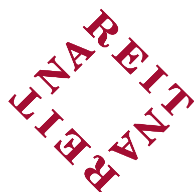
Avoiding the Top Four Risks of Real Estate Investing using Stock Market Based Derivatives

Presentation at
Weimer School of Advanced Studies in Real Estate and Land Economics
program on
"Innovation & Disruption in Commercial Real Estate"

May 14, 2016



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The Top Four Risk Factors in Real Estate Investment

- Specific Asset Risk (everybody knows this)
  - Large unit size, indivisibility, and transaction costs result in non-granular holdings
  - Meaningful geographic diversification requires assets in dozens of metro areas
  - Investment managers are unable to focus on market segments they understand
    - especially for diversified funds
  - Investors are forced to accept poor performance in order to achieve diversification
- Liquidity Risk (people tend to fool themselves about this)
  - Investors and investment managers cannot react to timely information
    - Thoughtful acquisitions become caffeinated buys
    - Orderly dispositions become distressed sales
  - Open-end funds erect liquidity barriers, especially when liquidity is most valuable
  - Closed-end fund structures only exacerbate liquidity problems
  - Investment decisions by private equity funds are driven by capital flows, not by investment opportunities
- Poor Asset Selection and/or Management (people seem to be surprised by this)
  - Can be mitigated with transparency, liquidity, governance, and capital market discipline
  - *Cannot* be mitigated simply by having smart, well trained investment managers!
- Valuation Risk (major source of self-delusion)
  - Appraisals on core properties are wrong by 12% on average (Cannon & Cole, JPortfMngmnt 2011)
  - Return volatility, and correlations with other asset classes, are falsely measured
  - Investors allocate too much to poorly performing assets and asset managers
  - Investors pay high fees for “falsely competent” investment management

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Example of Valuation Risk: Two Views of Hotel Property Values Following 9/11

112
108
104
100
96
92
88
84
80

6/29 7/6 7/13 7/20 7/27 8/3 8/10 8/17 8/24 8/31 9/7 9/14 9/21 9/28 10/5 10/12 10/19 10/26 11/2 11/9 11/16 11/23 11/30 12/7 12/14 12/21 12/28 1/4 1/11 1/18 1/25 2/1 2/8 2/15 2/22 3/1 3/8 3/15 3/22

- Health Care
- Industrial
- Retail
- Office
- Apartment
- Hotel
- NCREIF Hotel

Note: NCREIF Hotel index continued to decline until 2004Q1, and didn't recover to pre-9/11 values until 2006Q2

What about Leverage, Property Type, etc.?
--What do we mean by "Core" real estate investment?

- Core real estate investment is not defined simply by property type or leverage, but by the minimization of risks
- Core property types
  - Low asset-level volatility (office according to the NTBI, apartment according to the PureProperty)
  - Short leases (hotel, self-storage, apartment)
  - Comfort and familiarity (industrial, retail)
- Core locations
  - Low asset-level volatility (Midwest according to the NTBI, South according to the PureProperty)
  - Scarcity premium (CBD)
  - Comfort and familiarity (home bias)
- Core assets
  - Core property types in core locations
  - Long-term leases fully in place
- Core equity holdings
  - Core assets
  - Low leverage
- Core portfolios
  - Core equity holdings *combined with*
  - Diversification
  - Granularity to minimize specific asset risk
  - Liquidity
  - Good asset selection and management
  - Accurate valuation
- If you're missing any of these elements, your real estate investment may be "close enough" to core for your purposes, but it doesn't minimize risks

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What Do Investors Think of Risk Management in CRE?
Findings of the MSCI 2013 Global Asset Owner Survey

- Most survey respondents face difficulty in modeling real estate risk
  - A US pension fund said that they have “good understanding of real estate in the return space, but not in the risk space.”
- The global financial crisis provided a catalyst for strengthening risk management throughout the industry
  - The drivers for this change tended to be tighter regulation and moves from central risk functions to increase oversight of real estate departments
  - One major US plan sponsor said “I don’t see much from our real estate teams from a risk perspective, and feel the team doesn’t know much about portfolio risk except for leverage”
- There is a group of less sophisticated investors with minimal formal real estate risk management, and poor integration between the real estate team and the broader portfolio
  - The limited nature of formal risk management processes and weak integration with the rest of the portfolio leaves the real estate team, and the portfolio as a whole, exposed to the mistakes suffered by a number of asset owners through the global financial crisis
- Survey participants identified a range of issues including data shortages, timeliness and valuation accuracy facing risk departments seeking to build real estate into multi-asset-class risk analysis
  - These information issues have also been a major reason for asset owners historically excluding real estate exposure from such analysis

What Are (*or Should Be*) the Benefits of Investing in Real Estate?

- Strong Risk-Adjusted Returns
- Diversification
  - Returns are driven by a different market cycle
  - Low correlation with stocks, bonds, and other assets
  - Return drivers differ somewhat
    - by property type
    - by geographic location
- Many analyses suggest real estate should form ≈20% of a mixed-asset portfolio
  - Most portfolios have *much* smaller allocations

What Problems with Direct Real Estate Investment are Responsible for Limited Allocations?

- Illiquidity
- Large transaction costs
- Large unit size (indivisibility / non-granularity)
- Difficulty of constructing a diversified property portfolio
  - by property type and by geographic location
- Large capital outlay
- Poor measurement of asset values and returns
  - affects both expected returns and expected volatility
- Infrequent return measurement
- Late (lagged) return measurement
  - impossible to exploit tactical opportunities
  - also affects measurement of expected correlations
- Impossibility of short positions

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Synthetic Real Estate Investing: A Solution?

- Invest through derivatives tied to real estate indices
  - Swaps: index-measured return for floating interest rate + spread
  - Earlier market in swaps tied to NPI or IPD failed
    - market failed because of product problems, not lack of demand
- Advantages relative to direct real estate investing
  - Smaller transaction costs
  - Smaller unit sizes
  - Smaller capital outlay
  - Easier to construct a diversified portfolio of real estate exposures
- Enables hedging and other risk management practices

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Problems with Synthetic Real Estate Investing using Existing Instruments

- Difficulty of measuring asset values and returns
  - NPI and IPD are based on appraisals
  - Appraisals are subject to strategic behavior
  - Appraised values lag behind true movements in asset values
    - by about 4-5 quarters on average
- Infrequent return measurement (quarterly)
  - Infrequent settlement dates lead to very large margin requirements
- Lack of investable underlying
  - Impossible to hedge exposures
  - Impossible to exploit arbitrage opportunities
    - reduces market efficiency
- Counterparty risk
- Therefore, lack of market liquidity

FTSE NAREIT PureProperty® Indices

- Real estate returns (capital appreciation, income, total return) measured using information revealed through listed REIT stocks
  - No strategic behavior
  - No appraisal lag (or illiquidity lag)
- Six property type sectors
  - Apartment, Health Care, Hotel, Industrial, Office, Retail
- Four regions
  - East, Midwest, South, West (matches NCREIF regions)
- Sector/region combinations: e.g., East region Apartment
  - custom market definitions possible
- Property (delevered) as well as equity versions
  - Equity versions reflect capital structure elected by asset-owning REITs
  - Property versions correct for use of leverage by REITs
  - Leverage is adjustable synthetically by combining property and equity versions
  - "Core-plus" property types and capital structure with core diversification

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Synthetic Real Estate Investing using FTSE NAREIT PureProperty® Indices

- Same advantages relative to direct real estate investing
  - Smaller transaction costs, unit sizes, and capital outlays
  - Easier to construct a diversified portfolio of real estate exposures
- Frequent return measurement (daily)
  - Daily settlement dates enable small margin requirements
- Underlying is entirely investable
  - No difficulty hedging exposures
  - Arbitrage opportunities easy to exploit
- Possible to invest with no counterparty risk
- Transparent index methodology and constituents
  - Easily replicable
- Returns reflect listed REIT selection/management of assets
  - Superior returns
- Daily historical data starting September 23, 2002
  - Earlier non-investable version had data starting January 1, 2000.

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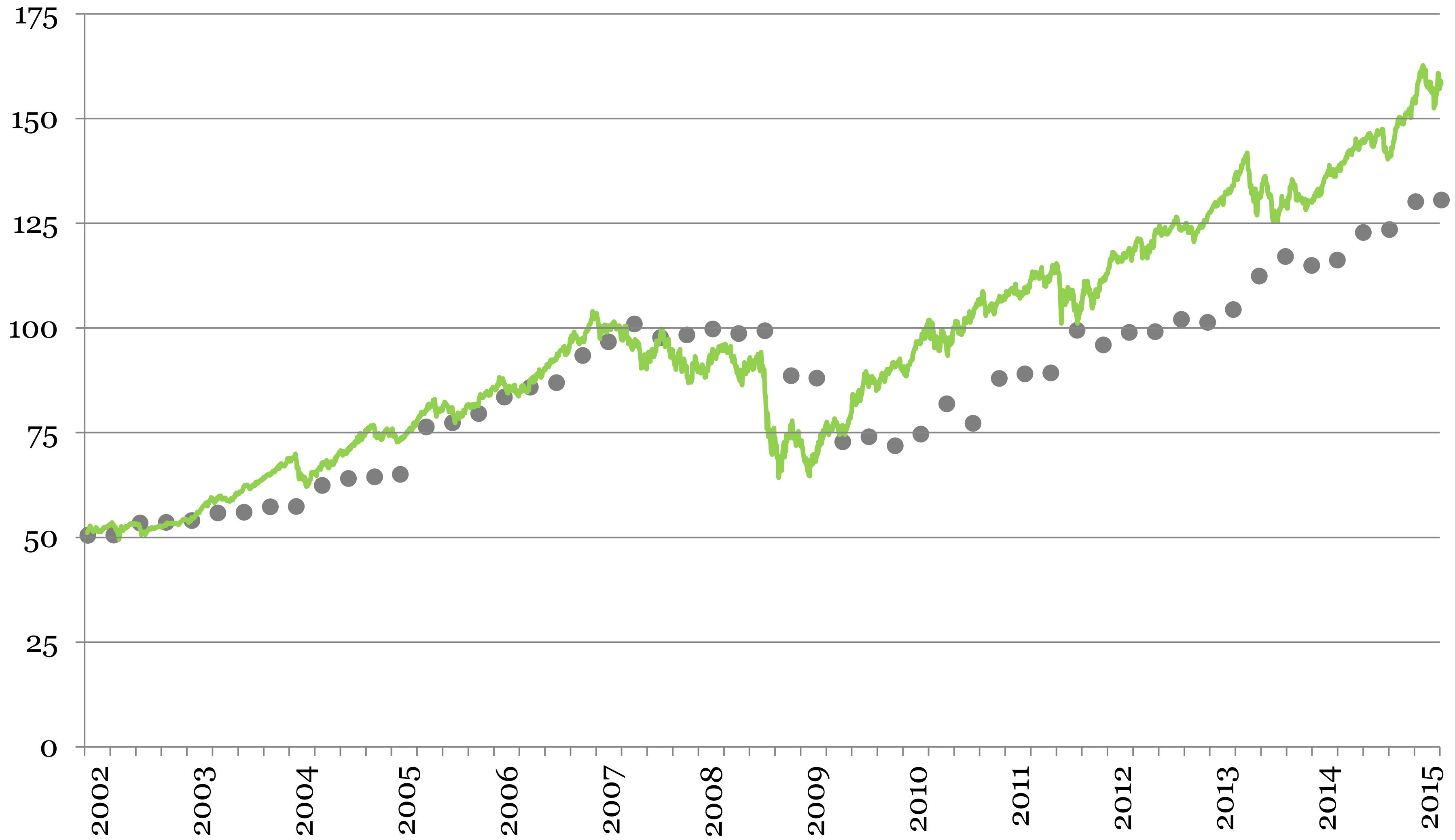
What do the PureProperty® Indices Look Like?



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Portfolio Uses of FTSE NAREIT PureProperty® Indices

- Strategic portfolio allocation
  - Management by listed equity REITs provides better returns
  - Liquidity: daily, with no gates
  - Small unit size (granularity), transaction costs, and capital outlay
- Portfolio completion
  - example: East region Office
- Tactical asset allocation
  - Swap one sector for another, one region for another, etc.
  - Temporary allocation of capital committed to other investments
- Risk hedging
- Apply alpha strategies in real estate
  - Beta of the commercial real estate asset class with portable sector- or location-specific alpha
- Synthetically add or subtract leverage

PureProperty Index Concept (Geltner & Kluger 1998)

- The best measurement of property returns is based on stock price movements of REITs traded in liquid, informationally efficient markets
- PureProperty methodology *extracts* the *common* change in values of properties of a given type, region, or type/region combination that *best* explains the *common* change in stock prices of listed REITs that own those properties
  - Index weights determined by multiple regression methodology
    - analogous to performance attribution
  - Index weights based on individual REIT asset holdings by type and region
    - analogous to fundamental investing
- Index weights correspond to long *and short* stock positions
  - Short positions serve the purpose of “purifying” index returns

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A Simplified Example of the PureProperty® Methodology

1. Let's say there are just two REITs (REIT 1 and REIT 2). We observe their portfolio holdings:
   - REIT 1 is classified as an apartment REIT, but has some office properties: its portfolio is 80% Apartment and 20% Office.
   - REIT 2 is classified as an office REIT, but has some apartment properties: its portfolio is 25% Apartment and 75% Office.
2. Let's say that we observe these stock price changes: REIT 1 +1.4%, REIT 2 -0.5%.
   - +1.4% is NOT the change in apartment values, because REIT 1's stock price was also affected by the change in value of its office holdings.
   - -0.5% is NOT the change in office values, because REIT 2's stock price was also affected by the change in value of its apartment holdings.
3. Mathematically, there is only one combination of property value changes that work exactly, given what we observed:
   - Algebra, with two equations in two unknowns, gives us a way of computing the answer:

     Apartment values must have gone up by 2% and office values must have gone down by 1%.
   - The value of REIT 1's portfolio changed by 80% * +2% (Apartment) plus 20% * -1% (Office) = +1.4%.
   - The value of REIT 2's portfolio changed by 25% * +2% (Apartment) plus 75% * -1% (Office) = -0.5%
4. In the real world things the numbers don't work out exactly, so we use regression:
   - Which combination of property value changes BEST explains what we observed?

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The PureProperty® *Equity* Index Methodology (still simplified)

- Observe the property holdings of all stock exchange-traded U.S. REITs:
  - With holdings primarily in the six property types (Apartment, Health Care, Hotel, Industrial, Office, and Retail)
- Compute portfolio share by market segment
  - Property Type, Region, and Type/Region Combination)
- Observe the returns for all REITs on each day:
  - Stock price change (price return)
  - Plus income distributions (total return)
- Do a cross-sectional regression of returns on portfolio shares:

$$r_{it} = \beta_{it}^{E} x_{it}^{E} + \beta_{it}^{M} x_{it}^{M} + \beta_{it}^{S} x_{it}^{S} + \beta_{it}^{W} x_{it}^{W} + \varepsilon_{it}$$

$$\text{where } x_{it}^{E} + x_{it}^{M} + x_{it}^{S} + x_{it}^{W} = 1$$

- The slopes of the regression equation are the changes in the PureProperty indices
- To compute the index weights, stop just short of running the regression:

$$\boldsymbol{\beta} = (\boldsymbol{X}'\boldsymbol{X})^{-1}\boldsymbol{X}'\boldsymbol{r}$$

$$\boldsymbol{w} = (\boldsymbol{X}'\boldsymbol{X})^{-1}\boldsymbol{X}'$$

- The weights identify a portfolio of positions in investable REIT constituents
- The returns to the portfolio are the “pure” returns to the target market segment

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Example of Determining PureProperty Index Weights: "Purifying" the Office Index

- Only three listed REITs have "pure" office portfolios
  - Alexandria Real Estate Equities, Kilroy Realty, Franklin Street Properties
- Most office REITs also have non-office holdings
  - Boston Properties and SL Green (apartment, retail)
  - Highwoods Properties (industrial)
- Selected non-office REITs get *negative* index weights
  - DCT Industrial Trust (industrial)
  - Simon Property Group (retail)
  - AvalonBay Communities (apartment)
- Negative weights on companies with holdings mostly of *non-office* properties counteract the effects of non-office holdings on the stock price movements of *office* REITs
  - thereby "purifying" the office index
- Thirty constituents have negative weights *totaling* 4.37%
  - Ninety-seven constituents have positive weights totaling 104.37%

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A Much More Difficult Example: "Purifying" the South Region Index

- No listed REITs have "pure" South region portfolios
- Only 15 listed REITs even have a majority of holdings in the South
  - Post Properties, Ryman Hospitality Properties, Cousins Properties (East region)
  - Camden Property Trust, Weingarten Realty, Equity One (East and West regions)
  - Whitestone REIT (Midwest and West regions)
  - Mid-America Apartment Communities, Independence Realty Trust (broadly diversified)
- Non-South REITs get *negative* index weights
  - AvalonBay Communities, Alexandria Real Estate Equities (East and West regions)
  - Boston Properties, SL Green, Federal Realty (East region)
  - Macerich, Essex Property Trust, Kilroy Realty (West region)
  - Sunstone Hotel Investors (Midwest and West regions)
- Negative weights on companies with holdings mostly *outside* the South counteract the effects of non-South holdings on the stock price movements of REITs with holdings mostly *in* the South
  - thereby "purifying" the South region index
- Thirty-five constituents have negative weights *totaling* 40.40%
  - Ninety-two constituents have positive weights totaling 140.40%

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Short Positions in the PureProperty® Index Series

	Property Indices			Equity Indices		
	Number of Short Positions	Aggregate Weight of Shorts	Maximum Short Position	Number of Short Positions	Aggregate Weight of Shorts	Maximum Short Position
Aggregate	0	0	0	0	0	0
Apartment	10	-0.28%	-0.09%	10	-0.45%	-0.14%
Health Care	1	-0.00%	-0.00%	1	-0.00%	-0.00%
Hotel	0	0	0	0	0	0
Industrial	27	-5.74%	-0.85%	27	-9.76%	-1.44%
Office	35	-2.86%	-0.34%	35	-5.11%	-0.61%
Retail	10	-0.14%	-0.04%	10	-0.25%	-0.07%
East Region	38	-10.44%	-0.97%	38	-18.29%	-1.70%
Midwest Region	40	-42.75%	-4.56%	40	-82.26%	-8.77%
South Region	40	-31.42%	-3.06%	40	-55.09%	-5.37%
West Region	44	-21.60%	-1.74%	44	-33.00%	-2.66%
East-Apartment	86	-50.24%	-4.14%	86	-77.80%	-6.41%
East-Office	73	-15.52%	-0.96%	73	-28.51%	-1.77%
East-Retail	31	-17.72%	-1.70%	31	-29.48%	-2.84%
Midwest-Apartment	53	-120.62%	-5.79%	53	-208.26%	-10.00%
Midwest-Office	65	-132.70%	-3.67%	65	-362.02%	-10.00%
Midwest-Retail	68	-42.35%	-3.39%	68	-78.79%	-6.31%
South-Apartment	32	-15.54%	-2.93%	32	-26.27%	-4.95%
South-Office	60	-51.88%	-4.81%	60	-85.07%	-7.89%
South-Retail	76	-43.04%	-2.42%	76	-86.96%	-4.90%
West-Apartment	21	-19.74%	-3.30%	21	-32.37%	-5.41%
West-Office	40	-14.73%	-1.58%	40	-24.16%	-2.60%

FTSE Russell NAREIT PureProperty

Delevering REIT Returns

- Leveraged returns represent a combination of three activities:
  1. Investing in an asset
  2. Borrowing capital
  3. Making payments on borrowed capital

  = Returns of the asset *through* the capital structure

  ⇨ Delevering reverses the effects of borrowed capital, revealing the effect of investing in the asset
- Delevered returns represent a countervailing combination:
  1. Investing in the asset *through* the capital structure
  2. Lending capital
  3. Receiving payments on loaned capital

  = Returns of the asset
- Note: delevering equity returns is functionally the same as having a blended portfolio of equity and fixed-income exposures
  - Collect data on debt (borrowed capital) by each constituent REIT
  - Collect data on cost of capital
  - Identify specific fixed-income investments that most closely reverse the effects of borrowed capital

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Sidebar: "Super-Levering" REIT Returns

- Property and equity versions of the PureProperty index series can be combined to achieve any target leverage
- Adjust leverage downward by combining long positions in both property and equity versions
  - in practice, adjust weights using contraction factor
- Adjust leverage *upward* by combining a long position in the equity version with a short position in the property version
  - in practice, adjust weights using expansion factor
    - larger weights on REIT constituents
    - negative weights (short positions) on fixed income

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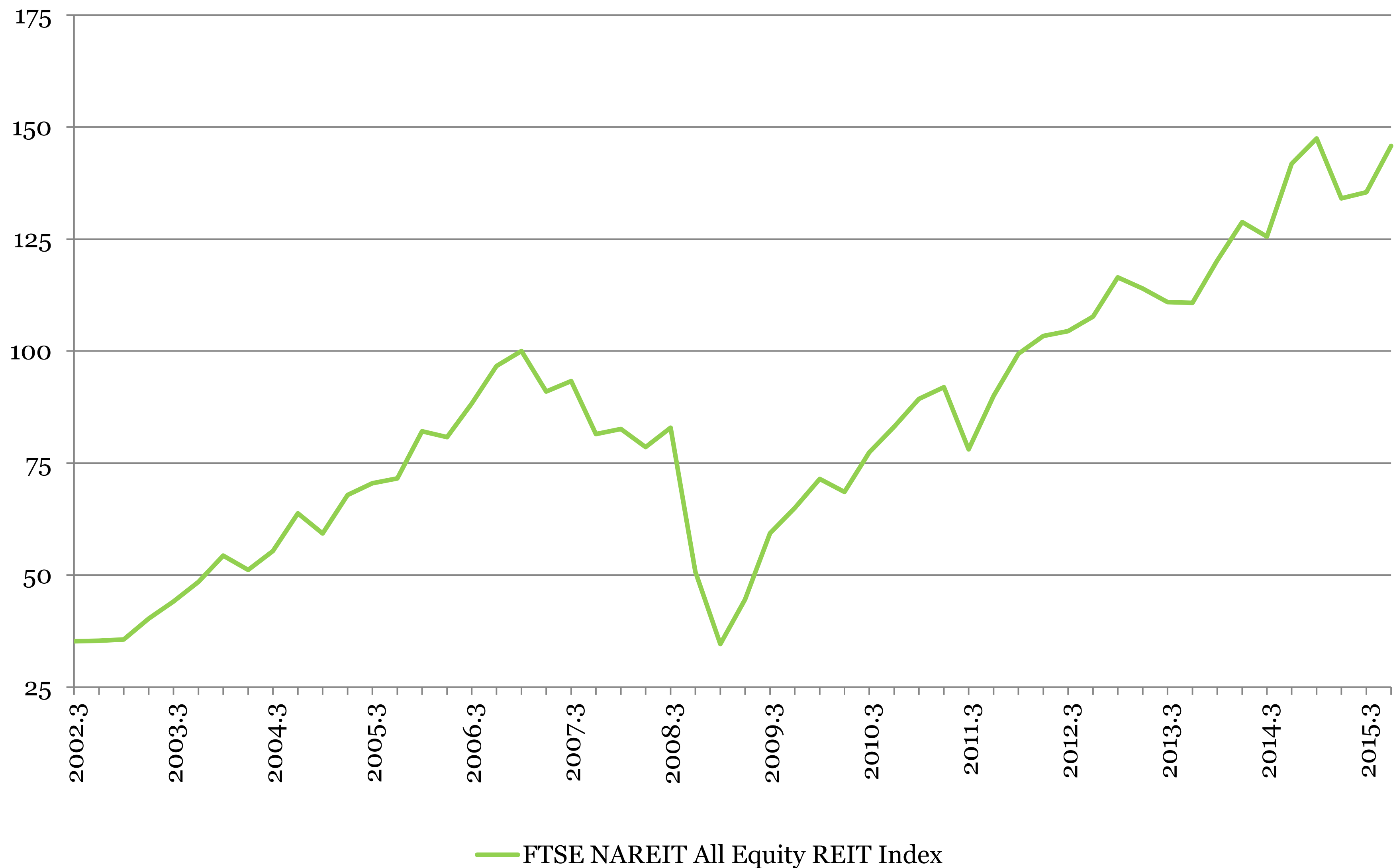
Pictures of Real Estate Returns



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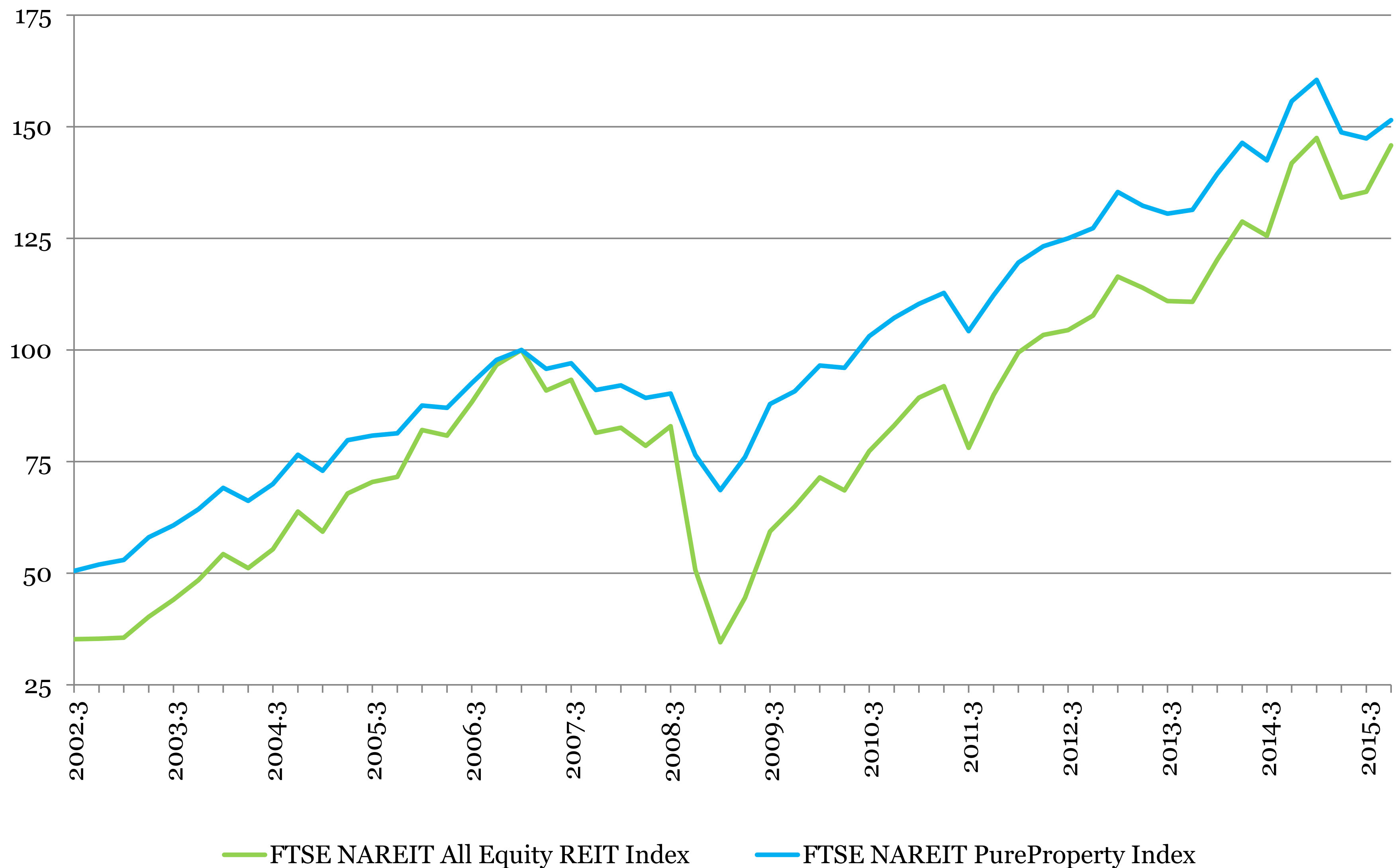

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Pictures of Real Estate Returns

Y-axis	25, 50, 75, 100, 125, 150, 175
X-axis	2002.3, 2003.3, 2004.3, 2005.3, 2006.3, 2007.3, 2008.3, 2009.3, 2010.3, 2011.3, 2012.3, 2013.3, 2014.3, 2015.3

FTSE NAREIT All Equity REIT Index
FTSE NAREIT PureProperty Index
NCREIF Transaction Based Index

Pictures of Real Estate Returns

175
150
125
100
75
50
25

2002.3
2003.3
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2012.3
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2015.3

FTSE NAREIT PureProperty Index
NCREIF Transaction Based Index

What Effect Does Delevering Have on Volatility?
Unlevered Capital Appreciation and Total Returns, 2002q4 – 2016q1

	Capital Appreciation		Total Return	
	Listed U.S. Equity REITs (unlevered)	U.S. Private Equity Real Estate (unlevered)	Listed U.S. Equity REITs (unlevered)	U.S. Private Equity Real Estate (unlevered)
Apartment	10.85%	10.63%	10.85%	10.70%
Industrial	11.12%	10.38%	11.16%	10.41%
Office	11.63%	10.64%	11.65%	10.63%
Retail	11.95%	10.95%	11.98%	11.15%
East Region	12.13%*	10.94%	12.18%*	11.06%
Midwest Region	10.81%*	10.03%	10.82%*	10.10%
South Region	10.34%*	10.30%	10.34%*	10.41%
West Region	12.05%*	10.62%	12.09%*	10.63%
Aggregate	**11.25%***	**10.55%**	**11.28%***	**10.62%**

All figures are annualized based on standard deviation of quarterly returns, 2002Q4-2016Q1. Listed U.S. equity REIT returns measured by the FTSE NAREIT PureProperty® index series; unlisted U.S. real estate returns measured by the NCREIF Transaction Based Index (NTBI). Quarterly returns for NTBI are measured using all available properties that transacted during each quarter; quarterly returns for PureProperty are measured on the basis of only the last stock transaction in each quarter.
*Includes health care and hotel properties, which are slightly more volatile. Source: NAREIT analysis of data from FTSE and NCREIF.

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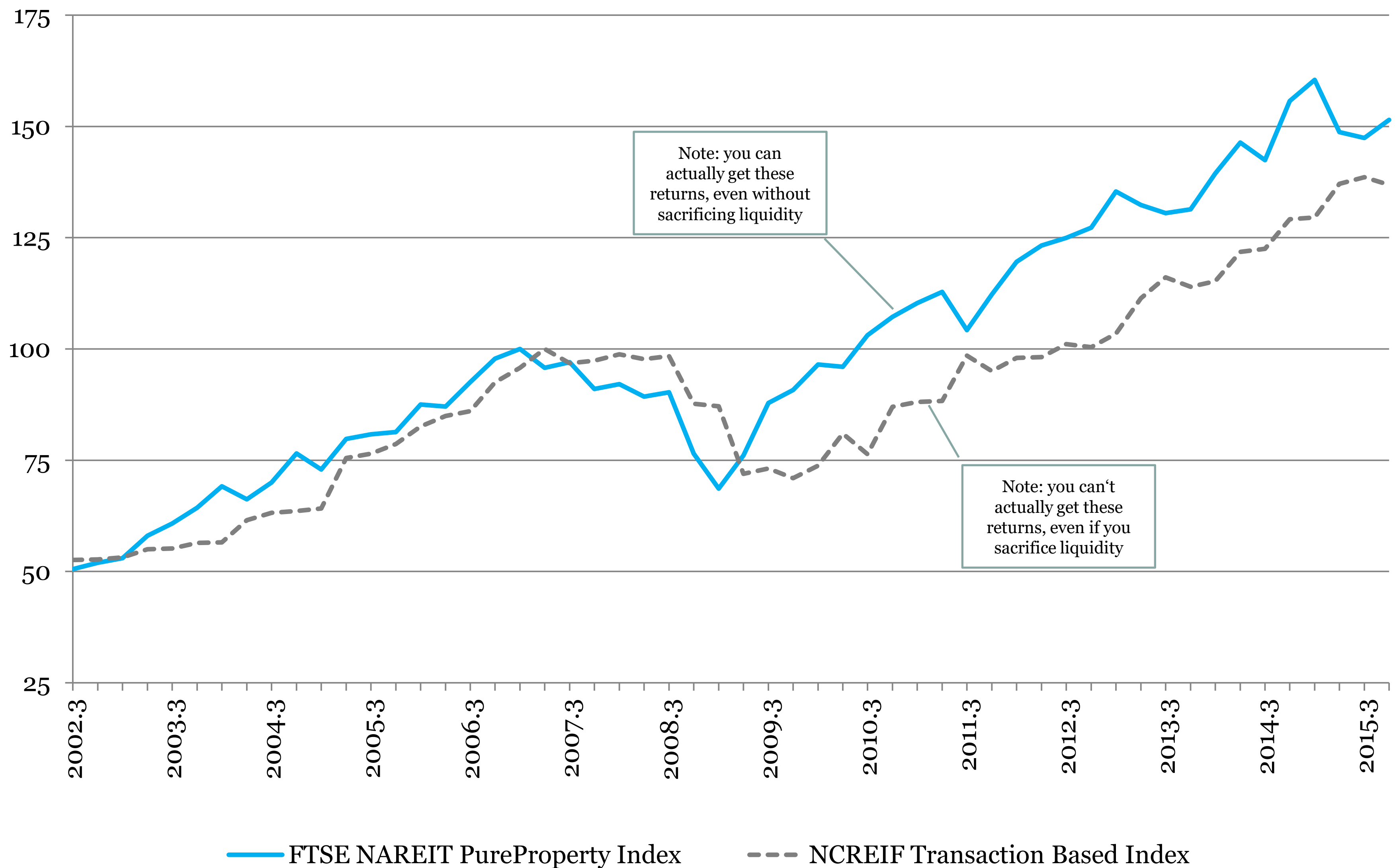
Pictures of Real Estate Returns



Pictures of Real Estate Returns

175
150
125
100
75
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25

2002.3 2003.3 2004.3 2005.3 2006.3 2007.3 2008.3 2009.3 2010.3 2011.3 2012.3 2013.3 2014.3 2015.3

FTSE NAREIT PureProperty Index — NCREIF Property Index — NCREIF Transaction Based Index

Pictures of Real Estate Returns

175
150
125
100
75
50
25

2002.3 2003.3 2004.3 2005.3 2006.3 2007.3 2008.3 2009.3 2010.3 2011.3 2012.3 2013.3 2014.3 2015.3

NCREIF Property Index NCREIF Transaction Based Index

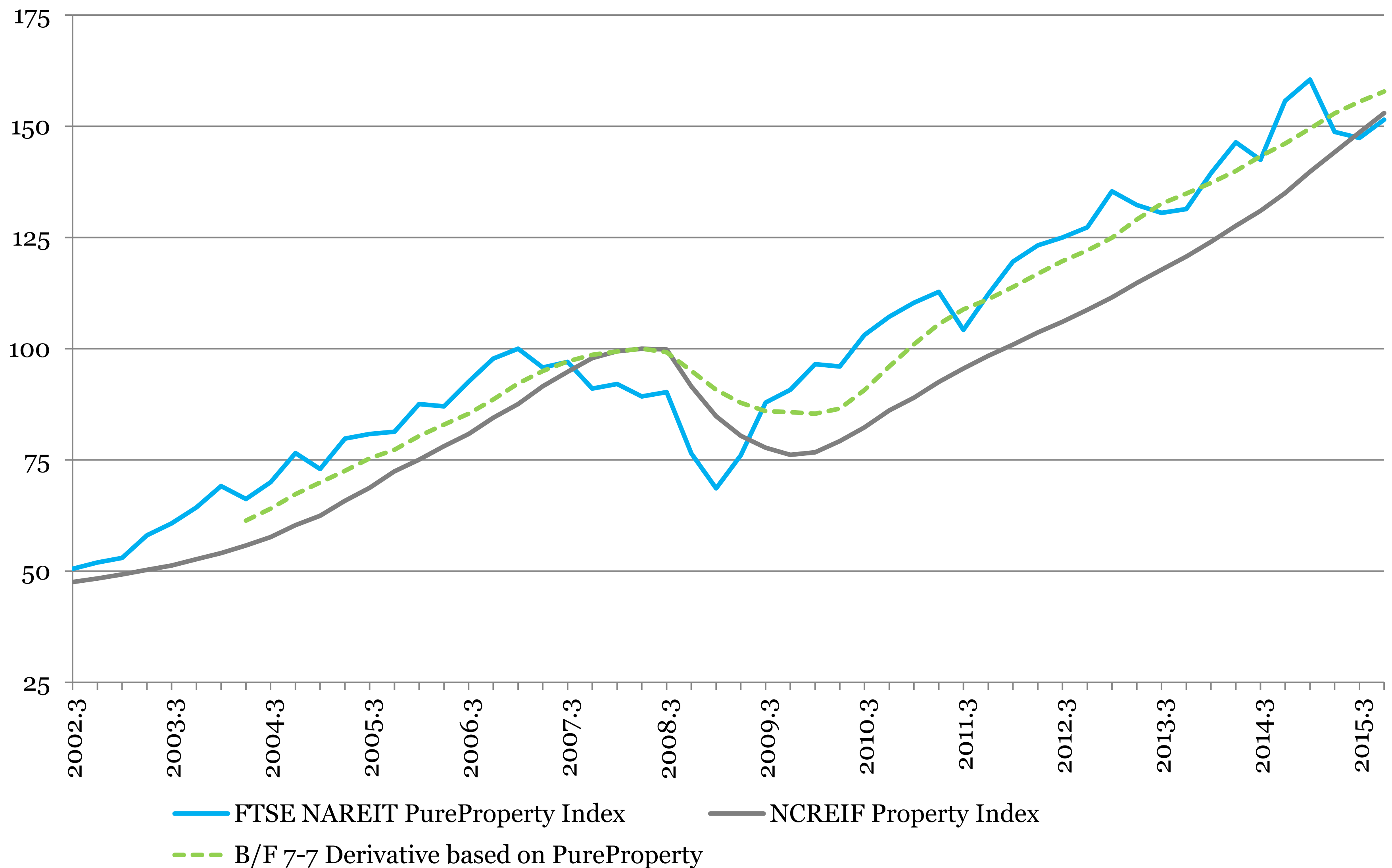
Pictures of Real Estate Returns

175
150
125
100
75
50
25

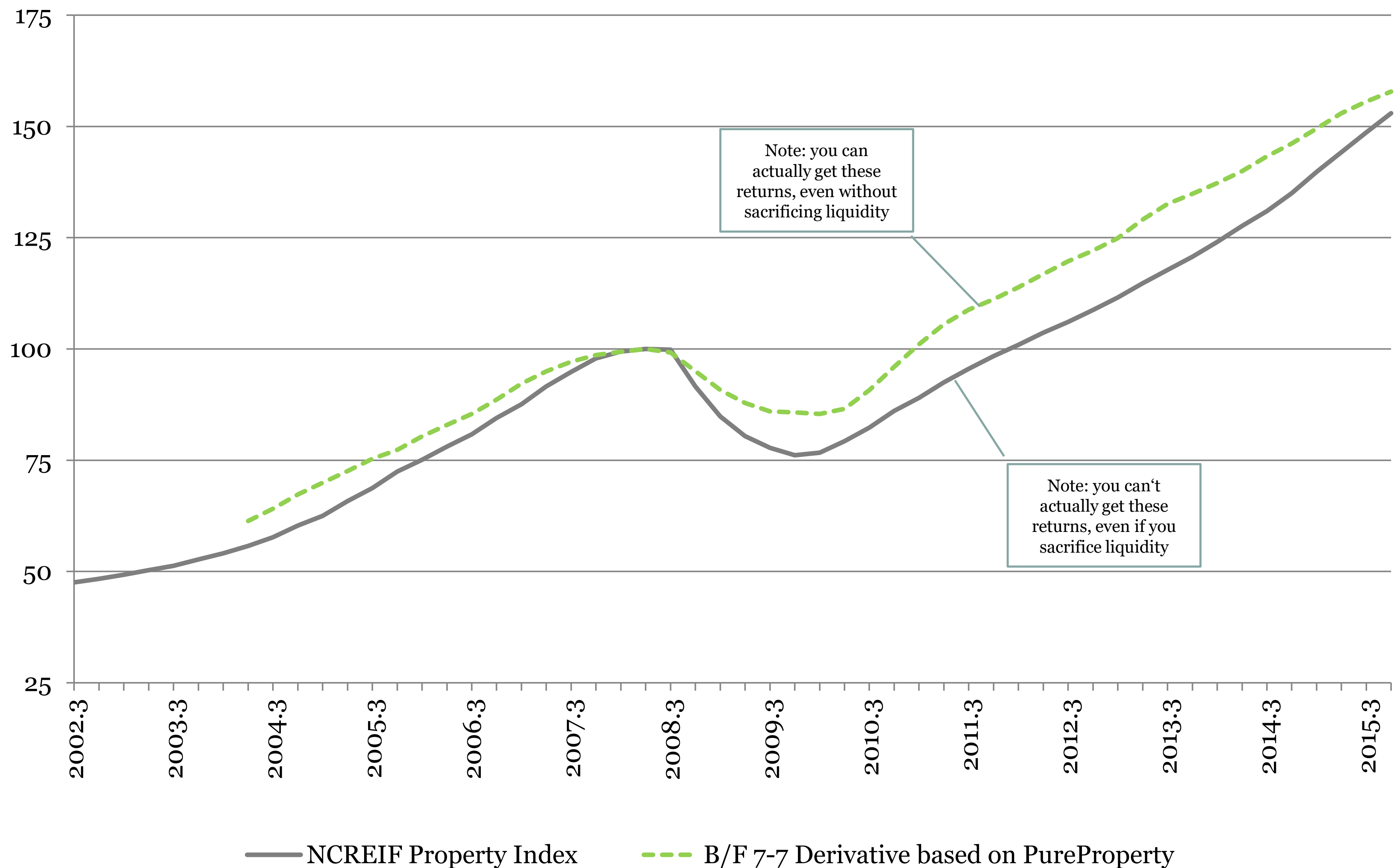
2002.3 2003.3 2004.3 2005.3 2006.3 2007.3 2008.3 2009.3 2010.3 2011.3 2012.3 2013.3 2014.3 2015.3

FTSE NAREIT PureProperty Index   NCREIF Property Index

Pictures of Real Estate Returns



Pictures of Real Estate Returns



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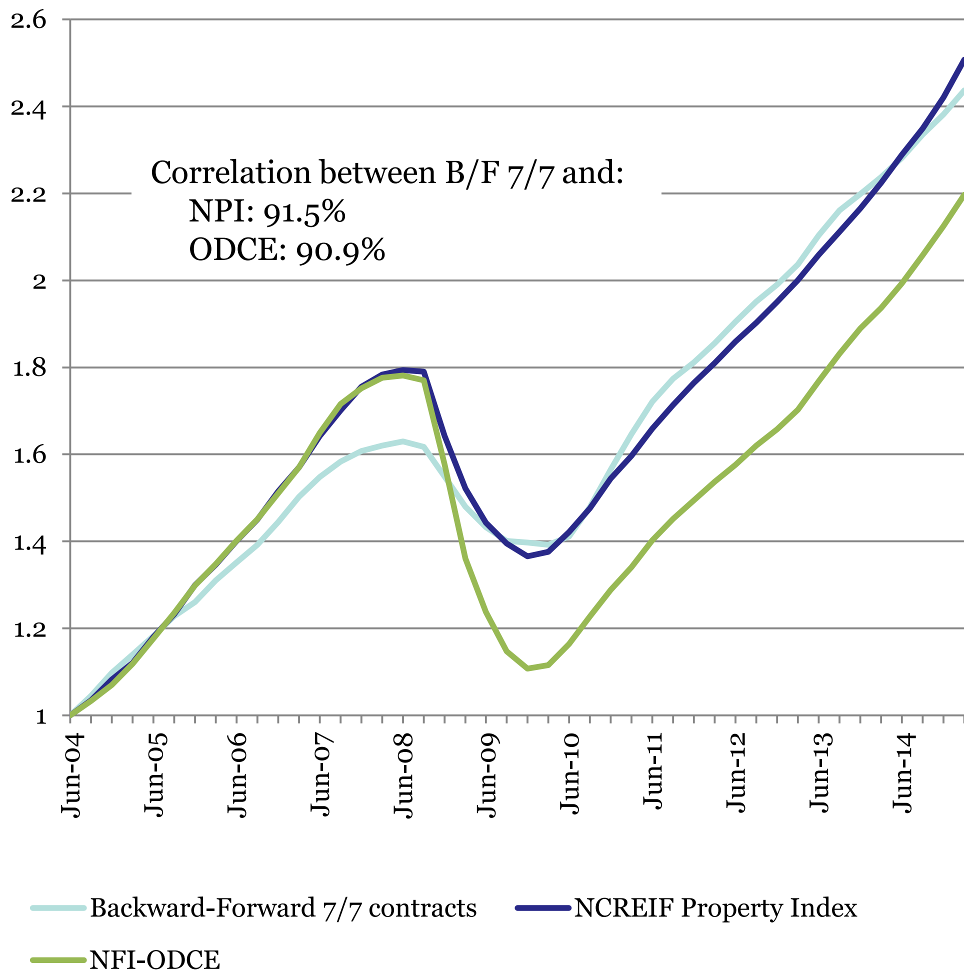
An Important Advantage of Private Real Estate Investment

- Lag and Smoothing Are Beneficial
  - Reduces perceived volatility, increases perceived risk-adjusted returns
  - Increases perceived diversification benefits
  - These "benefits" are false, but legally reportable
  - Liquid securities do not "benefit" from lag and smoothing
  - BUT lag and smoothing can be replicated using liquid securities!
- "Backward-Forward" Trading Contract
  - Derivative whose value in the future ("forward") depends on the lagged value ("backward") of liquid securities
  - Example: Backward-Forward 7/7 pays off 7 quarters from now based on the average daily value of the PureProperty index over the preceding 7 quarters
- Expenses and Liquidity of Backward-Forward Contracts
  - Underlying securities are readily marketable with explicit liquidity
  - Positions can be entirely hedged using liquid securities
  - Positions can be liquidated or adjusted at low transaction cost

FTSE NAREIT PureProperty

An Important Advantage of Private Real Estate Investment



Over the available historical period, a series of B-F 7/7 contracts held to maturity would have provided:

- Gross total returns similar to the NPI
- Net total returns almost certainly higher than the NPI
- Lower volatility than the NPI
- Better risk-adjusted returns than the NPI
- Almost the same (measured) correlations with other assets
- Better diversification benefits
- Daily liquidity

	B/F 7/7	NPI	ODCE
Gross TR	8.48%	8.83%	7.78%
"Volatility"	4.7%	6.1%	8.7%
"Sharpe Ratio"	1.52	1.22	0.74

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Backward-Forward Contracts for Targeted Segments of the Real Estate Market

Segment	B-F Design	Corr (%)	Gross Total Return B-F	Gross Total Return NPI	Measured Volatility B-F	Measured Volatility NPI	Measured Sharpe B-F	Measured Sharpe NPI
Aggregate	7/7	91.4	8.46	8.99	**4.59**	5.99	**1.56**	1.28
Apartment	7/7	88.0	8.78	8.59	**4.68**	6.29	**1.60**	1.16
Hotel	8/8	86.5	7.86	7.70	**4.87**	7.15	**1.35**	0.90
Industrial	8/8	88.5	7.57	8.86	**4.08**	6.10	**1.54**	1.24
Office	8/8	90.6	7.45	8.71	**4.33**	6.56	**1.42**	1.13
Retail	7/7	89.1	8.79	10.13	**4.86**	5.16	1.54	1.71
East Region	7/7	91.0	8.73	8.67	**5.03**	6.47	**1.48**	1.14
Midwest Region	7/7	89.3	7.70	7.68	**4.44**	4.78	**1.44**	1.34
South Region	8/8	85.5	8.08	9.11	**3.60**	5.29	**1.88**	1.48
West Region	7/7	92.4	9.17	9.73	**5.19**	6.47	**1.52**	1.30
East Apartment	6/6	79.9	8.07	7.35	**5.81**	7.31	**1.17**	0.83
East Office	8/8	87.9	7.36	8.92	**4.41**	7.23	**1.38**	1.06
East Retail	7/7	88.3	9.09	10.16	**4.93**	5.17	1.58	1.71
Midwest Apartment	5/5	57.0	9.32	8.44	**4.42**	4.74	**1.82**	1.51
Midwest Office	9/9	77.3	4.75	5.80	**3.82**	4.64	0.91	0.97
Midwest Retail	7/7	86.2	7.76	9.35	**4.94**	5.20	1.31	1.55
South Apartment	7/7	85.2	8.59	9.40	**4.62**	5.67	**1.58**	1.43
South Office	9/9	85.6	5.58	8.25	**3.27**	5.34	**1.31**	1.30
South Retail	6/6	84.0	7.59	10.34	**5.25**	5.59	1.20	1.62
West Apartment	7/7	91.2	9.23	9.48	**4.21**	6.65	**1.88**	1.23
West Office	8/8	92.0	9.32	9.49	**4.06**	7.06	**1.98**	1.16

Note: based on quarterly returns through 2015q3. Starting date determined by B-F design: 6/6 begins 2004q2, 7/7 begins 2004q3, 8/8 begins 2004q4, 9/9 begins 2005q1. Quarterly return for B-F is return on contract held to maturity and settled on that end date.

FTSE Russell NAREIT PureProperty

Revisiting the Top Four Risk Factors

- Specific Asset Risk
  - PureProperty provides access to fully diversified real estate portfolios
    - by property type and/or geographic location
- Liquidity Risk
  - PureProperty is investable through positions in liquid stocks of listed REITs
    - can trade hundreds of millions of dollars in one day
  - PureProperty supports synthetic investing through swaps and other derivatives
- Asset Selection/Management Risk
  - PureProperty provides access to returns on assets owned and managed by listed REITs
  - Superior income, capital appreciation, and total return
- Valuation Risk
  - PureProperty accurately measures both components of total return
  - No appraisal lag or illiquidity lag
  - No appraisal smoothing or illiquidity smoothing

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Summary: What Can the PureProperty Indices do for Real Estate Investment?

- Strong Risk-Adjusted Returns
  - listed REIT asset selection and management
- Diversification
  - by property type and geographic location
  - completion of concentrated portfolios
- Granularity
- Liquidity
- Reliable, timely valuation
- Low transaction costs
- Risk evaluation and risk management
- Same volatility and correlations as NPI
  - lower transaction costs

⇨ **Maybe real estate will finally approach the optimal ≈20% of a mixed-asset portfolio!**

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