

US Private Equity Real Estate Derivatives: Is Now the Time?

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Executive Summary

- In the US, private equity real estate does not yet have a **well-developed** derivatives market comparable to other major asset classes.
- Derivatives on US private equity real estate have the potential to **reshape direct real estate investment activity**. A fully functioning derivatives market would allow investors to separate property-level acquisition decisions from portfolio-level allocation choices. Innovative real estate investment funds, including direct real estate 130/30 and portable alpha strategies, could emerge.
- Pricing of derivatives today is quirky because of limited trading. This creates a **short-term arbitrage opportunity** for real estate investors knowledgeable about NCREIF index characteristics. Longer term, pricing should become more efficient if the derivative market takes off.
- Approximately **\$500 million** of derivative trades on US private commercial real estate have occurred to date. In the more developed UK market, **over \$18 billion** has been traded.
- Trading to date is a drop in the bucket compared to the estimated \$5 trillion value of the US commercial real estate market. In other major asset classes, derivative trading volume has often become as large as the underlying market within five years. Yet previous attempts to launch US private equity real estate derivatives have failed. Is there some **fatal flaw** in the idea of real estate derivatives? We would argue that there is not. Instead:
 - **Real estate market participants** will need to develop in-house resources to:
 - Understand real estate equity derivative mechanics. Since alternative forms of derivatives are often used in managing real estate investments today, this does not seem unreasonable.
 - Develop the ability to forecast real estate returns and translate forecasts into a view on derivative pricing.
 - **Investment bank dealers, brokers and others** with a vested interest in building a derivatives market will need to begin by:
 - Educating end users and learning to speak their language.
 - Introducing over-the-counter (OTC) products initially.
 - Focusing on one index at first – likely, the NCREIF Property Index.
 - Expanding the number of sub-indices available by metro market and/or property type. Real estate is a highly heterogeneous asset class, and the usefulness of derivatives will increase in proportion to their customizability. This may require derivative dealers to assume, or “warehouse,” more risk.
 - **Education** is the key to developing a successful real estate derivatives market.

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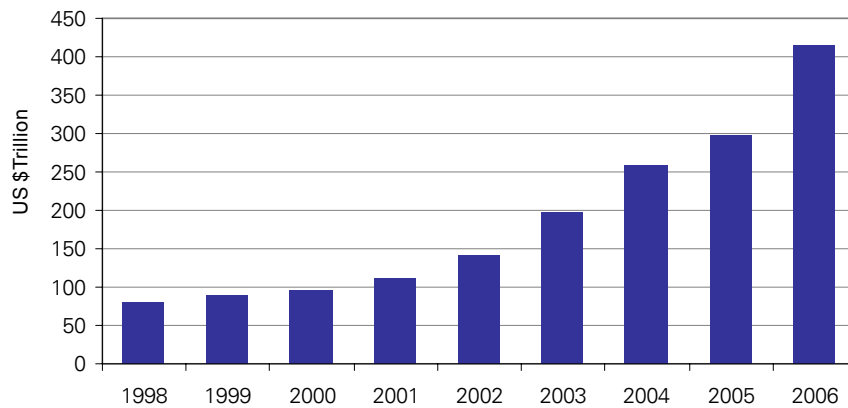
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Introduction

In the US, commercial real estate has evolved into a major asset class that plays a significant role in many institutional portfolios. Total US investible real estate assets are estimated at \$5 trillion, approximately 15% of the nation's investible universe, which also includes stocks and bonds. Despite its role and size, US private equity real estate does not yet have a well-developed derivatives market comparable to other asset classes. Industry participants have been slow to embrace derivatives as compared to other financial innovations like CMBS and REITs (securitized real estate debt and equity).

Outside of real estate, the derivatives market has grown significantly. The global OTC derivatives market has grown to over \$400 trillion. (Please refer to Exhibit 1.) The total notional value of OTC contracts outstanding is now roughly seven times as large as the global economy. As big as this number is, it actually underestimates the size of the derivatives market, because it excludes contracts traded on exchanges like the Chicago Mercantile Exchange.

Exhibit 1
Total Value of Global Over-the-Counter (OTC) Derivative Contracts Outstanding
Notional Amount



Source: BIS Quarterly Review, June 2007

Derivatives are financial instruments whose value is derived from an underlying asset or index. Assets with traded derivatives include commodities, equities, bonds and currencies. Traded indices include CPI (consumer price index) inflation, stock market benchmarks like the S&P 500, and even an index of weather conditions. Different types of derivative contracts include futures, forwards, options and swaps. Generally speaking, these contracts provide the right (or obligation) to buy (or sell) the underlying asset or index at a given price and time.

Derivatives were originally developed to manage risk in the agricultural industry. That is why, to this day, the center of US derivatives trading remains Chicago. These tools are perceived as a recent financial innovation, but they have been used for centuries. The use of derivatives can be traced back as far back as the Japanese rice market of the 1600s. The modern derivatives market has its roots in North American grain markets in the nineteenth century. Farmers seeking to hedge against unfavorable crop prices at harvest time would enter into a commodity futures contract. The early use of derivatives in the agricultural sector allowed farmers to reduce risk while offering the potential for gain to

the counterparty (the party who was taking the other side of the trade).¹ Today, derivatives have evolved into sophisticated tools for risk management and risk transfer. Their use has allowed financial institutions and investors to measure and deal with risk much more effectively.

What, then, has prevented the development of a derivatives market in the US private equity real estate industry? From a practical point of view, the development of a derivatives market will require a comprehensive and reliable benchmark index. But given that real estate is less transparent than other asset classes, questions remain regarding the quality and market coverage of the existing indices. The lack of one broadly accepted private equity real estate index is a key obstacle to the full-fledged development of a derivatives market in the US.

The active use of derivatives in managing real estate investments may also be at odds with the basic rationale for including real estate in a multi-asset portfolio. Originally, investors did not invest in real estate for its returns, but for its diversification potential. The liquidity of real estate, or lack thereof, was not a primary concern among many institutional investors. But as the real estate industry matures, and as the asset class becomes increasingly integrated into the broader capital markets, real estate is becoming viewed as an alpha generator and not purely as a portfolio diversifier.

The development of a liquid derivatives market should be the next step in the integration of real estate and capital markets. The Chicago Mercantile Exchange and Global Real Analytics estimate that the US private real estate derivatives market will grow to over \$105 billion in three to five years. This value would still be very small compared to the estimated \$5 trillion value of all US commercial real estate. The forecast may not be that far-fetched if one considers that in other asset classes the derivatives market has matured to at least the same size as the underlying market within the first few years of its existence.

As the real estate asset class matures and as investors increasingly adopt sophisticated financial tools, derivatives should be more widely used in order to:

- Hedge or gain cost-effective exposure to commercial real estate,
- Rebalance portfolios synthetically, and
- Capture excess returns or alpha.

In this report, we analyze the potential for a US real estate derivatives market to transform real estate investing and, at a much more fundamental level, the potential for this market to exist at all. First, we look at the development of the US market to date, and contrast it with that of the UK. The successful growth of the UK real estate derivatives market stands in contrast to the US experience. The next section highlights the key strategic uses of derivatives in managing exposure to real estate for various market participants. This is followed by a review of current market pricing and the real estate return forecast implied by today's prices. Key risks to the development of a private equity real estate derivatives market are then reviewed. A reference list of suggested reading is provided. Finally, the Appendix offers a comprehensive list of all real estate indices currently available for derivatives trading.

¹ Jeff Sanford, "Capital idea: The booming derivatives market gets its due", Canadian Business Online, June 5, 2007.

A Brief History of Real Estate Derivatives

Before discussing the strategic potential of derivatives and their potential risks, it makes sense to begin with a summary of the state of the market. Where is the US private equity real estate derivative market today? What have been the key developments to date? What can we learn from the UK, where the market is further along? Finally, in light of the fact that the first attempt to launch a US real estate derivatives market occurred more than 15 years ago, can any lessons be gleaned from past failures?

Existing Derivative Products Used by Real Estate Investors

The US private real estate derivative market may be in its infancy, but the use of other types of derivatives is not unusual among institutional real estate investors. Derivative markets tied to the following assets are commonly-used tools in real estate investing:

- **Foreign exchange and interest rates.** Real estate investors are exposed to a wide array of risks, some of which can be managed in part through non-real estate derivatives. For example, currency swaps have been used to manage foreign investments. Interest rate swaps have also been employed, to shift real estate debt from floating to fixed rate or vice versa.
- **CMBS and REITs.** Outside of private equity real estate, liquid derivatives markets have developed around other segments of the US commercial real estate market. Both securitized real estate debt (CMBS) and publicly-traded real estate equity (REITs) are tracked by benchmark indices with traded derivatives. For US REITs, structured notes linked to indices like the Wilshire REIT index are currently sold to institutional and retail investors. On the CMBS side, traded derivatives include total return swaps and credit default swaps (CDS). An exact figure for the total notional value of trades to date is not known. Estimates of total CMBS CDS trades since the market took off in late 2005 are in the tens of billions of dollars.² US CMBS issuance amounted to \$156.2 billion in 2006 and \$210.2 billion in 2007 through October, according to Commercial Mortgage Alert. Conservatively, then, the value of CMBS CDS outstanding represents about 10% of CMBS issued each year.

Development of the US Real Estate Derivative Market to Date

Several indices tracking the US direct real estate market are available for derivatives trading. Activity to date has centered on the NCREIF Property Index (NPI). The NPI is the established benchmark for tracking total returns on US institutional-quality private real estate. This index is appraisal-based and provides income and capital returns. In addition to the NCREIF Property Index, there are transaction-based price indices like the Moody's/REAL Commercial Property Price Index and the S&P/Global Real Analytics Commercial Real Estate Indices. Other indices focus on a specific property type, like the REXX Index on office and the HQuant Lodging Index on hotels. An overview of all indices is provided in the Appendix. For the purposes of this paper, we focus on the NCREIF index. The rationale for this selection is discussed in more detail in the Appendix.

² Alan Todd and Yuriko Iwai, "CMBX.NA Index and Single-Name CMBS CDS", CMBS World, Spring 2006.

Exhibit 2
Timeline of US and UK Real Estate Market Development

	US	UK
2000		Barclays and PRUPIM create Property Derivatives User Association (PDUJA)
2000-2003		PDUJA works with UK regulators to address potential obstacles to development of RE derivative market
2004		Several investment banks licensed to trade derivatives based on IPD UK indices
Dec. 2004		British Land and PRUPIM trade first major contract for £40 million
2005	NCREIF grants Credit Suisse an exclusive license to use NPI for derivatives	UK OTC market continues to develop. 7 banks are licensed dealers
Dec. 2005	2 or 3 trades occur based on NPI; value/parties not disclosed	
2006	Credit Suisse exclusive license ends; several more NPI-based derivative trades occur	National value of UK trades exceeds £1 billion. First property type swaps are traded. Over 10 banks are licensed dealers
2007	7 banks hold NCREIF licenses	UK market exceeds £7 billion

Source: Based on Venter (2007)

A timeline of significant events in the development of the US and UK markets is provided in Exhibit 2. The most recent efforts to kick-start a US real estate derivatives market began when Credit Suisse received an exclusive license to trade derivatives based on the NCREIF index.³ During 2005, two or three trades based on the NPI occurred. Parties to each trade, as well as the notional value, are not known. By year-end 2006, several more trades had been executed.

Throughout last year, it became clear that having just one investment bank licensed to deal in NPI derivatives was limiting market growth. There was a perception among some market participants that derivative pricing was too rich. At the same time, several index providers were jumping into the ring to offer commercial real estate indices unconstrained by the exclusive arrangement between Credit Suisse and NCREIF. These indices offered different methodologies and market coverage to appeal to different users. The real estate derivatives market was not sufficiently deep to make market fragmentation across various indices a positive development. In the end, the decision was made to offer NCREIF licenses to additional banks.

At present, seven investment banks are licensed dealers of NPI derivatives. As of mid-year 2007, the US market had seen roughly 8 to 12 trades on the NCREIF index. See Exhibit 3. The average notional value of these trades was approximately \$15 to \$20 million, for a total estimated value of \$100 to \$200

Exhibit 3
Estimated Trading Volume of US
Private Real Estate Derivatives
2005 - H1 2007

Total number of trades:	8 - 12
Average notional value:	\$15 - 20 m
Total notional value:	\$100 - 200 m
Number of NCREIF licensed dealers:	7

Source: Venter (2007)

³ Tullett Prebon launched some initial efforts to spur the development of NCREIF derivatives in 2003.

million.⁴ By November 2007, approximately \$500 million in trades were said to have occurred. It is not possible to give exact figures because these trades were all done OTC, which means that trade details are not publicly disclosed.

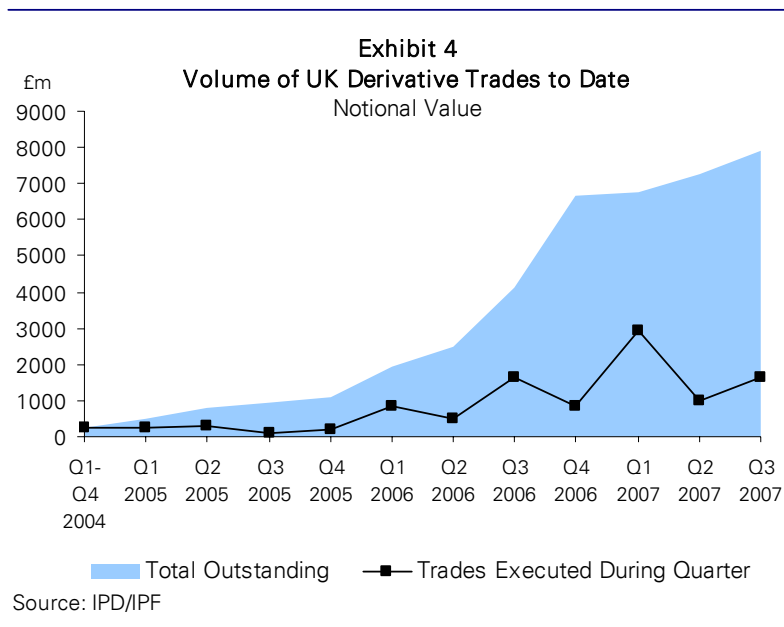
The UK Experience

As shown in Exhibit 2, real estate derivatives gained steam earlier in the UK than in the US. After a couple of false starts in the 1990s, prominent UK real estate investors, banks and other market participants came together in 2000 to create an industry organization encouraging the development of a real estate derivatives market. The Property Derivatives User Association tackled regulatory issues, including the proper accounting treatment of a real estate equity derivative.

Industry support consolidated around a single index tracking the UK commercial real estate market: the Investment Property Databank (IPD) UK Index. This index is an appraisal-based measure of capital and income return on UK institutional-quality real estate. By 2004, several investment banks were licensed to trade derivatives. Two major real estate investors, British Land and PRUPIM, traded a £40 million contract that year. They heavily publicized the trade in order to encourage others to participate in the nascent derivatives market.

On December 31, 2005, the total notional value of UK real estate derivative contracts outstanding had reached £1 billion. By year end 2006, the total value had jumped past £6 billion, and was approaching £8 billion by third quarter 2007. Over 700 UK trades have been executed to date, with more than 500 currently outstanding. (Please refer to Exhibit 4.) Growth was fueled by industry associations like the Investment Property Forum's Property Derivatives Interest Group, which brought real estate investors together for education and discussion.

Anecdotally, trade in the UK contracts appears to have slowed recently, as local real estate return expectations have weakened. Any slowdown has not been captured in the figures through September 30, 2007.



⁴ Jani Venter, "Barriers to Growth in the US Real Estate Derivatives Market," Master's thesis, MIT, September 2007.

Lessons Learned from Past Failures

The timeline for Exhibit 2 begins in 2000. Yet those with long memories will recall that real estate derivatives had been launched previously. In 1991, futures contracts on UK real estate were offered on London's Futures and Options Exchange. Total return swaps, similar to those available today, were also developed for the US at that time.⁵ These efforts came to naught. In 1994, private real estate contracts based on the IPD index were marketed by Barclays Capital in the UK. Some trades were done but the market never blossomed.

What can we learn from these experiences? Why might now be the time, when the 1990s were not? What needs to happen in order for a private real estate derivatives market to succeed?

- **Start with OTC swaps.** In other asset classes, derivative markets were started with customized over-the-counter products, and the development of exchange-traded futures and options followed.⁶ OTC dealers can provide investors with derivatives of the exact notional dollar amount and linked index that they prefer. Dealers and brokers can also give new derivative investors more one-on-one guidance on how the products work. The exchange-traded market, by contrast, offers standard contract sizes and less index customization, and requires greater upfront knowledge from market participants.
- **Clear up regulatory issues.** Unclear tax and accounting treatment of derivative investment slowed market growth in the UK. The potential tax advantage of derivatives was a key component of their appeal. Once the favorable tax treatment was confirmed by regulators, the UK market took off.
- **Wait for growth of the derivatives market overall.** As shown in Exhibit 1, the derivative market is ten times larger today than it was when the last US real estate derivative push was made. Perhaps investor confidence and knowledge were lacking at that time, but are present today.
- **Let real estate "Wall Streetize."** The 2008 Emerging Trends in Real Estate report, from ULI and PriceWaterhouseCoopers, uses this phrase to describe the growing influence of investment banks in real estate markets. Today, private equity real estate professionals and investment bankers continue to see the world very differently. As more and more practitioners become fluent in both perspectives, a resulting synthesis could be a liquid private real estate derivatives market.

Why Has a Dynamic US Market Yet to Emerge?

Successful implementation of the lessons learned from past failures allowed the UK market to develop. Given that many of these conditions are met in the US as well, why is the US market not developing faster? In most asset classes, the US has led the world in derivative market development. Why has the real estate derivatives market taken off in the UK, while only a few trades have occurred in the US?

Key differences between the US and UK real estate markets include:

- **UK growth driven by end users, not derivative dealers.** In the UK, a coalition of real estate investors and lenders collaborated to spur the development of the market.

⁵ S. Michael Giliberto, "Property Asset Cash Transfers: A New Tool for Real Estate Portfolio Management", Salomon Brothers, September 12, 1991.

⁶ The Derivatives & Securities Consultancy Ltd, "An Introduction to Derivatives", 2007.

These so-called “end users” were the market participants creating demand for derivatives. In the US, investment bank dealers and index providers have led the charge to date. This supply-side effort has not yet seen the same success as the demand-led UK initiatives.

- **Higher UK transaction costs and derivative tax advantage.** In the UK, physical real estate transactions are subject to a stamp tax of approximately 7.5% of property value, in addition to other transaction costs. Real estate derivatives, however, are not subject to these transfer taxes. In the US, transaction costs and transfer taxes are much lower than in the UK. As a result, there is less incentive for US end users to push for the development of a derivatives market. Nonetheless, transaction costs and taxes are substantial enough to suggest advantages of synthetic real estate investment in the US as well.
- **Widespread acceptance of a single UK benchmark index.** Derivative user interest quickly coalesced around the UK’s IPD index, without the ‘index wars’ seen currently in the US. The dominance of the IPD index appears to be due both to the quality of the index and to decisions made by the IPD organization. Similar to the NCREIF Property Index, the IPD index is based on property appraisals, covering higher-quality commercial real estate. Unlike NCREIF, however, the IPD index covers roughly 50% of the UK real estate universe. NCREIF only covers an estimated 5% of the US real estate stock. The superior market coverage of the IPD index perhaps discouraged the development of competing indices. Moreover, IPD made index licenses available to all interested dealers from the beginning. It is worth noting that the IPD is appraisal-based, and therefore subject to lagging true market returns and displaying smoothing. The index’s reliance on appraisals, instead of transactions, does not appear to have dissuaded UK investors.
- **Superior UK ability to use derivatives as a hedge for accounting purposes.** Derivatives on the IPD index are more likely to serve as an effective hedge for UK real estate exposure, from an accounting perspective. Ideally, a derivative should be highly correlated with the asset to be hedged. When this is the case, net real estate exposure is reduced on a firm’s balance sheet. The UK is a smaller market, and the IPD index is dominated by properties in and around London. The US commercial real estate market, on the other hand, is at least five times as large as the UK’s. Much greater diversity in return performance exists across US regions. The greater homogeneity of the UK market contributes to greater hedge effectiveness, i.e., less basis risk. These concepts will be defined and discussed in more detail in the hedge strategy and risks sections that follow.

Strategic Uses of Derivatives in Managing Real Estate Exposure

What do NPI derivatives really have to offer a direct real estate investor? In this section, we turn to specific applications of real estate derivative products in managing portfolios.

Derivatives are sufficiently well-established that investors tend to be familiar with the advantages they provide. Well-known benefits include the ability to short a sector, hedge broad market exposure and turn an uncertain income stream into a certain one. In the References section, we provide a list of articles for readers who seek more technical information about how derivatives work.

While the basic uses of derivatives are commonly known, it is perhaps more difficult to imagine how NPI derivatives might be used in the context of managing a direct real estate portfolio. Exhibit 5 summarizes the primary potential applications of real estate

derivatives, along with likely users and their foreseeable direction of exposure (long or short). Potential users are grouped into three rough categories: hedgers, speculators and 'allocators.' We will discuss these groups in more detail in the sections that follow.

Exhibit 5
Using Derivatives to Manage Real Estate Exposure

	Benefit	User	Direction	Concerns
Hedgers	Hedge Market Exposure	Lenders, developers, owners, investors	Short	Lack of market risk (volatility), basis risk
Allocators	Gain or Reduce Market Exposure	Investors, especially foreign	Long or Short	Variance in derivative pricing over the cycle, basis risk
	Asset Allocation	Investors, RE portfolio managers	Long or Short	
	Detachment of Alpha from Beta	RE managers, investors	Short	
Speculators	Directional Plays	Investors, hedge fund managers, RE managers	Long or Short	Lack of volatility (market risk), basis risk
	Relative Value (Pricing) Arbitrage	Hedge fund managers	Long or Short	

Source: RREEF Alternative Investments

Hedgers

Historically, derivative markets have been built on hedgers who use these products to manage risk. Speculators, in turn, provide market liquidity as a result of their willingness to take on risk. Few markets have developed without interest from both sides. Therefore, we begin our discussion with a focus on natural risk-mitigators and natural risk-takers. Why would each side have an interest in private real estate derivatives, and which obstacles may concern each constituency? While hedgers and speculators have opposing motivations for entering the market, both sides face very similar concerns and risks using NPI-based derivatives.

Advantages: On the hedge side, several market participants are likely to be more exposed to the vicissitudes of the real estate market than they would like. Real estate *developers* might prefer to gain income from charging fees for their services, not from directional changes in the real estate market. *Lenders* may seek protection from a significant market downturn that would lead to a surge in defaults. Likewise, *corporate and individual real estate owners* may prefer to enjoy the benefits of owning their space without being exposed to major market fluctuations. *Real estate investment managers* may choose to hedge their inherent exposure as a firm to major declines in the market. It is not clear, however, that investment managers will short the index in client products, as they are in the business of providing real estate market beta.

Disadvantages/Concerns: Hedgers will be most concerned with the effectiveness and true benefit of a derivative hedge. Key questions will include: Does shorting the available index really protect me from loss? What if my building or market performs differently from the index? This potential gap between the risk to be hedged and the available indices is called *basis risk*.

Suppose a firm owns its corporate office headquarters in Boston and seeks to hedge against a significant decline in value. Assume that this property behaves identically to the NCREIF Boston CBD office index. Today, the most similar contract with any liquidity is on US office total returns. See Exhibit 6 for a simplified estimation of whether a US office derivative is likely to be an “effective hedge” for Boston CBD office, for fair value accounting purposes. Please note that this is a back-of-the-envelope calculation and it is not clear exactly what the common practice for US real estate derivative accounting will be. The 10-year historical correlation of Boston CBD office total returns with those on all US office is 0.764 on a rolling four-quarter basis. If the firm sought to deem a derivative transaction as an effective hedge, according to FAS 133, certain correlation tests should be met. One test is based on regressing the change in value of the derivative on the change in value of the hedged asset. Common practice suggests that the adjusted R-squared of this regression should be above 80%, meaning that at least 80% of the asset’s value change is captured by the derivative. Yet for Boston CBD office hedged with a US office derivative, the adjusted R-squared is just 57%. This is one example among many; a hedge could certainly be more effective in other situations. The moral remains: It is not clear whether US private equity real estate derivatives will be an effective hedge for owners with limited, non-diversified US real estate exposure.⁷

Exhibit 6
Effective Hedge Test for Accounting Purposes
 Boston CBD Office Example
 10 Year, Rolling Four Quarter Basis

	<u>Boston CBD Office</u>	<u>US Office</u>
Average Annual Return		
Total	17.2%	13.3%
Price	9.3%	5.1%
Income	7.3%	7.9%
Correlation of Total Returns	0.764	–
Adjusted R-Squared	57.0%	–

Note: This is a simplified example. Various tests for determining hedge effectiveness exist. Consult your auditor for more information.

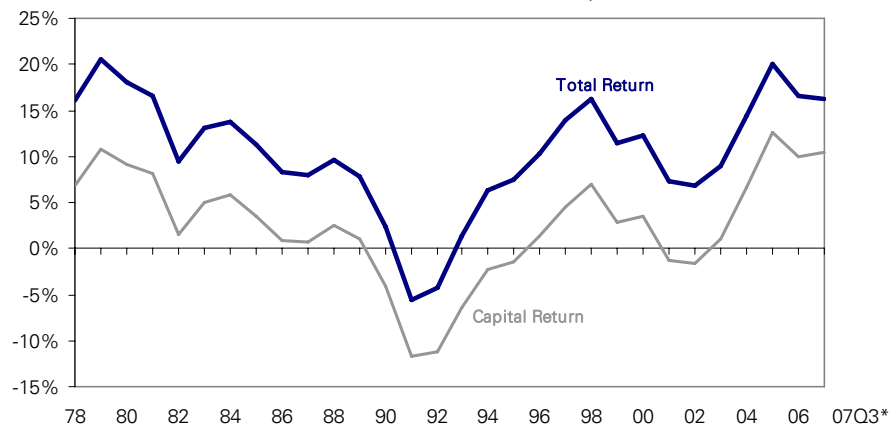
Source: NCREIF and RREEF Alternative Investments

Anecdotal reports suggest that users are seeking more specialized contracts by metro market and property type. This would greatly reduce basis risk. The caveat to entering into derivative contracts on unique sub-indices, however, is that the trade is likely to be pricey and virtually impossible to exit before the contract end date.

Potential hedgers may also ask themselves if guarding against *real estate market risk* is really necessary. Some argue that hedging against commercial real estate downturns is unnecessary because these assets have rarely experienced major value declines. From 1978 to present, the NCREIF capital return has been negative in just eight years. The maximum negative return was -11.8%. Often, the income return from commercial real estate has offset any depreciation. (Please refer to Exhibit 7.) The NPI has been down only 2 years out of roughly 30 years of history.

⁷ For a more general look at basis risk, please see: Patrick Lecomte and Will McIntosh, “Designing Property Futures Contracts and Options Based on NCREIF Property Indices,” *Journal of Real Estate Portfolio Management*, Vol. 12, No. 2, 2006.

Exhibit 7
NCREIF Annual Returns Since Inception



Source: NCREIF

Yet hedgers are likely most concerned about drops in real estate value, not total return. Holding onto a building through tough times, collecting income as an offset to value declines, is only a viable downside strategy if you are able to hold onto the property. Many real estate owners may lack the capital or property management capabilities to wait out a downturn. Lenders and developers, for example, generally want to sell out of real estate as their exit strategy. As measured by the NPI capital return, real estate values dropped 32% from 1989 to 1995. Hedging downside real estate risk makes sense for those who want or need to sell as an exit strategy.

We believe that many real estate market participants would prefer to cap their upside – through shorting an index – than be exposed to significant downside. This is especially true for firms that do not consider commercial real estate investment their core business.

Speculators

Advantages: Turning now to speculators, two potential strategies emerge. These include making a bet on the direction of real estate returns and looking for relative value across sectors. *Hedge funds, proprietary trading desks, real estate portfolio managers, and real estate investors* could all choose to engage in these strategies.

Making a *bet on market direction* is fairly straightforward. As opposed to ‘allocators,’ who seek synthetic exposure to the asset class and will be discussed more later, speculators are likely to use derivatives as a way of adding leverage. The diverse real estate exposure that an index provides is likely to attract players who know less about the industry. Such players include global macro hedge funds.

If directional plays are easy to understand, relative value plays may require a bit of explanation. How would a *relative value, or arbitrage, strategy* be executed in practice?

As an example, take a real estate hedge fund that aims to exploit pricing discrepancies across public and private markets. If an office REIT holds a strong portfolio, but the public valuation is not keeping pace with the manager’s perception of net asset value, the hedge fund manager could purchase shares of this REIT. At the same time, she could go short a REIT that appears overvalued compared to NAV. A similar strategy could be applied in a liquid private real estate derivatives market. Perhaps REIT index derivatives are pricing in a major drop in return performance over the next two years, while NCREIF derivatives forecast steady returns in line with the historical average. A real estate hedge fund could exploit the discrepancy, aiming to profit on the convergence between the two sectors’ pricing rather than the overall direction of the real estate market.

Disadvantages/Concerns: Speculators will face the same index, market and basis risks as hedgers. Primary concerns for speculators will include: Does this index really capture the segment of the market I want to bet on? What if I want to short midtown Manhattan office, but the closest I can get is shorting US office? This is *basis risk* again.

Secondly, speculators will ask: How can I make money betting on a *historically stable index*? The ripest markets for speculators are marked by volatility, since big swings create potential for big returns, and hedgers are willing to pay more for downside protection. Note that lack of volatility in the NCREIF index is exactly the same issue that hedgers will be facing, when they make their decision whether or not to hedge. An index with less appraisal smoothing would be beneficial to speculators and hedgers alike.

Allocators

If hedgers want to decrease risk, and speculators seek to load it on, 'allocators' sit somewhere between the two on the risk spectrum. These players are intentional real estate investors looking to enhance their portfolio through the use of derivatives. They seek to strategically alter their real estate allocation.

Advantages: For *investors* and *investment managers*, three distinct derivative strategies emerge for improving real estate allocations. These strategies include: shifting broad US real estate market exposure, changing allocations within a US real estate portfolio and detaching property-level alpha from market beta.

- **Exposure to US real estate performance.** Investors may seek to increase or decrease their net exposure to US real estate using a derivative. This strategy would entail going long or short the total NCREIF Property Index. Foreign investors may prefer the ease of a derivative to learning about how to execute a direct US strategy. (Likewise, a US investor may prefer to use a real estate derivative to gain exposure to the UK, France or other markets with linked derivatives.) Entering or exiting a private equity real estate investment, even an open-end commingled fund, can take months or years. Alternatively, suppose an investor has seen their real estate portfolio outperform other asset classes and is now overweight to real estate. Shorting a derivative for a year or two could be a better way to return to the target allocation than the outright selling of direct real estate investments.
- **Managing property type and geographical allocations.** Within a real estate portfolio, investors and investment managers may want to change their broad weighting across property types and regions. These allocation changes across sectors and geographies could be tactical or property-driven. First, on the *tactical* side, derivatives allow for short-term allocation changes to make macro-level bets. An investment manager may believe that apartments will outperform retail over the next 12 months. A direct portfolio could likely not be altered in time to exploit that outperformance, but a derivative strategy could be implemented. Note that this eliminates the need to select from the menu of properties for sale. If you believe the West will outperform, you can gain access to Western performance – both properties on the market and the much broader universe of properties you cannot buy directly. You also do not need to worry about how to exit the investment. Through a derivative, the end date is built into the contract. Secondly, the decision to use derivatives to change an allocation can be *property-driven*. Derivatives allow an investor to select the best buildings for his portfolio and then re-allocate the portfolio using derivatives.
- **Separation of alpha from beta.** In theory, derivatives permit the separation of alpha from beta. From an investor's perspective, alpha can come from property-

level outperformance, and it can also come from manager selection. For example, imagine an investor finds an attractive commingled fund vehicle, with superior management and property holdings, but the fund is overweight in office and the investor would prefer a neutral weighting. The investor could place capital with the fund and use a derivative to reduce her own exposure to office. Derivatives allow investors to select not only the best properties, with less worry about portfolio allocation, but also the best managers.

Disadvantages/Concerns: What are the risks that allocators face? *Basis risk* appears yet again. Going overweight in Southern retail requires an effective Southern retail market hedge. This may not exist today. In fact, the only marginally liquid derivatives today are based on US total and capital returns, as well as total US returns by property type. It may be possible to negotiate a short position on Southern retail, but the trade is likely to come at a high price.

For those who would use derivatives to gain exposure to the asset class, *derivative pricing* will pose an additional risk. Over the past couple of years, a US derivatives market has failed to emerge in part because everyone expected strong real estate returns. Going long became cost-prohibitive for all but the most bullish. In addition to all the market risks an investor faces in direct investment, a synthetic investor is also exposed to fluctuations in others' expectations of market returns. This is especially the case if she wants to stay invested in real estate beyond the terms of the original contract. Suppose the investor pays a fixed leg of 4% today to get long total return exposure over the next three years. In 2010, how much will it cost to renew the exposure? It is not possible to know. On the direct side, however, fees for real estate investing are fairly predictable, perhaps near 0.5% of assets under management. For an investor seeking long-term exposure, direct real estate investment appears superior to synthetic.

Imagining the Future: How Could Private Real Estate Portfolio Management Change With a Liquid NPI Derivatives Market?

The detachment of excess property-level return from the broader market return offers fascinating possibilities for real estate portfolio management. We can envision several strategies which are currently unknown in real estate becoming commonplace if derivatives take hold. In many ways, we can look to the public markets – equities and fixed income – for precedent.

- **130/30 strategies:** Will there one day be a 130/30 direct real estate fund? As in certain equity market funds today, a direct real estate fund manager could use leverage to acquire properties worth 130% of invested capital. The manager could select the best property-level investment opportunities and short the sectors in which he was then overweight (or believed were likely to underperform). Excess returns on 130% of investor capital could be delivered, while using derivatives to short 30% of the portfolio would reduce some of the downside risk associated with using leverage and allocating in a non-optimal, property-driven fashion.
- **Market dislocations:** Derivatives could provide an excellent way to exploit market dislocations, even in a core-plus or value-added portfolio. Suppose many investors have turned away from US retail, expecting lower returns in this property type, and embraced office. Excellent retail properties could be on the market, while good office investment opportunities could be scarce. Managers could scoop up quality properties in 'unpopular' property types and geographies, and use derivatives to manage the resulting portfolio-level exposure. Even if the consensus is right, and retail does underperform office, derivatives allow investors to benefit from the relative outperformance of their holdings versus the market.

- Portable alpha:** Could a direct real estate manager now offer 'portable alpha'? Will specialist funds gain market share relative to diversified commingled funds? Managers often have areas of specialty – a certain property type or region, say – and areas of comparative weakness. Yet many investors prefer a diverse product that offers exposure to all major sectors across the US. Derivatives would, in theory, allow a manager who excels at selecting and managing Southern retail properties to offer a portable alpha product that neutralizes investor exposure to Southern retail market returns. The manager could purchase \$500 million worth of property in this market and short the Southern retail index for \$500 million. This is called portable alpha because the investor is much less exposed to market beta than to the manager's ability to outperform the market.

Pricing and Opportunities in Today's Market

For all the strategic reasons to use derivatives, pricing will be a key determinant of whether investors choose to use them. Limited price transparency characterizes the US real estate derivative market to date. This is due to the over-the-counter nature of the NCREIF total return swap market, as well as the limited number of trades. Yet pricing is becoming more transparent every day. In this section, we offer recent price quotes and assess the implicit NCREIF Property Index forecasts in these prices.

Pricing: Exhibit 8 provides NPI total return swap pricing as of November 15, 2007. Quoted prices represent an average of prices available from investment bank derivative dealers, as collected by the brokerage firm GFI Group. These prices are for contracts commencing in fourth quarter 2007 and lasting two or three years. All prices represent annual return figures. The Ask price is the fixed rate the long side pays to receive the NPI return, while the Bid price is the fixed rate the short side receives in exchange for paying the NPI return. The difference between the two is the profit that intermediaries receive. All rates represent a percentage of some 'notional' amount. This notional amount is the dollar value of the contract; it is considered notional because the underlying dollar amount is never exchanged between the long and short parties. Cash flows on a total return swap are exchanged quarterly over the life of the contract. For more details on total return swap mechanics, please refer to the References section for suggested reading.

Exhibit 8				Exhibit 9	
Estimated NPI Total Return Swap Market Pricing				Implied NCREIF Total Return Forecast	
Return Swaps Beginning Q4 2007				Based on Swap Pricing	
As of November 15, 2007					
		<u>Bid</u>	<u>Ask</u>		<u>NPI Total Return</u>
All NPI	2 Year	2.0%	3.5%	2002	7%
	3 Year	2.0%	3.5%	2003	9%
Apartment	2 Year	1.5%	3.5%	2004	14%
	2 Year	2.5%	4.5%	2005	20%
Industrial	2 Year	4.5%	6.5%	2006	17%
Office	2 Year	1.5%	3.5%	2007F	16%
Retail	2 Year			2008F	3%
				2009F	1%
				2010F	3%

Note: The Ask price is the fixed rate the long side pays to receive the NPI return, while the Bid price is the fixed rate the short side receives when they agree to pay the NPI return. The spread between the two provides the intermediaries' profit.

Source: GFI Group

Note: This estimate of the derivative market's implied NCREIF forecast does not necessarily reflect RREEF's outlook on market returns.

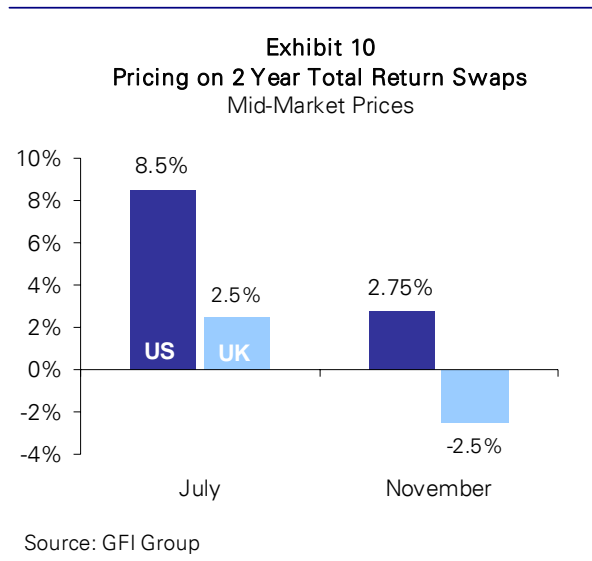
Source: GFI Group and RREEF Alternative Investments

What is the implied NCREIF forecast in these swap prices? For a real estate investor, the embedded NPI return forecast would be the most meaningful metric to evaluate derivative pricing. Exhibit 9 presents the implied NPI returns in today's swap prices. For

2008 through 2010, total returns on US real estate are forecast to be in the low single digits. This is far below the five-year historical average NCREIF return of 14.8%. Total returns on real estate are basically the sum of price and income returns. Income returns are quite stable historically and can be expected to equal about 6% over the next three years. Thus, the swap market is forecasting real estate price declines of about 3% to 5% per year from 2008 to 2010.

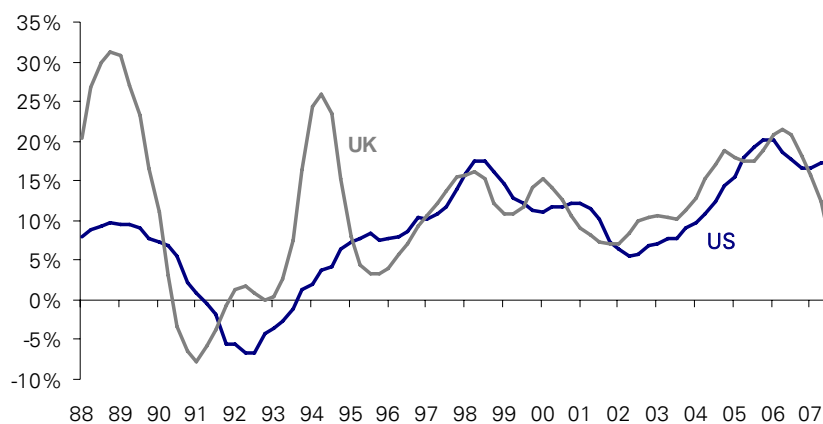
This calculation of implied NCREIF returns is based on a few assumptions. There are several swap pricing models in the finance literature. Using different pricing models would have different implications for the embedded NPI forecast. Here, we calculate the mid-market breakeven NPI return using an equilibrium approach to swap pricing (see Lim and Zhang 2006 for a discussion of equilibrium vs. arbitrage pricing). The 'mid-market' rate is an average of the bid and ask prices, which reflects pricing absent transaction costs. The breakeven NPI return is that which yields zero expected return for the short and long parties. Secondly, appraisal lag leads returns to be somewhat predictable in the short term. The 'pure' implied forecast is therefore adjusted to incorporate likely upside from appraisal lag over the next two quarters.

The swap market's NCREIF return forecast has become much more pessimistic since July 2007. Exhibit 10 shows how pricing has changed in the US and UK over the last few months. Annual return expectations have dropped dramatically in both markets, though the outlook remains stronger in the US than in the UK. As shown in Exhibit 11, actual UK return performance has fallen off significantly in recent months, while US real estate has continued to deliver robust returns.



US pricing today appears to be overly influenced by pricing in the more liquid UK market. Rapid changes in NCREIF forecasts based on UK expectations may not take into consideration the US index's slower-moving nature. Both the UK and US indices are appraisal-based, but the UK index seems to have less appraisal lag than NCREIF. Changes in IPD returns from one year to the next have historically been more dramatic than changes in NCREIF. Refer again to Exhibit 11. In 1990, the worst year in the UK real estate index's history, total returns dropped to -8.4% from 15.4% the previous year. US return performance appears smoother – due in part to NCREIF's greater appraisal lag. Year-over-year changes in UK total returns have exceeded 20 percentage points. But in the US, total returns have never moved more than 8 percentage points year over year.

Exhibit 11
Real Estate Total Returns
Rolling Four Quarter, Appraisal-Based



Source: NCREIF and IPD.

Opportunities: In our view, US total return swaps will be cash-flow positive for the long side at today's pricing, especially for a two-year trade. NCREIF has never turned on a dime as it is currently forecast to do. Even a rapid deceleration (by NCREIF standards) would yield higher returns than the current two-year market forecast.

Turning to property type swaps, office pricing appears rich today. It is also curious that NPI total return swaps are priced more cheaply than a weighted average of the property type prices would imply. This may create an arbitrage opportunity.

Of course, pricing can change quickly, as shown in Exhibit 10. Yet for those willing to take the risk, we believe there is short-term money to be made by exploiting irrational derivative pricing driven by limited trading. These trades should be profitable even if the real estate derivative market fails to take off.

Outlook for More Efficient Pricing: As more people jump into the market, superior price discovery results. 'Price discovery' refers to the ongoing negotiation between market participants to come to a break-even price, where half the market expects better NCREIF returns and half expects worse. The arbitrage opportunity described above should be a short-term one if the derivative market takes off, because price discovery should improve.

More market transparency should also occur if trading in futures and options gains steam on the Chicago Mercantile Exchange (CME). This market in commercial real estate futures and options is not based on NCREIF. Instead, contracts are linked to the transaction-based S&P/GRA Commercial Real Estate Index (SPCREX). More information on this index is available in the Appendix. Trading has officially launched on the CME but it does not appear that many trades have yet occurred as of this date. The CME plans to make current and historical prices available to the public on its website. To date, prices are not available, likely due to thin trading.

In addition to enhanced price discovery, greater trading activity should also improve prices for long and short parties alike. The spread between the price paid by the long side and the amount received by the short side – also known as the bid/ask spread – is expected to narrow as the market becomes more liquid. Intermediaries require greater compensation in an illiquid market because it is more difficult to match longs with shorts. Dealers may also be holding some market risk themselves, in initial deals, to get the

market going. Observe in Exhibit 8 that the bid/ask spread ranges from 150 basis points on more liquid US total return contracts, to 200 basis points on less frequently traded property type swaps. Compare these spreads with those on plain vanilla US interest rate swaps, which turn a fixed interest rate into a floating one and vice versa. These very liquid swaps have a bid/ask spread of about 3 basis points.

A Hypothetical Trade

Consider the following example of a two year total return swap that begins in the fourth quarter of 2007. (It is possible to enter this contract during the fourth quarter, as returns have not yet been published.) Suppose the long party is a foreign investor seeking to gain access to US commercial real estate returns, while the short party is a speculator with bearish views on the sector. Let us assume a swap at current pricing with a notional value of \$10 million. As shown in Exhibit 8, the long party will pay 3.5% per annum to receive the NPI total return. The short party will pay out the NPI return and receive 2.0% per annum. The intermediary will keep the 1.5% that remains between the amount the long side gives and the value the short side receives.

Exhibit 12 illustrates the cash flow mechanics of this total return swap. For simplicity, subtleties like calculating the present value of cash flows are ignored in this example. Recall that the notional value of \$10 million is never exchanged between the counterparties. Payments are made quarterly upon publication of NCREIF index returns. In the first quarter of the trade, i.e. the fourth quarter of 2007, assume that the NCREIF total return is 3.0%. The long side would receive this 3.0% return and make a payment of 0.875% (equivalent to 3.5% annually). On net, the long side receives 2.125% of the notional value of \$10 million. For the fourth quarter of 2007, in this example, the long side earns \$212,500. Conversely, the short party pays out 3% and receives just 0.5% (equivalent to 2.0% annually). This equals a \$250,000 loss for the short party. The difference between the short side's \$250,000 payment and the long side's \$212,500 profit goes to the trade intermediary.

Exhibit 12
Mechanics of a Hypothetical Trade
2 Year Total Return Swap

Quarter	Notional Amount	Long Pays*	Short Receives*	Hypothetical NCREIF Total Return**	Long Earns: (NCREIF - Deriv. Cost)	Short Earns: (Deriv. Payment - NCREIF)	Long Cash Flow	Short Cash Flow	Intermediary Cash Flow
2007Q4	\$10,000,000	0.875%	0.5%	3.0%	2.125%	(2.5%)	\$212,500	(\$250,000)	\$37,500
2008Q1	\$10,000,000	0.875%	0.5%	2.0%	1.125%	(1.5%)	\$112,500	(\$150,000)	\$37,500
2008Q2	\$10,000,000	0.875%	0.5%	1.0%	0.125%	(0.5%)	\$12,500	(\$50,000)	\$37,500
2008Q3	\$10,000,000	0.875%	0.5%	0.0%	(0.875%)	0.5%	(\$87,500)	\$50,000	\$37,500
2008Q4	\$10,000,000	0.875%	0.5%	1.0%	0.125%	(0.5%)	\$12,500	(\$50,000)	\$37,500
2009Q1	\$10,000,000	0.875%	0.5%	1.0%	0.125%	(0.5%)	\$12,500	(\$50,000)	\$37,500
2009Q2	\$10,000,000	0.875%	0.5%	2.0%	1.125%	(1.5%)	\$112,500	(\$150,000)	\$37,500
2009Q3	\$10,000,000	0.875%	0.5%	3.0%	2.125%	(2.5%)	\$212,500	(\$250,000)	\$37,500
Net Gain/Loss							\$600,000	(\$900,000)	\$300,000

* Quarterly equivalent of current swap market pricing: 2% bid and 3.5% ask per annum.

** These figures represent a hypothetical path of NCREIF total returns. This does not reflect RREEF's forecast of NCREIF returns.

Source: GFI Group and RREEF Alternative Investments

In this hypothetical example, NCREIF total returns averaged 6.5% over these two years. (Please note that this does not reflect RREEF's forecast of real estate returns.) The market expected return, as implied by today's swap pricing, is about 2.75% per year. Therefore the long side would be the winner in this example. The long side gained \$600,000 on this hypothetical trade. The short party paid out \$900,000, with the difference going to the trade intermediary.

The large bid/ask spread in today's pricing suggests that derivative dealers are reaping significant gains. It is worth noting that a perfect alignment of long and short counterparties – with identical desired duration, start date, and notional value, as in this example – is rare today. The bid/ask spread reflects the dealer's risk in matching up all the disparate counterparties. If the derivative market takes off, this risk should decline and the bid/ask spread should narrow.

Risks

Two separate classes of risks can be identified when examining the US real estate derivatives market. The first set of risks are those that may prevent the development of a well-functioning derivatives market. A second set of risks are faced by institutional investors when employing a derivatives strategy alongside their direct real estate investments. Each set of risks is addressed separately below.

Market Development Risks

1. **Liquidity Risk:** Liquidity is a major virtue in any derivatives market, because it allows users to exit a trade before the contractual end date. It also improves derivative pricing for buyers and sellers alike by narrowing intermediaries' profit.⁸ Prices are much more transparent in a liquid market, and more choices of underlying index are usually available. Yet until liquidity emerges, potential users may be wary of entering the market. This is a chicken-and-egg problem that tends to lead derivatives markets to be either huge or nonexistent. As of now, there is no definitive data on the volume of derivatives trade in the US, but it is safe to say that significant liquidity has not yet emerged. Anecdotal estimates put the total notional value of trades to date at \$500 million, with trades averaging about \$10 million each, but this cannot be confirmed by NCREIF staff or any market participant.
2. **Basis Risk:** Real estate is a highly heterogeneous asset class. The diverse nature of real estate assets makes any hedging strategy much more difficult. Any real estate index available for a derivatives trade may be too broad to reflect the particular local market conditions of the assets to be hedged. The potential gap between the performance of the index and the performance a derivative user wishes to measure is known as basis risk. This problem arising from the heterogeneous nature of real estate will only be solved if index coverage expands to incorporate real estate at a regional, city and, more significantly, local level.
3. **'One-Sided' Risk:** Demand for real estate derivative trades needs to exist on both long and short positions. As discussed earlier, NPI derivatives may not be suitable for hedging losses, both due to basis risk and lack of market risk. At times it may be very hard to find parties to take the short position of a trade. Until this year, virtually everyone has wanted to be long US real estate. The market's consistent surprises to the upside could have discouraged short bets.

⁸ Intermediaries can afford to take a smaller cut of each trade if trade volume is substantial and it's easy to find counterparties.

4. **Appraisal Manipulation Risk:** Since the NPI includes valuations based on appraisals, its use may raise questions regarding inappropriate appraisal practices or concerns that a data contributor may “game the index.” If a NCREIF data contributor is large enough, they may be able to unduly influence the index by pre-determining which properties are revalued during a particular quarter. If the data contributor accounts for a significant share of the NPI universe, they may have some “insider” knowledge which they can use in placing a trade.
5. **Index Risk:** Finally, the presence of multiple indices may cause some initial confusion which may further hinder the development of a US private real estate derivative market. Scattered trading on several indices would impede the development of market liquidity. The Appendix provides an overview of the various indices that are being considered for derivatives trades in the US.

Investor Risks

It can be argued that institutional investors include real estate in their portfolios primarily to diversify risk and hedge against unanticipated inflation. For these investors, real estate is considered a long-term investment, with added returns due to real estate’s less liquid nature. To the extent that real estate derivatives are used to hedge against short-term losses or time the market, this runs contrary to the whole rationale for building a long-term exposure to real estate investments. Many commercial real estate investors are not perturbed by the asset class’s lack of liquidity.

While derivatives are a tool to manage risk, their use creates some potential additional risks. Investors should consider the following before entering into a trade:

1. **Leverage Risk:** The number one risk facing investors is that, for some derivatives, potential losses can far exceed those of direct real estate investment. With a real estate direct investment, the most you can lose is the total value of the property. To put that another way, the worst possible outcome is to end up with nothing. With some real estate derivatives, you could be obligated to pay out far more money than you put up initially. Derivatives can be used as a form of leverage. When used to leverage up a portfolio, derivatives allow for far greater leverage ratios than any lender would give a direct real estate investor. Some hedge funds, for example, are leveraged 100 to 1. In the advent of a crash in real estate values, the use of leverage adds much greater risk to any investment strategy. Historical examples of investors undone by synthetic leverage are abundant. The case of Orange County in 1994 is an example of how the use of derivatives to dramatically leverage up a portfolio can lead to bankruptcy or insolvency. Even if an investor is responsible with his own use of derivatives, he is still exposed to the risk that his counterparty has been less responsible.
2. **Counterparty Risk:** The second risk to real estate investors of using derivatives involves the person on the other side of your trade: the counterparty. OTC derivatives expose investors to the risk that the counterparty will default. Exchange-traded derivatives offer more protection to an investor, but even these have risks. Today, virtually all US private equity real estate derivative trades have taken place over-the-counter. The possibility of counterparty default should be part of any investor’s due diligence or risk analysis process before entering into a trade. Investment bank swap dealers will perform credit checks on both parties, but counterparty risk is still an important variable to keep in mind.

Concluding Remarks

There does not yet exist a liquid US private equity real estate derivatives market similar to one that is emerging in the UK. A functioning derivatives sector could lead to a much more efficient and transparent real estate market that is increasingly integrated with the broader capital markets. The obstacles to the historical growth of a US-based derivatives market have been documented extensively throughout this report. The primary factors include:

- Lack of a single index tracking US commercial private equity real estate,
- Lack of demand by “end users”,
- Smaller tax advantage, and
- Lack of strong correlation between existing indices and the actual performance of localized real estate markets.

In addition to these four factors, the lack of education surrounding the functionality and applicability of real estate derivatives has been an important obstacle to growth. Even though the use of derivatives is widespread across other asset classes, participants in private equity real estate have been slow to embrace the merits of this financial tool. Traditional private equity real estate players focus primarily on the bottom-up characteristics of each specific property. Value is created over time from a well-executed purchase of an asset at the right price, solid property management to improve tenancy and underlying cash streams while minimizing costs, and timely asset sale. Profits are realized through hands-on property-level management and the execution of an asset-level strategic plan.

As traditional real estate investors have evolved into managers of multi-billion dollar portfolios of real estate assets, the need for financial instruments to better manage risks across their portfolios from a top-down perspective has emerged. There has thus been a disconnect between the historical approach of real estate operators to value creation and the needs of a large portfolio for optimal execution and risk management. Traditional real estate operators have not yet seen the need for property derivatives and the lack of end-user demand for such financial innovations has been an important obstacle to the development of a derivatives market. As real estate portfolios get larger and as real estate integrates more fully with the broader capital markets, derivatives can evolve as a tool for better balancing of portfolios and enhanced risk management. Educating traditional real estate operators is essential to the evolution and development of a well-functioning derivatives market in the US.

The higher degree of complexity in today’s real estate portfolios spans virtually all strategies, from core to value-added to opportunistic, and including both global and domestic investments. Modern-day strategies lend themselves increasingly to the adoption of derivative techniques. A well-executed derivatives strategy can aid real estate portfolio managers primarily for risk-management purposes. Derivatives may be used to hedge or gain exposure to equity real estate in a cost effective manner, and also to rebalance portfolios synthetically.

As the quality of traded real estate indices improves and as knowledge of the uses and benefits of derivatives expands, the market for real estate derivatives should flourish in the US, following the trend in the UK. With real estate having evolved into a significant part of the alternatives allocation of most institutional and high net worth investors, a derivatives strategy should evolve as one method for managing risk in an increasingly sophisticated real estate market.

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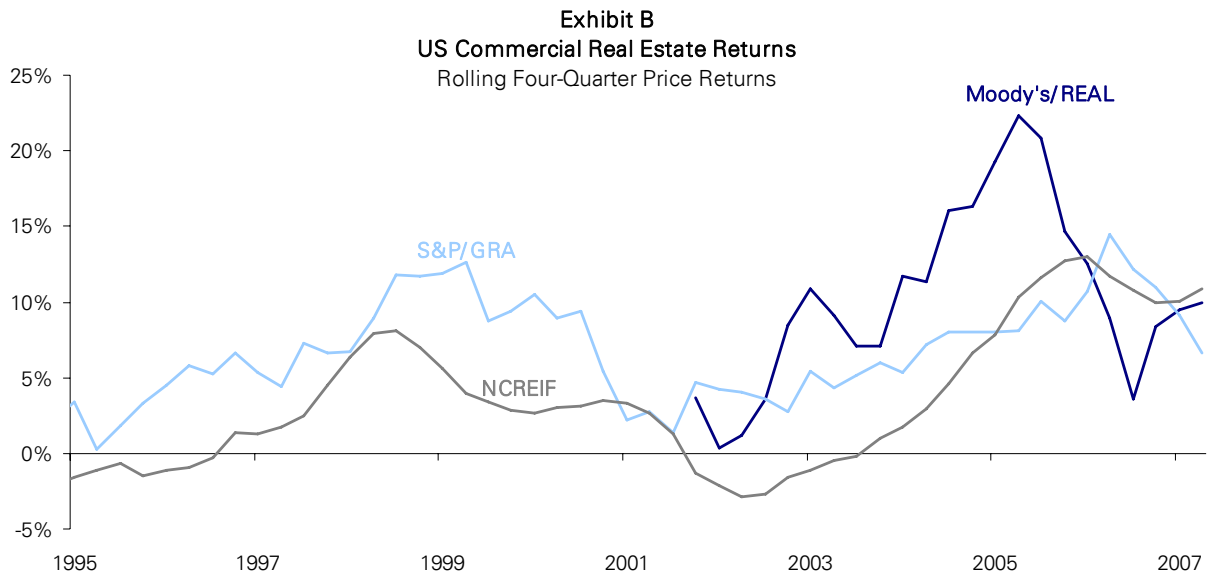
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Appendix: Choosing a US Direct Real Estate Index

Several indices track the commercial real estate market and are available for derivative trading. Below we summarize the key characteristics of each index with a comparison of the historical behavior of each index.

Exhibit A highlights the key characteristics of the existing US real estate indices offered as a basis for derivatives. Three indices – the NCREIF Property Index, S&P/Global Real Analytics Commercial Real Estate Index and Moody's/REAL Commercial Property Price Index – cover major property types throughout the US. Two additional indices cover one property type only: the REXX Index tracks US office, while the HQuant HLI Index monitors US hotel performance.

The choice of an index is critical because the historical behavior of each index varies significantly. Exhibit B shows rolling four-quarter price returns on US commercial real estate for the three derivative indices that cover all major property types. The timing and magnitude of return performance is very different. The appraisal-based NCREIF index has a smoother return history than the two transaction-based indices. The S&P/GRA has persistently higher average returns than NCREIF: the index delivered a 6.6% annual price return since 1994, while NCREIF averaged only a 3.5% return. The Moody's/REAL index, based on Real Capital Analytics data, is well-known to lead the NCREIF index. This index reached peak performance at mid-year 2005, while the NCREIF index peaked in early 2006. The S&P/GRA index hit its peak even later, at mid-year 2006. Clearly, a derivative trader could make “the right bet” on one index, but the same bet could be a losing one on a different index. The relationship between all of these indices and “true” market performance is unclear.



Source: NCREIF, MIT Center for Real Estate, and Standard & Poor's.

Various potential users of real estate derivatives will likely prefer different indices. Yet there is a clear incentive to focus trading activity on as few indices as possible, to promote liquidity. Here are the likely preferences of each potential user group:

- **Hedgers who are not investors.** For lenders, developers and corporate owners, a transaction-based price return index should be ideal. Such indices should provide the best real-time estimate of changes in real estate market value. An appraisal-based index, on the other hand, may not capture recent price movements. NCREIF's focus on institutional-quality real estate may also be too limited to capture these hedgers' actual real estate exposure.
- **Hedgers who are investors.** Institutional and other investors looking to hedge their market exposure often use NCREIF as their benchmark. Their existing investments are likely valued by appraisals. Thus, this group may prefer a NCREIF-based derivative to sell real estate exposure.
- **Speculators.** Those making directional or arbitrage bets will likely prefer the volatility of a transaction-based index. Yet they will also like a market with the greatest interest from hedgers and allocators, as this will be where they will find the most potential counterparties looking to lay off risk. We believe speculators will enter any market with trading momentum, regardless of their preference for volatility.
- **Allocators.** All allocators are intentional real estate investors who likely think of NCREIF as the benchmark for US real estate performance. Investors looking to switch their allocation across property type and region, or separate alpha from beta, are likely holding a portfolio of appraised properties. For these investors, NCREIF derivatives – available across as many regional and property type sub-indices as possible – would be ideal. Foreign institutional investors looking for US exposure are also likely to prefer a NCREIF derivative. Foreign real estate benchmarks, including the IPD Global Index and its national sub-indices, are appraisal-based. Derivatives on a volatile transaction-based index, with cash flows exchanged monthly or quarterly, could lead to unpredictable and substantial cash payouts.

What conclusions can we draw from these varying preferences? First, institutional investors are likely to be best served by NCREIF derivatives, whether they use them for allocation or hedging purposes. Speculators may prefer volatility but are likely to enter where the bulk of trading occurs. If a market develops in US private commercial real estate derivatives, it is our belief that NCREIF derivatives will build liquidity first because they meet the needs of these two key constituencies. The group least served by NCREIF derivatives are hedgers whose core business is not real estate investing. These hedgers include lenders, developers and corporate owners. Their preference for a transaction-based index, with a better real-time estimate of value outside of institutional-quality real estate, may spur liquidity on non-NCREIF indices.

Exhibit A
US Commercial Real Estate Indexes

Index	Coverage		Property Lifecycle	Data Source	Frequency	Methodology	Valuation Basis	Type of Return	Subindices
	Universe	Property Types							
NCREIF	Institutional investments managed by NCREIF members.	Apt, Off, Ret, Industrial, Hotel	Operating, at least 60% occupied.	Investment managers in NCREIF.	Quarterly	Simple change in property market value.	Appraisal	Total, Price, Income	50+ indexes: by property type and composite, at the US, regional, state and metro levels.
S&P/GRY (Global Real Analytics)	Closed transactions.	Apt, Off, Ret, Warehouse	Any	Public records; No primary data collection.	Monthly	Simple change in price per square foot, 3 month moving average.	Transaction	Price	10 indexes: national, by major property type, and by region.
Moody's/REAL	Closed transactions over \$2.5 million.	Apt, Off, Ret, Industrial	Any	Real Capital Analytics database; Developed by MIT.	Monthly, Quarterly and Annual	Repeat sales regression.	Transaction	Price	29 indexes: by property type and composite, at US, regional and selected metro levels.
REXX	Properties tracked by leasing brokers and major markets tracked by a real estate research firm.	Office	Any	Brokers (Cushman & Wakefield, Newmark/Knight Frank) and data providers (TWR).	Quarterly	Δ Rent model (uses economic and rent variables).	Inferred	Total, Price, Rent	16 indexes: office, at US and metro levels.
HQuant	Approximately 68% of US hotels at all service ranges.	Hotel	Operating	Smith Travel Research.	Weekly and Monthly	Change in average daily room rate (ADR).	N/A	Income	30+ indexes: national, by type of hotel, and by region and metro.

Source: Morgan Stanley, Principal Real Estate Investors, Real Estate Research Corporation, CBRE/Torto Wheaton Research, and RREEF Alternative Investments.

Important disclosure

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