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A Liquid Benchmark for Private Real Estate

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Executive Summary

Commercial real estate represents an important element of the asset allocation process but is difficult to access directly. There are high barriers to entry and exit. In times of financial stress, it can be very difficult to liquidate holdings. Listed (or publicly held) real estate is far more liquid, but also comes with its own set of problems. These securities are far more volatile, especially over shorter time frames, and incorporate an additional layer of (corporate) leverage. Indexes tracking direct and listed real estate differ significantly in their calculation methodologies, making direct comparisons difficult.

We have attempted to capture the best of the two worlds: an investable index with a risk and return profile of direct (private) real estate and the liquidity of listed (public) real estate. Products based on this index may appeal to both smaller asset owners that are not large enough to build a diversified direct real estate portfolio and to larger investors as a liquid way to quickly build or reduce exposure to this asset class.

One of the fundamental differences between listed and direct real estate lies in the debt used by listed real estate companies to leverage their capital. This leverage has two important consequences. It magnifies property returns and adds the cost of financing debt to the total return. In constructing the MSCI USA IMI Liquid Real Estate Index, we have deleveraged listed real estate securities and invested the resulting cash into a fixed income index. Based on the simulations for the U.S. market, the index has historically achieved a risk and return profile much more in line with the IPD US Quarterly Property Index than the MSCI USA IMI Core Real Estate Index, a pure equity-based index.

This new index aims to combine the best features of direct real estate indexes — more accurate measures of the asset class' performance — and listed real estate indexes (timelier valuations, greater transparency and investability).

Introduction

Commercial real estate is the most commonly held alternative asset class, following only equities and fixed income in size in the typical institutional portfolio. Thanks to its risk and return profile, real estate can offer a significant diversification effect to the total portfolio. It offers a stable income stream from rent, as well as inflation protection and expected capital appreciation over the long term given limited supply and constantly growing demand.

Real estate investments can be made in two ways. Traditionally, investors buy assets directly through private markets (either directly or through a pooled vehicle) or take a stake in an unlisted fund. Direct ownership, in particular, presents high barriers to entry, as it requires significant capital outlays and asset class-specific structuring experience. Combined with high transaction costs and illiquidity, these hurdles can be very significant for smaller investors and make private real estate mostly suitable only for large institutional investors with long investment horizons. Even large institutional investors may be discouraged by liquidity concerns and monitoring costs that are significantly higher for private real estate than for equities. From 1998 to 2011, U.S. institutional investors experienced average costs of 22.9 bps for U.S. large-cap stocks, 55.5 for US small caps and 44.3 for non-U.S. equities. That compares to average costs of 112.6 bps for private real estate (Beath, 2014).

The public market offers a second route to invest into real estate. Listed companies with property portfolios, such as Real Estate Investment Trusts (REITs) generally offer lower transaction costs and daily liquidity. The securitized nature of public markets also makes it easy to diversify even a relatively small portfolio. However, accessing real estate through equity markets also comes with disadvantages: leverage, higher volatility and a high equity market beta.

Different kinds of indexes exist to measure direct and listed real estate. Direct real estate indexes such as the ones calculated by IPD, a unit of MSCI, measure returns on physical properties and are valued infrequently through appraisals. Listed real estate indexes, on the other hand, are based on daily stock prices and can be calculated in real time.

Correlations between these two types of indexes generally have been low,[1] leading some experts to question how much linkage really exists between these two avenues for accessing real estate exposure and whether real estate securities are closer to equities or real estate from an asset class perspective.

In this paper, we present an alternative way of creating a benchmark for real estate using a multi-asset class index. This new approach aims to achieve a risk and return profile similar to that of physical real estate (except for some artificial differences due to smoothing and autocorrelation that will be discussed later) while preserving the liquidity and ease of access of listed real estate. Our study focuses on the U.S. market.

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[1] For example, the correlation of quarterly returns between the IPD US Quarterly Property Index and the MSCI USA IMI Core Real Estate Index was 0.3 for the 2001-2014 period.

Private and Listed Real Estate Indexes

Much of the debate on the link between public and private real estate is fuelled by the difference in the ways in which performance is measured. Below we explain how private and public real estate indexes are constructed.

Private Real Estate Indexes

Private real estate indexes, such as the IPD Indexes, measure the performance of physical real estate based on individual properties. For example, the IPD Global Annual Property Index currently tracks almost 62,000 properties worth over USD 1.4 trillion in 25 countries across developed and emerging markets.

It is difficult to construct real estate indexes based purely on transactions, given the intermittent nature of real estate deals and the wide variety in types of properties. When commercial real estate is sold, it can take several months to complete a deal and the parties involved can keep the details of the transaction private. Thus, commercial real estate indexes are often based on periodic appraisals. These indexes are referred to as Valuation Based Indexes (VBIs). As assets are revalued more frequently than they transact, VBIs allow for robust, comparable analysis on a much larger sample. However, the frequency of VBI publication is still constrained by how frequently assets are revalued in the local market. Direct real estate indexes are therefore calculated at a relatively low frequency (quarterly, biannually, or annually for most countries).

The reliance on appraisals also means that direct indexes' are typically slow to respond to events, exhibit artificially low volatility and are autocorrelated, i.e., the time series of returns is correlated with itself, something that is usually not observed for investable indexes.[2] To illustrate these effects, Exhibit 1 shows the autocorrelation function of the IPD US Quarterly Property Index returns with significant autocorrelation observable from three to nine months from the appraisal date

Exhibit 1: Reliance on Appraisals Causes Direct Real Estate Indexes to Display Significant Autocorrelation
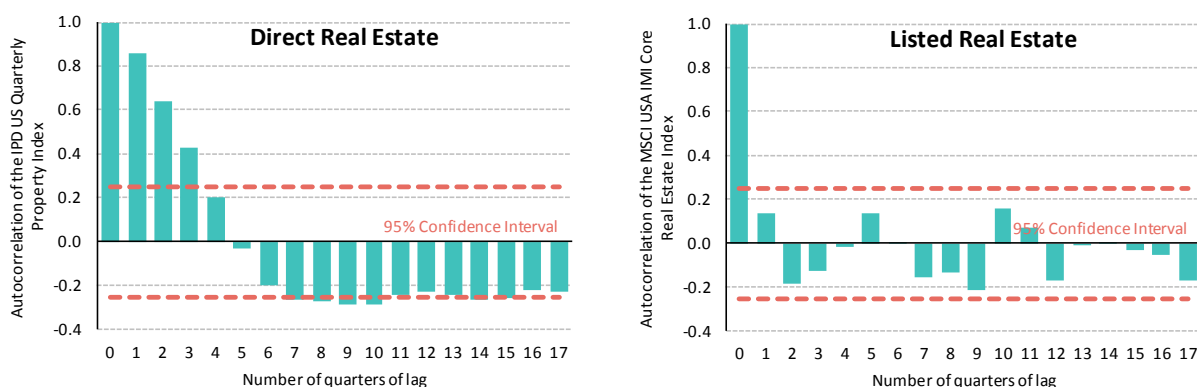
Based on quarterly data for December 1998 – December 2013

Appraisal smoothing contributes to autocorrelation in two ways. At the individual property level, revaluations tend to be conservative and somewhat backwards-looking. At the portfolio level, not all properties are revalued at the same time or with the same frequency, causing temporal aggregation to

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[2] If systematic autocorrelation persisted in indexes for listed securities, arbitrage opportunities would be created.

occur in the index, i.e., the index calculation can include valuations performed at varying dates, meaning that only some of the properties in the index will have current valuations.

Comparing Listed Real Estate Indexes and Private Real Estate Indexes

Instead of directly valuing properties, listed real estate indexes measure the performance of companies that are quoted on the stock market and hold, develop and operate real estate. Particular care needs to be exercised when constructing listed real estate indexes. Typical equity industry classifications such as GICS®[3] include companies operating in the real estate industry, such as real estate brokers, as opposed to companies directly exposed to real estate. The MSCI Core Real Estate Indexes include only companies that own, develop and operate real estate of specific property types similar to those included in direct real estate indexes.[4]

In principle, because listed companies are exposed to the same type of properties as those included in private real estate indexes, an investor should obtain equivalent exposure to real estate as an asset class, whether going through the public or the private route. There are, however, important differences between public and private real estate indexes:

- **Leverage.** Listed real estate indexes measure performance at the security level, and thus incorporate a much broader range of assets and liabilities than private real estate indexes. Debt is perhaps the most important example as listed real estate companies frequently carry leverage on their balance sheets. Securitized real estate returns reflect this leverage and the associated financial risks whereas direct real estate indexes are reported on an unlevered basis.

- **Volatility.** Listed real estate indexes exhibit more volatility than direct real estate indexes due to higher leverage and because they are part of the broader equity market. Direct real estate indexes, on the other hand, experience smoothing of their returns because appraisals occur only periodically.

- **Valuations.** Listed real estate indexes typically incorporate changes in valuations much more quickly than direct real estate indexes because the former are based on market prices while the latter are appraisal based.

- **Net Income.** Treatment of net income by constituents in listed indexes and direct real estate indexes varies significantly. Listed real estate companies may choose to retain some of the net income generated by their portfolio. In some situations, rules, such as those governing U.S. REITs, require that most net income be passed through to investors. In contrast, 100% of net income generated by direct real estate will flow back into index returns.

- **Geographic classification**. Indexes also reflect differences in geographic classification of their constituents. The country of listing and incorporation are generally used to classify real estate securities. For example, if a listed Australian REIT owns assets in Japan, these assets will contribute to the Australian listed index return. In the direct market, assets are classified according to their physical location.

- **Fees and cash.** Any asset management fees charged would affect listed vehicle profits and thus will be reflected in public market returns as well as cash holdings. Direct indexes do not incorporate fees and cash.

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[3] The Global Industry Classification Standard, jointly developed by MSCI and Standard & Poor's.

[4] See the MSCI Core Real Estate Indexes methodology (http://www.msci.com/eqb/methodology/meth_docs/Core_Real_Estate_Indexes_Oct14.pdf) and Appendix II for the sub-industries of the GICS Real Estate industry group that are eligible for inclusion in the MSCI Core Real Estate Index.

- Taxes can become a point of difference between listed and direct indexes when companies included in the listed index are not fully tax transparent. If a listed real estate company is not structured to be tax exempt, its returns will be affected by tax payments. This is not relevant for direct real estate returns that are all pre-tax.

The performance of the IPD US Quarterly Property Index and the MSCI USA IMI Core Real Estate Index followed a similar pattern for the 13-year period ended June 30, 2014, as can be seen in Exhibit 2. However, leverage, volatility and the lag effects can also be clearly observed, especially around the global financial crisis of 2007-8. Over the long term, the core real estate index, while outperforming the IPD index, is far more volatile, has a much larger maximum drawdown and its beta is nearly identical to that of the equity market as a whole. In the following section, we construct a liquid index that has risk and return characteristics closer to those of the direct real estate index.

Exhibit 2: MSCI USA IMI Core Real Estate Index and IPD US Quarterly Property Index Risk and Return
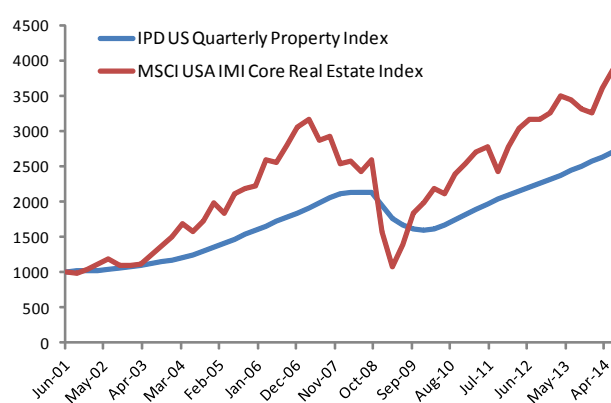
Key Metrics

	IPD US Quarterly Property Index	MSCI USA IMI Core Real Estate Index
Total Return (%)	8.0	11.0
Total Risk (%)	5.8	23.5
Tracking Error (%)	0.0	22.5
Maximum Drawdown (%)	25.6	65.8
Yield* (%)	6.1	5.0
Turnover** (%)		7.1
Beta to MSCI USA***	0.12	0.92
Beta to IPD***	1.00	1.60

Period: 06/29/2001 - 06/30/2014

Annualized from quarterly data

*Average of year-end values

**Annualized from semi-annual index review data

***The IPD index is lagged by 4 quarters

Building a Liquid Benchmark for Private Real Estate

Linking Listed and Direct Real Estate

Pagliari and Ang, among others, attempted to establish an explicit link between public and private real estate. We use their insights to create an investable and liquid index based on listed real estate that has characteristics similar to a direct real estate index. As discussed previously, listed real estate companies use debt to finance the acquisition of the properties that they acquire. That debt constitutes the bulk of their liabilities. Hence, the return on a stock of a listed real estate company should be approximately equal to a leveraged return on the underlying properties and can be expressed in the following statement:

$$Return(Listed\ Real\ Estate) = Leverage \times Return(Physical\ Property) - Cost\ of\ Debt$$

Using simple algebra, we can express the return on a property as a function of the return of the listed company as

$$Return(Direct) = \frac{E}{D+E} \times Return(Listed) + \frac{D}{D+E} \times Cost\ of\ Debt$$

where E denotes the equity of the listed company and D denotes its debt.

We can therefore construct an index that aims to mimic direct real estate by deleveraging a listed real estate index. We estimate the proportion of equity in the deleveraged index by the $\frac{E}{D+E}$ ratio.

In practice, the book value of equity is a poor proxy for the market value of equity for real estate companies, especially those filing under U.S. Generally Accepted Accounting Principles (GAAP), because accounting rules require companies to carry properties at cost on their balance sheet. We therefore use market capitalization to estimate the market value of equity, following Ang et al. This method of calculating leverage also acts as a way to reduce turnover in the deleveraged index and hence lowers replication costs: Positive (negative) performance of listed real estate companies will tend to increase $\frac{E}{D+E}$ and lead to a greater (smaller) proportion of equity in the deleveraged index.

Index Construction Steps

Selecting the Universe

First, we need to narrow the universe to companies that actually have an exposure to real estate properties. We use the MSCI Core Real Estate Indexes as a starting point. However, we do not reweight the listed real estate index by property type to match the exposures of direct real estate. Please see the Appendix for more detail.

Applying the Volatility Tilt Methodology

We next seek to reduce the volatility of the listed index by applying the MSCI Volatility Tilt Factor Index methodology to the core index; the volatility tilt methodology over-weights securities of the parent index with lower than average volatility and under-weights the riskier securities. A high capacity strategy, the Volatility Tilt Factor methodology does not significantly alter the liquidity and capacity characteristics of the index. Historically, this methodology has reduced the risk of the index, especially in volatile periods while preserving the returns.

Exhibit 3: Volatility and Returns of Core Real Estate Index vs. Core Real Estate Volatility Tilt Index
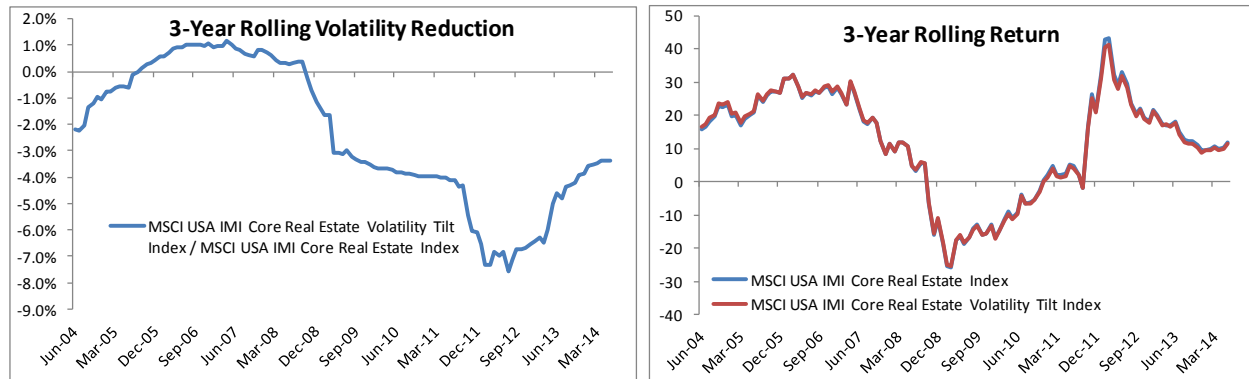
Deleveraging the Index

In the final step, we deleverage the MSCI Core Real Estate Volatility Tilt Index. Deleveraging both better replicates unlevered direct property returns and further reduces the risk of the equity index.

Deleveraging is achieved by combining the MSCI Core Real Estate Volatility Tilt Index with a Markit iBoxx short-duration inflation linked index. While this process will not exactly replicate the cost of debt of real estate companies, it offers additional inflation protection consistent with real assets and little duration risk. A closer proxy for the cost of debt could be achieved by using preferred REIT shares and REIT debt, but doing so would add exposure to REITs on both the equity and fixed-income sides, increasing correlations between the two and thus increasing risk. For example, in the event of a REIT bankruptcy, both the equity and the fixed income components of the index would suffer.

As explained in the previous section, to derive the weights of equity and fixed income in the index, we use market capitalization to estimate the book value of equity of the MSCI Core Real Estate Volatility Tilt Index.[5] We first calculate the debt-to-price ratio for the equity index as follows:

$$\frac{D}{P} = \sum_i \omega_i \times \left(\frac{D}{P}\right)_i$$

where

- ω_i is the weight of the constituent i in the MSCI USA IMI Core Real Estate Volatility Tilt Index

- $\left(\frac{D}{P}\right)_i$ is the debt-to-price ratio for constituent i

We then derive the weight of the delivered fixed income and equity components:

- Weight of Fixed Income = $\left[\left(\frac{D}{P}\right)^{-1} + 1\right]^{-1} = \frac{D}{D+P}$

- Weight of Equity = 1 – Weight of Fixed Income

These weights are then reset on a semi-annual schedule.

The level of equity in the MSCI USA IMI Liquid Real Estate Index varies between 30% and 70% over the 13-year simulated history. Consistent with intuition, the lowest exposure to equities in the combined index can be observed during the financial crisis when REITs were the most leveraged. This leverage largely resulted from collapsing equity prices while debt levels stayed relatively constant.

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[5] We use P (price) instead of E (equity) in the equations that follow.

Exhibit 4: Equity Weight of MSCI USA IMI Liquid Real Estate Index Varies Over Time
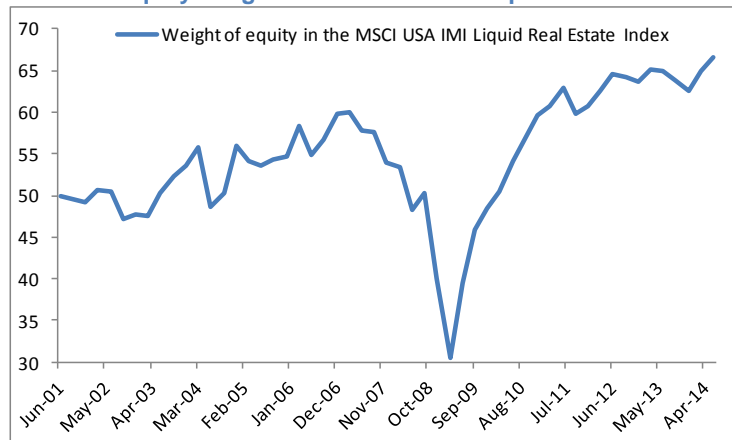
Liquid Real Estate Index Characteristics

The resulting MSCI USA IMI Liquid Real Estate Index, which reflects a deleveraged exposure to listed real estate, tracked the IPD US Quarterly Property Index much more closely than the MSCI USA IMI Core Real Estate Index, which reflects a leveraged exposure, and had similar performance over the long term, as can be seen in Exhibit 5. While the liquid index also appears to be more volatile than the direct real estate index, the smoothness of the latter stems in part from appraisal-based valuations.

Exhibit 5: MSCI USA IMI Liquid Real Estate Index Approximates Direct Index Performance

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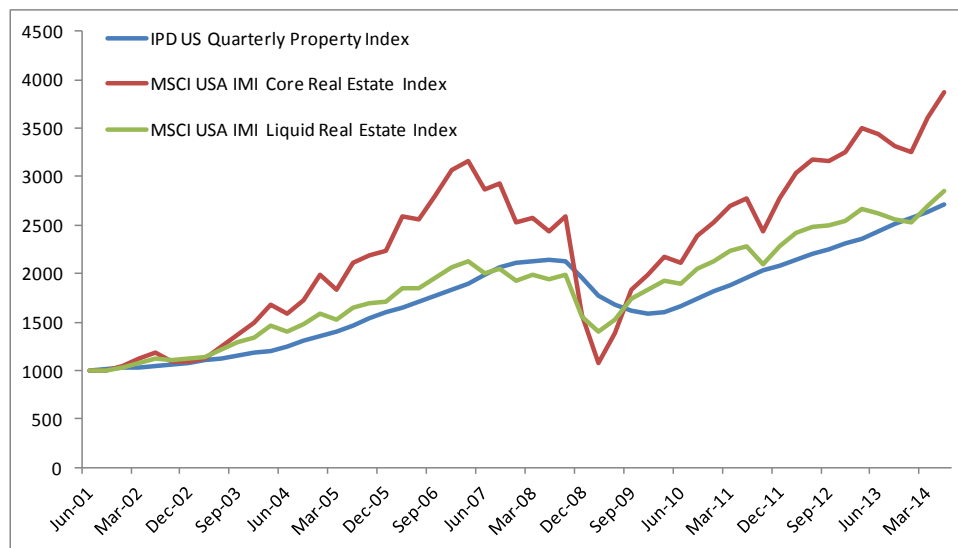
To illustrate the effect of smoothing on returns, we smooth the MSCI USA IMI Liquid Real Estate Index over four quarters (given that autocorrelation was found at lags 1-4) by using a simple average. The resulting series, drawn using the same scale as the previous chart, look very much alike, as can be seen in Exhibit 6.

Exhibit 6: The Smoothed MSCI USA IMI Liquid Real Estate Index Mirrors the IPD Index
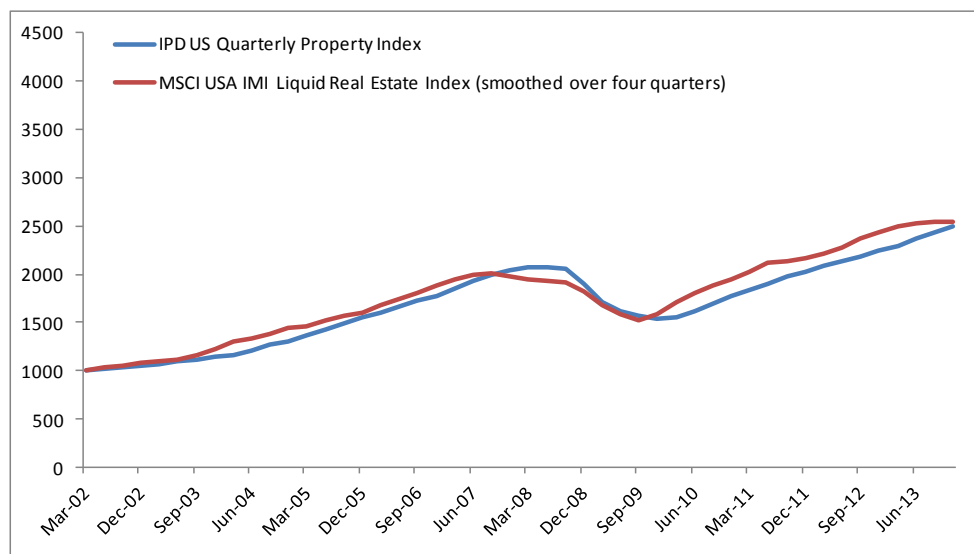
Other key metrics for the three indexes show that the liquid index's characteristics are closer to the direct index over the June 2001 – June 2014 period, as can be seen in Exhibit 7.

Exhibit 7: Key Metrics for the Direct, Core and Liquid Real Estate Indexes

Key Metrics

	IPD US Quarterly Property Index	MSCI USA IMI Core Real Estate Index	MSCI USA IMI Liquid Real Estate Index
Total Return (%)	8.0	11.0	8.4
Total Risk (%)	5.8	23.5	11.7
Tracking Error (%)	0.0	22.5	11.3
Maximum Drawdown (%)	25.6	65.8	34.2
Yield* (%)	6.1	5.0	4.1
Turnover** (%)		7.1	3.9
Beta to MSCI USA***	0.12	0.92	0.43
Beta to IPD***	1.00	1.60	0.74

Period: 06/29/2001 - 06/30/2014

Annualized from quarterly data

*Average of year-end values

**Annualized from semi-annual index review data

***The IPD index is lagged by 4 quarters

In additional to similarities in historical performance, we observe:

- The volatility of the MSCI USA IMI Liquid Real Estate Index is 11.7%, significantly lower than the MSCI USA IMI Core Real Estate Index[6] but still much higher than the 5.8% for the IPD US Quarterly Property Index. Maximum drawdown for the liquid index is 34%, significantly lower than for the core index's 66%, and much closer to the 26% value for the IPD Index

- The MSCI USA IMI Liquid Real Estate Index had a much lower equity beta than the MSCI USA IMI Core Real Estate Index, at 0.4 vs. 0.9.

- The one-way index turnover of the liquid index has been moderate at 3.9%, potentially reducing replication costs.

- The MSCI USA IMI Liquid Real Estate Index more quickly reflects market movements than the IPD US Quarterly Property Index, thanks to the former index's daily valuations of the underlying instruments.

Despite the similarity in historical performance, the MSCI USA IMI Liquid Real Estate Index is not intended to be a complete substitute for direct real estate benchmarks. Instead, the index represents a new way to benchmark commercial real estate, with a distinct set of characteristics designed to meet the needs of investors with a portfolio size that does not allow them to invest in direct real estate or those seeking an exposure to real estate with high liquidity.

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[6] The direct real estate volatility is artificially high. Applying a Bayesian desmoothing methodology, the "true" risk of direct real estate has been estimated to be about 12.5% using the Barra Private Real Estate Model PRE2 (Shepard et al., 2014), very close to the volatility of the delevered index.

Conclusion

Creating a liquid index that replicates performance of a direct real estate index is notoriously difficult. By understanding and adjusting for the differences in volatility and leverage between listed and private real estate, we can offer a close approximation. The MSCI USA IMI Liquid Real Estate Index reweights the securities of the parent index to reduce volatility and deleverages the index by combining it with an index of short-term inflation-protected bonds.

This new index aims to combine the best features of direct real estate indexes ("truer" measurement of the asset class) and listed real estate indexes (more responsive valuations, greater transparency and investability). At the same time, the liquid index corrects for their disadvantages. Unlike the direct real estate index, it is replicable and liquid. And unlike the listed real estate index, the new index backs out leverage taken by real estate companies and has offered lower volatility and a lower correlation with the equity market. Historical characteristics of the MSCI USA IMI Liquid Real Estate Index are far closer to the IPD US Quarterly Property Index than that of the listed index, acknowledging that some of the differences relate to the appraisal-based nature of direct real estate indexes.

In short, the MSCI USA IMI Liquid Real Estate Index offers an innovative tool for investors seeking a more liquid benchmark for this important asset class.

Future research on this topic will focus on extending this framework to other countries and regions.

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Appendix I: Reweighting by Property Type

Some observers (Pagliari et al.) argue that a listed real estate index should be reweighted by property type to match the exposures of direct real estate and better replicate direct real estate indexes. However, we reject this approach for the following reasons:

- The property type factor is significantly less important than the country factor when explaining real estate returns. For example, Shepard et al. (2014) found that private real estate is highly correlated within countries while being highly diversified across countries.

- Liquidity and capacity of the index would be reduced by reweighting away from its natural market capitalization-based weights.

- Concentration of the index would be increased by reweighting some relatively thin listed real estate property type sectors. For example, the MSCI USA Core Real Estate Industrial Index significantly underperformed its parent index during the financial crisis. Underperformance stemmed from liquidity issues and the small number of companies in the sector, not from the underlying properties.

Exhibit 8: Relative Performance of Property Type Indexes in the US

Legend:
- USA IMI Core Real Estate Industrial / USA IMI Core Real Estate
- USA IMI Core Real Estate Office / USA IMI Core Real Estate
- USA IMI Core Real Estate Residential / USA IMI Core Real Estate
- USA IMI Core Real Estate Retail / USA IMI Core Real Estate
- USA IMI Core Real Estate Specialized / USA IMI Core Real Estate
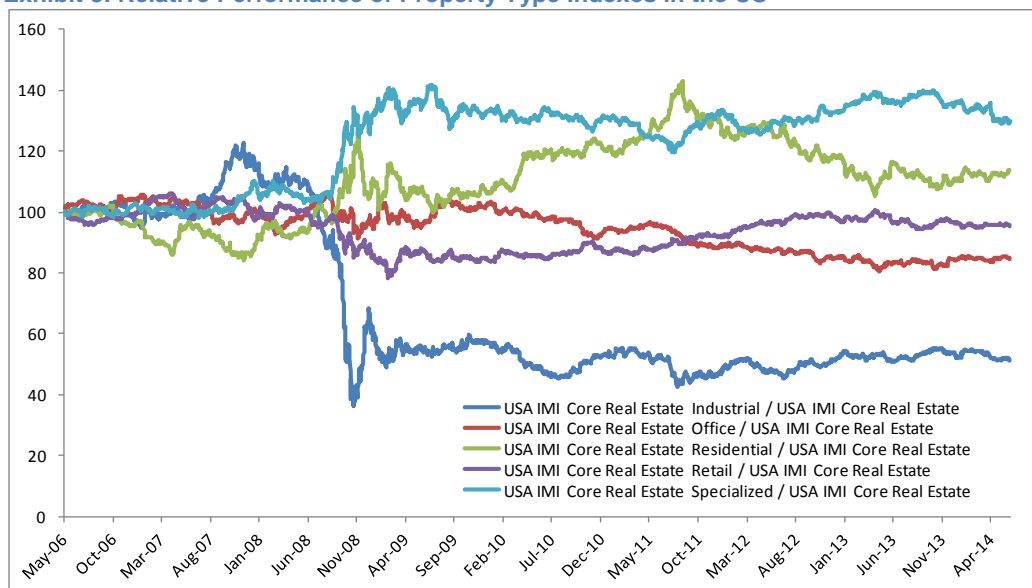
Appendix II: MSCI USA IMI Core Real Estate Index

		MSCI USA IMI Real Estate	MSCI USA IMI Core Real Estate Index
REITs	Industrial	X	X
	Office	X	X
	Retail	X	X
	Residential	X	X
	Healthcare	X	X
	Hotel & Resort	X	X
	Storage	X	X
	Diversified	X	X
	Mortgage	X	
	Timber, Telecom	X	
	Prisons, Cinemas, Gaming	X	
Non REITs	Developers, Operating and Diversified Companies	X	X
	Services	X	

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[1] *As of June 30, 2014, as reported on September 30 2014 by eVestment, Morningstar and Bloomberg*   *Nov 2014*