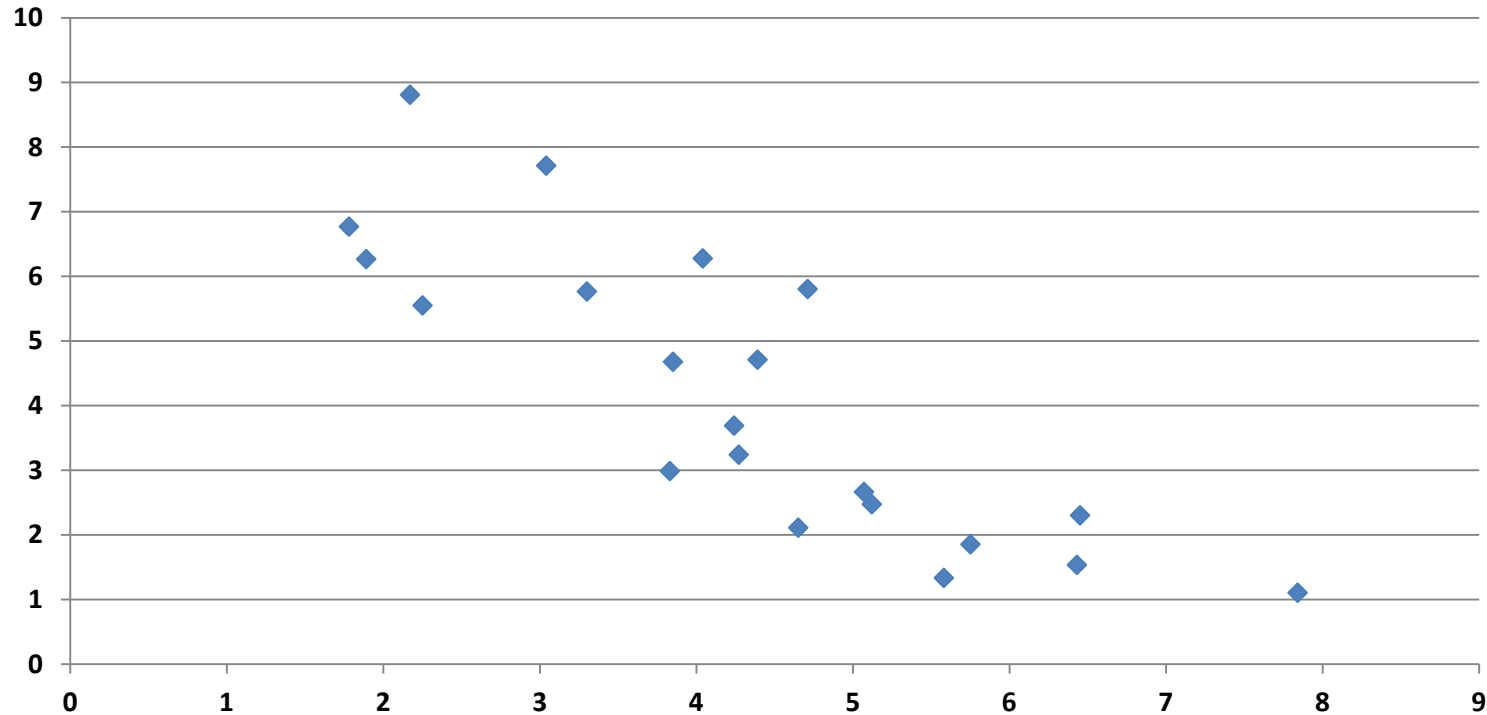


# NCRIEF and the T-Rates (cont'd)



# What About NCRIF's Transaction Index ?

NCRIF Transaction Index 1994 - 2014



# Inferred Useful Lives Per Sector

These are the inferred from the hyperbolic regressions that provide the best fit:

Property Types	R-squared	Implied Useful Life
Industrial	85 %	30 years
Retail	85 %	35 years
Office	82 %	25 years
Apartment	83 %	28 years
Hotel	76 %	30 years

This R-Squareds are good news not only as magnitudes but also as a ranking !

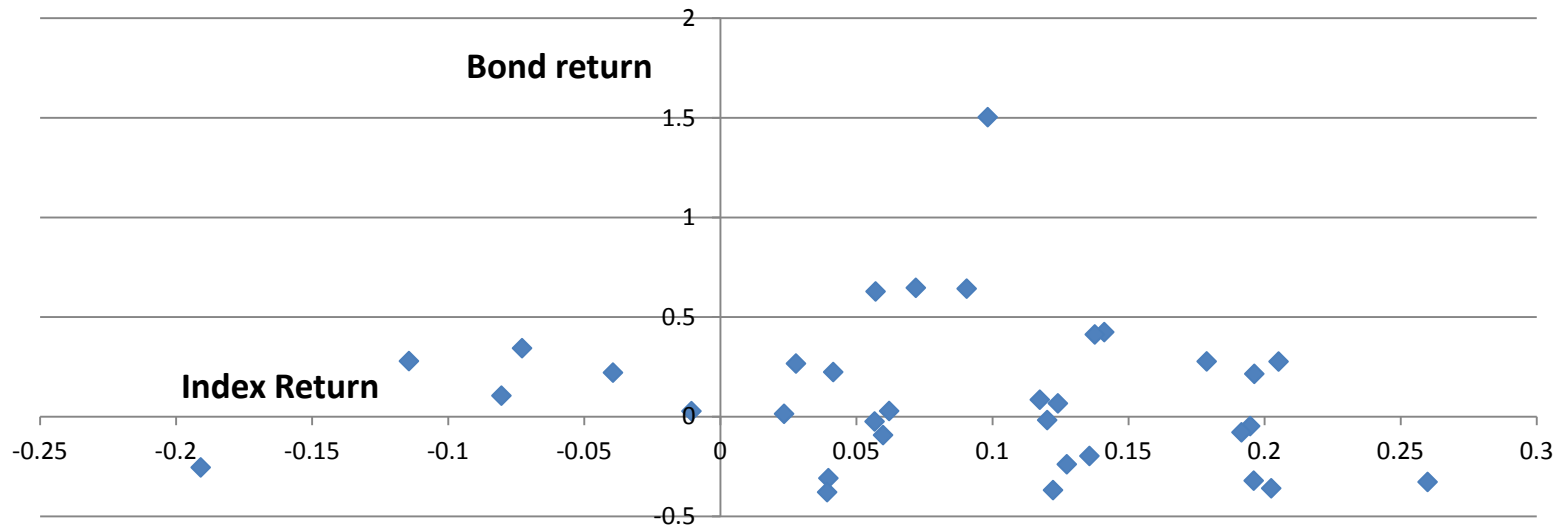
# Still Not Convinced ?

**May be you are right to doubt the positive correlation.** How about an experiment?

We create artificially a series of zero coupon long term bond returns using actual 10 year rates, pricing the bond at each point in time and taking proportional changes from period to period.

What is the **correlation** with the NCRIF Index: **- 0.09**

## Contemporaneous One Period Returns



# What Have We Missed ?

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The result on the previous slide correspond some prior empirical findings from third parties.

What this analysis misses is that all these returns happen from a different value base (denominator of return). When one of the time series has a strong AR component (NCRIEF) this short term trending in the denominator due to smoothing, will tend to offset smaller changes in the numerator (closer to actual P/L), which makes the periodic return correlation calculation spurious at best.

**Should investors care for correlations of returns in how they evolved in the past? No, unless those correlations are invariant.**

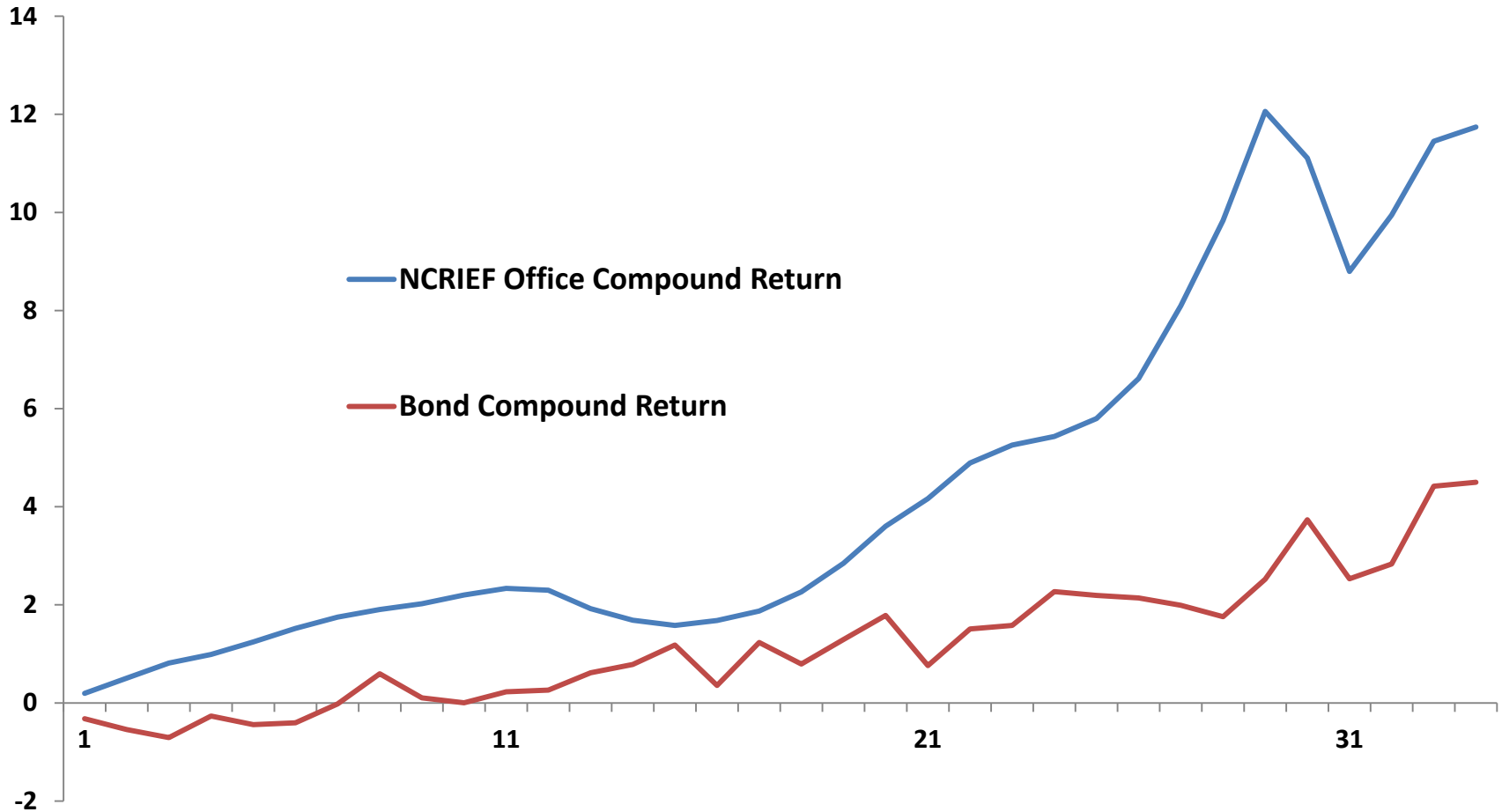
Instead, investors are unconditionally interested in the return and correlation from now up to their investment horizon.

# How to make the Return Analysis Better ?

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- How to mitigate the “biased” return denominator problem of one period returns ?
- Look at compound returns, which use a common denominator base
- Correlation between the compound Office NCRIEF and bond compound return then turns out to be: **0.9**
- You might say “but compound returns are trending, hence correlation is suspect”
- We de-trend both the bond compound return series and the NCRIEF Index compound return. Correlation is still there: **0.4**. Which is far from zero or negative.

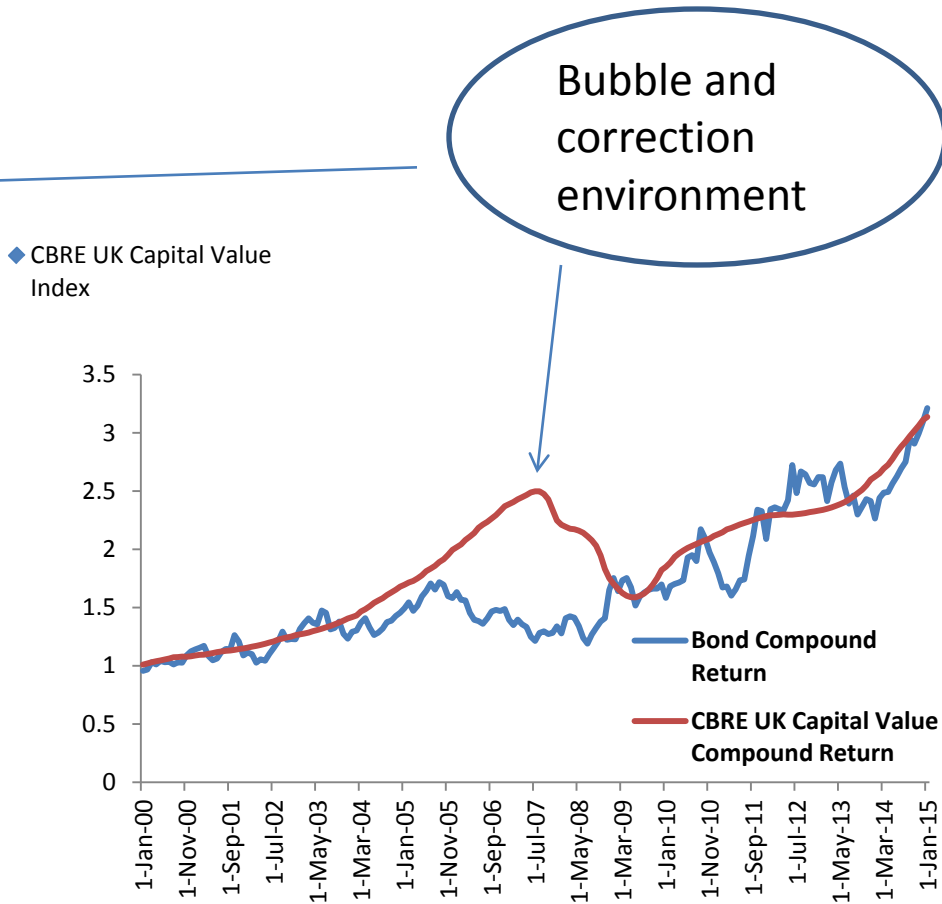
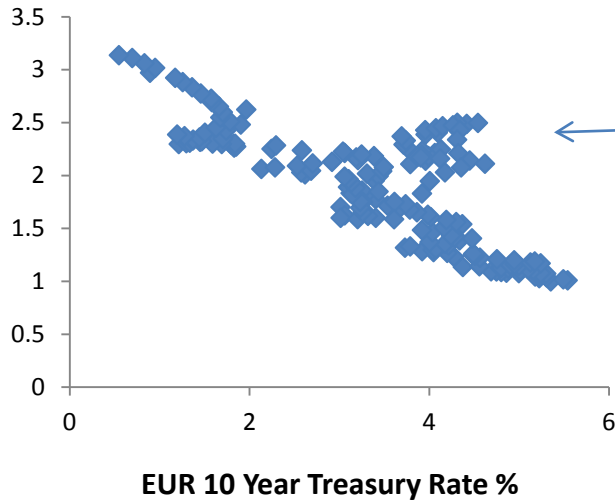
# All in a Picture





# Another Commercial RE Index: CBRE

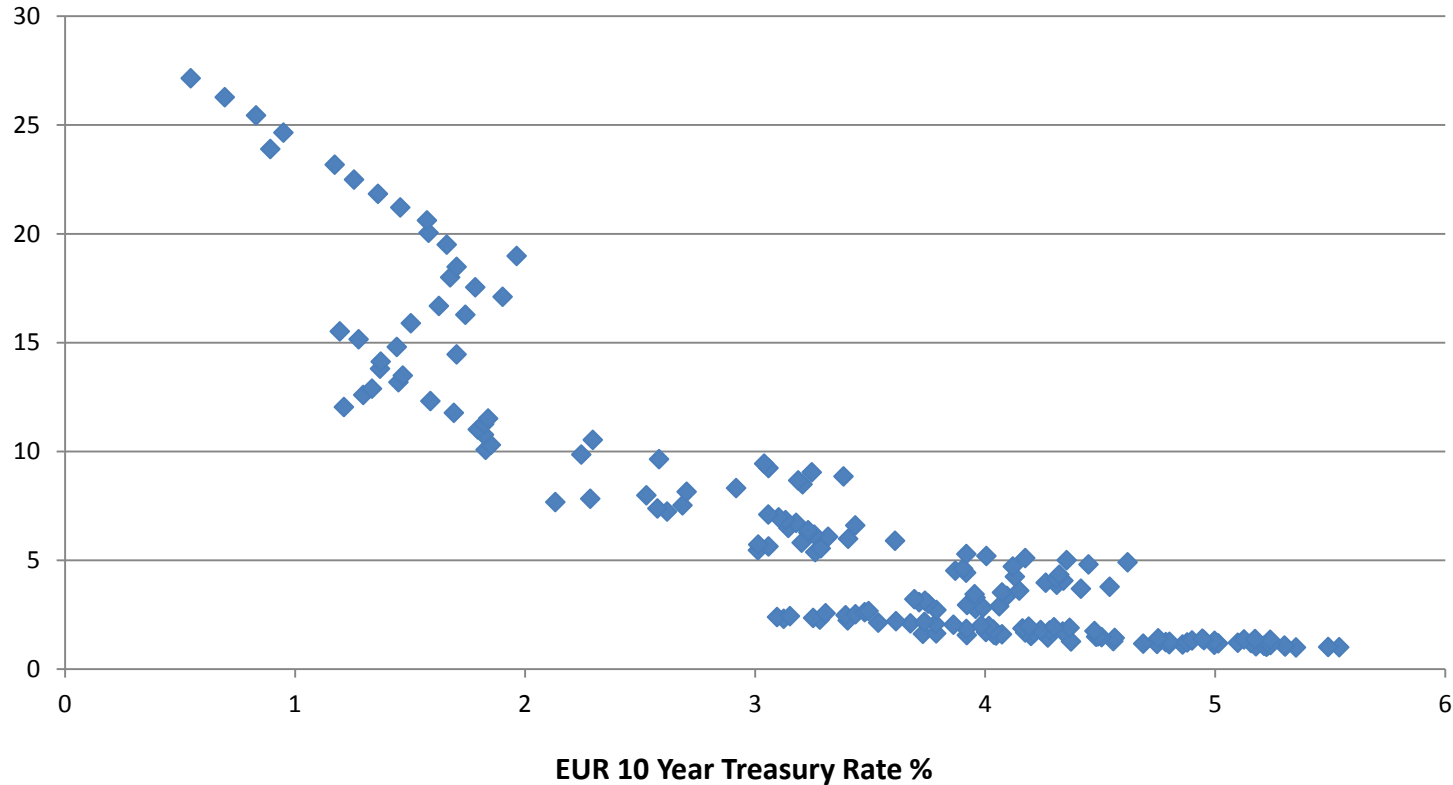
## CBRE UK Capital Value Index (Levered)



# CBRE UK Industrial Capital Value Index

Index Value (Inferred from Returns)

CBRE UK Industrial



# What About Correlation with Equities ?

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NCREIF Lags S&P500 - 1 year Correlations	
NCREIF	.46
Office	.48
Hotel	.51
Apartment	.50
Industrial	.46

# Correlation with Equities (cont'd)

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- Previous studies known to us only considered contemporaneous correlations between equities and commercial real estate indexes
- The reasoning that there might be a lag can be one or combination of:
  - Appraisal professionals absorbing information of the economic environment into valuations
  - The stock market is a lead signal for the real economy. As the real economy picks up, so does demand for commercial real estate
- Leading or not the correlation between equities and real estate is just as important to a long term investor, where those effects will be fully reflected in returns over their investment horizon.

# What is Northfield's Conclusion?

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- Real Estate, unlike what a number of previous studies suggest, is correlated with the performance of both stocks and bonds
- Any risk measurement tools should be sufficiently flexible to:
  - Capture both the bond-like and stock-like characteristics of real estate
  - Differentiate between real estate investments that are more bond-like and stock-like
  - Offer strategies that efficiently hedge illiquid RE risks with liquid public instruments
- Northfield's RE risk model is designed to have exactly these features

# Northfield's Commercial RE Model

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- Captures the bond-like and stock-like characteristics by observing features of the lease provisions that mean cash flows are predominantly fixed (more of a bond), or more volatile with the rent market (more of an equity):
  - Length of lease
  - Lease level reset frequency
  - Vacancy
  - Down time
  - Renewal rates, etc.
- Allows hedging Commercial Real Estate Risks (and illiquid and high-transaction cost asset class) with liquid instruments (stocks, bonds, their derivatives), which have lower transaction costs. It does so by:
  - Using the same risk factor framework both in the liquid and illiquid segments of the total portfolio

# Northfield RE Model Property Correlations

**Five Sample U.S. Properties, with No Intra-Term Lease Resets, No Leverage**

	Mall	Apartment	Hotel	Warehouse	Office
Mall	1				
Apartment	0.45	1			
Hotel	0.82	0.41	1		
Warehouse	0.95	0.46	0.81	1	
Office	0.91	0.42	0.80	0.91	1

*Properties were modelled, assuming no lease resets due to rent market moves within lease terms. Correlations are generally high, due to common bond-like properties and a narrow risk driver – interest rates.*

# Northfield RE Model Property Correlations 2

## Full Intra-Term Lease Resets, No Leverage

	Mall	Apartment	Hotel	Warehouse	Office
Mall	1				
Apartment	0.40	1			
Hotel	0.75	0.39	1		
Warehouse	0.61	0.31	0.62	1	
Office	0.52	0.25	0.51	0.45	1

*Properties were modelled, assuming complete lease resets due to rent market moves within lease terms. Correlations are lower, due to the idiosyncratic nature of the rental markets and more equity-like properties.*



# Northfield RE Model Property Correlations 3

## Full Intra-Term Lease Resets, with Leverage (~50%)

	Mall	Apartment	Hotel	Warehouse	Office
Mall	1				
Apartment	0.22	1			
Hotel	0.7	0.19	1		
Warehouse	0.55	0.14	0.57	1	
Office	0.42	0.11	0.46	0.39	1

*With leverage correlations are even lower. The reasons are two. First, in the presence of fixed rate mortgages interest rate exposures is partly hedged on the long and short (gearing) side. Second, due to leverage, the idiosyncratic and equity like qualities of the remaining risk profile become magnified.*

# Managing RE Risk

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- Effectively managing RE risk requires more than indices that measure the “average” performance of the “average” property in a given market for a given land use.
  - Few, if any, investors have portfolios sitting at the mean
- Northfield’s tackles this problem through the use of a factor model using a general and parsimonious set of common factors across all asset classes in conjunction with basic property-level information such that:
  - If it is found that a significant and unacceptable proportion of your portfolio's risk is contributed by interest rates, it is easy to reduce that exposure – hedge interest rates or bond futures, or sell bonds.
  - If your real estate portfolio is concentrated in financial centers, and therefore exposed to financial industry credits, you can make immediate steps to manage this risk by selling stocks, futures, or ETFs for those companies/industries found to be tenants in your buildings.
  - The amount of the hedge can be easily determined because of the common factor set of all asset classes.

# Preview of Part II

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- The effect of leverage on diversification in stressed markets
- Does distance equate with diversification
- Securitized real estate and diversification

# Conclusions

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- There is undeniable empirical connection between long term bonds and real estate that points to a positive correlation
- There is significant lead-lag correlation between the equity market and real estate, which is equally important to long-term investors as contemporaneous correlation
- The key feature of commercial real estate is that it is between the characteristics of a bond and an equity; it is the role of a bespoke risk model to find what proportion of RE belongs to each.
- Having such a model at hand we can find the conditions and strategies that will allow us to tailor our portfolio to the desired risk profile.