March 2019 / Research Report

ALTERNATIVE INDICES PRIMER

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1 / Executive Summary

Alternatives are becoming an important asset class for many investors who seek diversification from traditional equities and fixed income. Although there are a number of alternative asset classes (among them hedge funds, private equity, commodities, real estate and infrastructure), for purposes of this report, our focus is primarily on three of the alternative asset classes, real estate, infrastructure and commodities. Therefore, for purposes of this report, we define the alternatives investment space as non-listed and listed real estate equity and debt, non-listed and listed infrastructure equity and debt, and commodities. Many investors find it difficult to benchmark alternatives in contrast to traditional equities and fixed income. This report aims to provide an overview of available indices that track the performance of the various alternative asset classes. Some of these indices may be suitable for benchmarking depending on an investor's objective, while others may be useful as signals to track performance.

We gathered a list of indices to represent the various alternative asset classes in the regions of U.S., Europe and Asia Pacific. Please refer to the Matrix and List of Alternative Indices sections for a summary by asset class and region. We have also prepared two- or three-page tear sheets for each index featured, which explores the methodologies. We also included a performance attribute analysis to show returns over varying historical performance periods (5-years, 10-years and 20-years), standard deviations, and correlations to equity and fixed income markets as well as inflation and gross domestic product (GDP) growth. In addition, we have also prepared performance analysis sections to explore asset class behavior during different economic conditions, correlations to GDP, consumer price index (CPI) and between asset classes, and historical asset class risk and return profiles.

2 / Introduction

Alternatives are becoming more important for many investors who seek diversification from traditional equities and fixed income. While equity investors have benefitted from a good rally over the past few years[1], many equity markets have displayed volatility more recently[2]. Fixed income markets on the other hand, have experienced lower returns,[3] albeit with lower volatility. As quantitative easing turns to quantitative tightening, alternative asset classes may look more interesting.

In this report, we define the alternative asset classes as non-listed and listed real estate equity and debt, non-listed and listed infrastructure equity and debt and commodities. We gathered a list of commonly-used indices in the alternative space and prepared summaries of each index. This report is meant as a guide to indices and benchmarks in alternatives. Towards the back section of the report, we prepared some analysis to summarize performance of the various asset classes during different economic scenarios, correlations, and historical risk and returns.

Benchmarks vs. Indices

Not all indices may be viewed as benchmarks. Benchmarks help investors create and achieve objectives and offer a framework. They also help investors and fund managers with performance attribution to understand the drivers of investment performance. A relevant benchmark ideally should be investable with a large sample size that is reflective of the industry. It should also be transparent in construction so users understand the composition, weighting methodology, currency, and other technical attributes, and should be supported by independent measurements.

Finding relevant benchmarks for liquid asset classes is not difficult since the underlying investments are in most cases readily tradable. This is especially true for listed equities and somewhat less so for listed bonds. Finding benchmarks for non-liquid asset classes such as non-listed real estate and infrastructure is more difficult because it may be impractical to replicate the holdings of a defined basket and different strategies might result in very different outcomes.

Indices may track performance of an asset class but may not be appropriate to use to compare performance if they are not investable. Using U.S. non-listed real estate as an example, the property-level index, the NCREIF NPI, is a useful measure of performance of various U.S. markets and property sectors. However, it is not investable. In contrast, the NCREIF Open-End Diversified Core Equity (ODCE) funds index tracks the performance of open-end core funds which are investable, and includes the effect of cash balances, debt and fees.

While there are key differences between indices that can and cannot use as benchmarks, we recognize that benchmarks may be difficult to determine for some alternative asset classes such as private equity. Most private equity funds are closed ended and returns are reported at cost for the first few years, instead of through an appraisal or mark-to-market process. In this case, it is difficult to fully benchmark performance, and for that reason, many default to using absolute return hurdles.

Another alternative is to add a premium to a well-known traditional publicly-available index. For example, a method of benchmarking for some private infrastructure debt funds is to use a listed infrastructure debt index with a specific rating and duration, such as BBB and 7 years, and add an illiquidity premium.

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[1] The S&P 500 returned between -4.4% to 32.4% from FY 2009 to FY 2018.
[2] The VIX Index was 25.4 as of 12/31/2018 vs. 11.04 a year earlier.
[3] The Bloomberg Barclays Global Aggregate Index has returned 3.0% on an annualized basis since 2009.

3 / Matrix of Alternatives Indices

EXHIBIT 1: ALTERNATIVE INDICES BY ASSET CLASS AND REGION

	Global	U.S.	Europe	Asia Pacific
Non-Listed Real Estate	1. Global Real Estate Fund Index (GREFI) 2. MSCI Global Quarterly Property Fund Index	1. NCREIF NPI 2. NCREIF ODCE 3. NCREIF OE 4. MSCI U.S. Qtrly Property Index 5. MSCI/PREA U.S. ACOE Qtrly Property Fund Index	1. MSCI Continental Europe Property Level Index 2. MSCI Pan-European Property Fund Index (PEPFI) 3. INREV	1. ANREV All Funds Index 2. MSCI Asia Annual Property Index
Non-Listed Real Estate Debt		1. Giliberto-Levy Commercial Mortgage Performance Index (G-L 1) 2. Giliberto-Levy High Yield CRE Debt Index (G-L 2)		
Listed Real Estate Equity	1. FTSE EPRA/NAREIT Developed Index 2. FTSE EPRA/NAREIT Developed ex US	1. MSCI US REIT Total Return Index 2. Wilshire US REIT Index	1. FTSE EPRA/NAREIT Developed Europe (NEPRA Index) 2. FTSE EPRA NAREIT Europe Ex UK (NUXUK INDEX) 3. FTSE EPRA NAREIT UK (NUPUK INDEX)	1. FTSE EPRA/NAREIT Asia Index (TRGASU INDEX) 2. FTSE EPRA/NAREIT Asia ex Australia Index (TRPAAU INDEX)
Listed Real Estate Debt		1. Bbg Barclays IG Reits TR Index 2. Bbg Barclays CMBS IG TR		
Non-Listed Infrastructure	1. MSCI Global Quarterly Private Infrastructure Index			
Listed Infrastructure Equity	1. DJ Brookfield Global Infrastructure			
Listed Infrastructure Debt	1. Markit iBoxx USD Infrastructure Bond Index 2. Markit iBoxx USD Liquid High Yield Infrastructure Bond Index 3. Markit iBoxx EUR Infrastructure Bond Index 4. Markit iBoxx GBP Infrastructure Bond Index			
Commodities	1. Bloomberg Commodity Index			

Source: DWS

4 / List of Alternative Indices

Non-Listed Real Estate
Global
1. Global Real Estate Fund Index (GREFI) ● *fund level* ● 5.1 (sub-section number)
2. MSCI Global Quarterly Property Fund Index ● *fund level and asset level* ● 5.2

U.S.
3. NCREIF Property Index (NPI) ● *asset level* ● 5.3
4. NCREIF Fund Index- Open-End Equity (NFI-OE) ● *fund level* ● 5.4
5. NCREIF Fund Index – Open-End Diversified Core Equity Fund Index (NFI-ODCE) ● *fund level* ● 5.4
6. MSCI U.S. Quarterly Property Index ● *asset level* ● 5.6
7. MSCI/PREA U.S. ACOE Quarterly Property Fund Index ● *fund level* ● 5.7

Europe
8. MSCI Continental Europe Property Level Index ● *asset level* ● 5.8
9. MSCI Pan-European Quarterly Property Fund Index (PEPFI) ● *fund level* ● 5.9
10. INREV Quarterly Index ● *fund level* ● 5.10

Asia Pacific
11. ANREV Index ● *fund level* ● 5.11
12. MSCI Asia Annual Property Index ● *asset level* ● 5.12

Non-Listed Real Estate Debt
13. Giliberto-Levy Commercial Mortgage Performance Index (G-L 1) ● *asset level* ● 5.19
14. Giliberto-Levy High Yield CRE Debt Index (G-L 2) ● *asset level* ● 5.20

Listed Real Estate
Global
15. FTSE EPRA/NAREIT Developed Index ● 5.14
16. FTSE EPRA/NAREIT Developed ex US ● 5.14

U.S.
17. MSCI US REIT Total Return Index ● 5.15
18. Wilshire U.S. REIT Index ● 5.16

Europe
19. FTSE EPRA/NAREIT Developed Europe ● 5.14
20. FTSE EPRA NAREIT Europe Ex UK ● 5.14
21. FTSE EPRA NAREIT UK ● 5.14

Asia Pacific
22. FTSE EPRA/NAREIT Asia Index ● 5.14
23. FTSE EPRA/NAREIT Asia ex Australia Index ● 5.14

Listed Real Estate Debt
24. Bloomberg Barclays Investment Grade REITs Total Return Index ● *asset level* ● 5.17
25. Bloomberg Barclays CMBS Investment Grade Total Return Index ● *asset level* ● 5.18

Non-Listed Infrastructure
26. MSCI Global Quarterly Private Infrastructure Index ● *asset level* ● 5.21

Listed Infrastructure
27. Dow Jones Brookfield Global Infrastructure Index ● *asset level* ● 5.22

Listed Infrastructure Debt
28. Markit iBoxx EUR Infrastructure Bond Index ● *asset level* ● 5.23
29. Markit iBoxx GBP Infrastructure Bond Index ● *asset level* ● 5.23
30. Markit iBoxx USD Infrastructure Bond Index ● *asset level* ● 5.23
31. Markit iBoxx USD Liquid High Yield Infrastructure Bond Index ● *asset level* ● 5.24

Commodities
32. Bloomberg Commodity Index (BCOM) ● *asset level* ● 5.25

5 / Index Briefings

The following pages contain brief descriptions and characteristics of the indices that we listed in the previous section. We also included performance attributes of each index, including historical total returns, volatility, Sharpe ratios, and correlations. We designed the following pages as two- or three-page tear sheets for ease of the reader.

5.1   Global Real Estate Fund Index (GREFI)

EXHIBIT 2: GLOBAL REAL ESTATE FUND INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	8Y	8Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
9.4%	8.4%	8.4%	-23.1%	-10.4%	39.2%	-44.0%	30.9%	2.1%	3.87

Source: Bloomberg, NCREIF, Oxford Economics, and DWS. As of September 30, 2018, latest data available.
Note: Equities refer to the MSCI All Country World Index; Fixed Income refer to the Bloomberg Barclays Global Aggregate Index; GDP and CPI refers to a weighted average GDP growth and CPI of the U.S., Eurozone and Asia Pacific from Oxford Economics; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The GREFI Index started in 2010 and therefore correlations, standard deviation and the Sharpe Ratio and some return data are calculated using quarterly data over the past 8 years.

Description: The Global Real Estate Fund Index (GREFI) All Funds Index measures the net asset value performance of non-listed real estate funds on a quarterly basis and is jointly produced by National Council of Real Estate Investment Fiduciaries (NCREIF), European Association for Investors in Non-Listed Real Estate Vehicles (INREV) and the Asian Association for Investors in Non-Listed Real Estate Vehicles (ANREV).[4] Performance is measured net of fees and other costs. [4] The GREFI is now published 12 weeks after quarter end. [4] The returns are based on fund level data that is provided to ANREV, INREV and NCREIF directly from managers. [4] The GREFI is an unfrozen index, which means historical data can be revised. [4] NCREIF contributes the NFI-ODCE data for the GREFI index which is frozen as of this writing, whereas data from INREV and ANREV are unfrozen. As of September 30, 2018, GREFI comprised of 467 funds with a gross asset value of $734.8 billion and leverage of 21.7%.[4]
Start date and release: The index was launched in 2014 with data history starting in 3/31/2010. The index is released 12 weeks after quarter-end. [4]
Access: The latest snapshot report is publicly available from the INREV website: www.inrev.org/library/global-real-estate-fund-index-grefi-quarterly. The latest press release is also available from the NCREIF website: http://www.ncreif.org/news. The full report and time series is available to members through the NCREIF, INREV and ANREV websites.
Return types: Total return
Weighting: Net asset value of the funds
Usage: Research on returns and allocations by region.
Inclusion criteria: All funds included in the ANREV Quarterly Index (core, value added and opportunity) and all funds included in the INREV Quarterly Index (core and value added). US core funds and non-core funds are included, where the US core funds consists of the NCREIF Fund Index Open End Diversified Core Equity (NFI-ODCE) and the US non-core funds consist of the NCREIF Fund Index Open End (NFI-OE). The NCREIF Fund Index Closed End Value Added (NFI – CEVA) data is no longer included as NCREIF has stopped releasing data. [4]
Available indices: GREFI All Funds Index; regional indices include Asia Pacific, Europe and U.S.; GREFI Core and Non-Core indices; Regional core and non-core indices for Asia Pacific, Europe and U.S.; Open End Fund Index; Regional open end fund indices for Asia Pacific, Europe and U.S. [4]

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[4] Global Real Estate Fund Index (Q3 2018 Report, latest available)

EXHIBIT 3: GLOBAL REAL ESTATE FUND INDEX TOTAL RETURNS BY REGION AND FUND TYPE

GREFI Core Returns by Region

Asia Pacific Core — Europe Core — US Core (ODCE)

GREFI All Funds, Core and Non-Core Returns

GREFI All Funds — GREFI Core — GREFI Non-Core
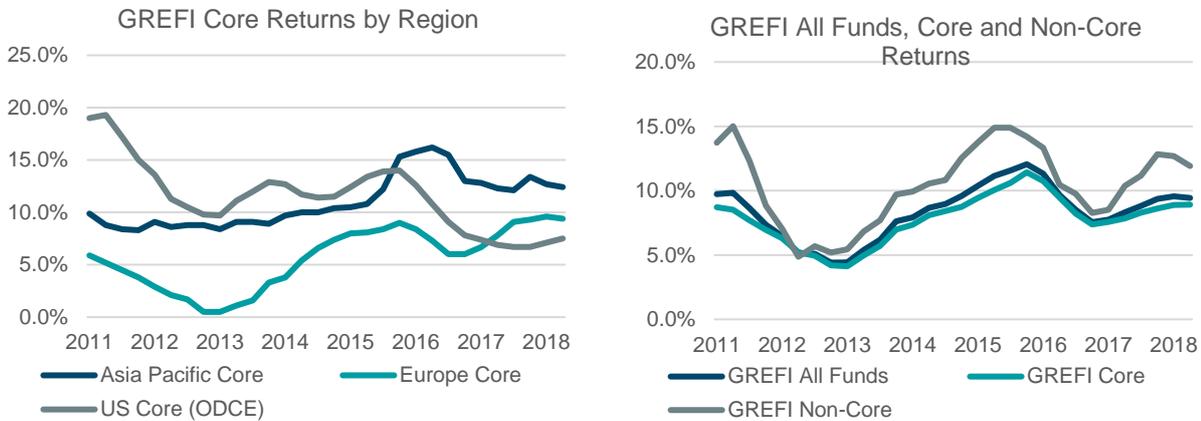
Source: NCREIF. As of September 30, 2018, latest available.

Methodology: The GREFI is based on the contributions of fund-level data from NCREIF, ANREV and INREV. ANREV and INREV investment styles (core, non-core, and opportunity) are self-defined by the manager. [4] While NCREIF ODCE index has strict inclusion criteria, INREV and ANREV inclusion appears similar based on leverage levels.

The Modified Dietz methodology is used to calculate quarterly net asset value fund performance. The total re-turn measures the performance over a specific period and does not include projections to the end of the fund's life. [4]

EXHIBIT 4: GLOBAL REAL ESTATE FUND INDEX RETURNS BY REGION, FUND TYPE AND SECTOR

Composition by Geographic Category (% GAV)

Country Allocation (% GAV)

Composition by Number of Funds

Sector Allocation (% GAV)
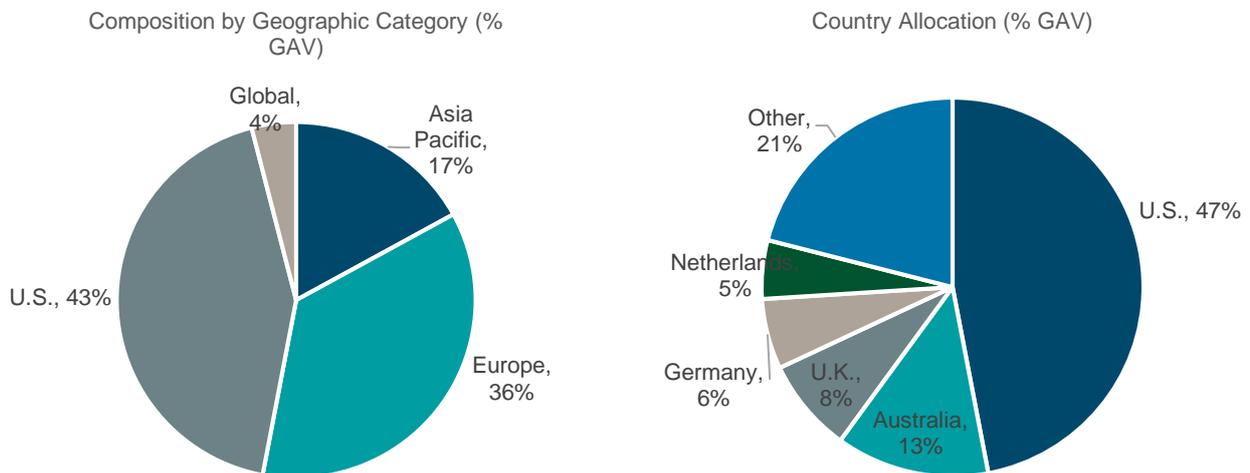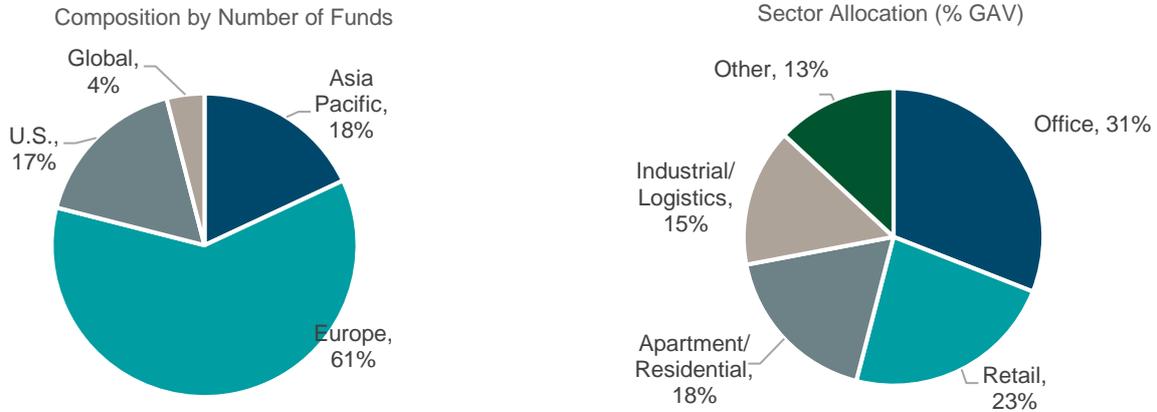
Source: NCREIF. As of September 30, 2018, latest data available.

Issues and Limitations:

- The GREFI is NAV-weighted, therefore larger funds would have a bigger weight than smaller funds.
- The investment styles for funds reporting to ANREV and INREV are self-defined, which can lead to different definitions for core and non-core funds (value-add and opportunistic).
- The U.S. make up 47% of the country allocation by GAV, followed by Australia at 13%. This may not be fully representative of a global investor's allocation.
- Data history starts in 2010 which is limited since it does not capture a full economic cycle and only represents a recovery period. This results in a Sharpe ratio which in our view is likely too high and a standard deviation which is likely too low.

5.2   MSCI Global Quarterly Property Fund Index

EXHIBIT 5: MSCI GLOBAL QUARTERLY PROPERTY FUND INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std. Dev.*	Sharpe Ratio*
5Y	10Y	10Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bnd Yld		
10.0%	6.5%	6.1%	30.1%	-32.4%	86.9%	54.1%	-53.8%	9.3%	0.66

Source: Bloomberg, MSCI, Oxford Economics, and DWS. As of December 31, 2018, latest data available.
Note: Equities refer to the MSCI All Country World Index; Fixed Income refer to the Bloomberg Barclays Global Aggregate Index; GDP and CPI refers to a weighted average GDP growth and CPI of the U.S., Eurozone and Asia Pacific from Oxford Economics; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The MSCI Global Property Fund Index started in 4Q 2008 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 10 years.

Description: The MSCI Global Quarterly Property Fund Index is a quarterly, appraisal-based index that measures the performance of unlisted funds.[5] All funds included in the index are core (diversified and special-ized), open-ended (or semi-open), and valued quarterly using international valuation standards, hold at least USD $100 million in GAV, at least 85% of which in real estate, maintain maximum leverage of 60%, and have their performance validated by MSCI[5]. The MSCI Global Quarterly Property Fund Index is unfrozen, and the user can obtain fund-level and asset-level performance numbers. The fund-level index includes the effect of lev-erage, fund management fees and cash balances. The asset-level index performance is unlevered and deduct property but not fund management fees. All returns are in local currency. As of December 31, 2018, the index included 101 funds consisting of 8,323 properties with a Gross Asset Value of US$ 484.2 billion and Net Asset Value of US$ 384.1 billion[6].

Start date and release: The index has data history starting in 12/31/2008[6] and is released approximately 75 days after year-end for Q4 results and 65 days after quarter-end for other quarters.[7]

Access: Full history and sub-indices are available via subscription or license agreement. Headline numbers for most recent period publicly available at www.msci.com/real-estate-fact-sheet-search.

Return types: Total return, Income return, and Capital return

Weighting: Fund Net Asset Value for the fund-level index, and Gross Asset Value for the asset-level index

Usage: internal research and strategy, utility in external research materials, as an unofficial benchmark (not di-rectly cited in Fund Documents / Partnership Agreements, but used as a reference point internally and/or exter-nally), as an official benchmark, and for performance attribution / risk management analytics. Some investors and managers use the index in its standard form, while others require a customized version (re-weighted, local currency versus fixed currency, etc.). A license agreement with MSCI is needed to use as an official bench-mark.

Inclusion criteria: All funds are core (diversified and specialized), open-ended or semi-open, and valued quar-terly; hold at least USD $100 million in GAV, at least 85% of which in real estate, and maintain maximum lever-age of 60%.

Available indices: Fund-level index is typically referenced (includes effects of leverage, fund management fees and cash balances). Asset-level index is also available, which is unleveraged and gross of fund manage-ment fees. Further breakdown of returns is available at the asset-level, including by property type (office, retail, industrial, residential, other), and region (Asia Pacific, UK, Continental Europe and North America).

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[5] MSCI Global Quarterly Property Fund Index webinar presentation, Results to December 2018. March 27, 2019.
[6] MSCI Global Property Fund Index Digest (December 2018 Report, latest available).
[7] MSCI Indexes release schedule 2019

EXHIBIT 6: MSCI GLOBAL QUARTERLY PROPERTY FUND INDEX TOTAL RETURN BY REGION AND PROPERTY TYPE

MSCI Global Quarterly Property Fund Index by Region

MSCI Global Quarterly Property Fund Index by Property Type

Source: MSCI. As of December 31, 2018, latest data available
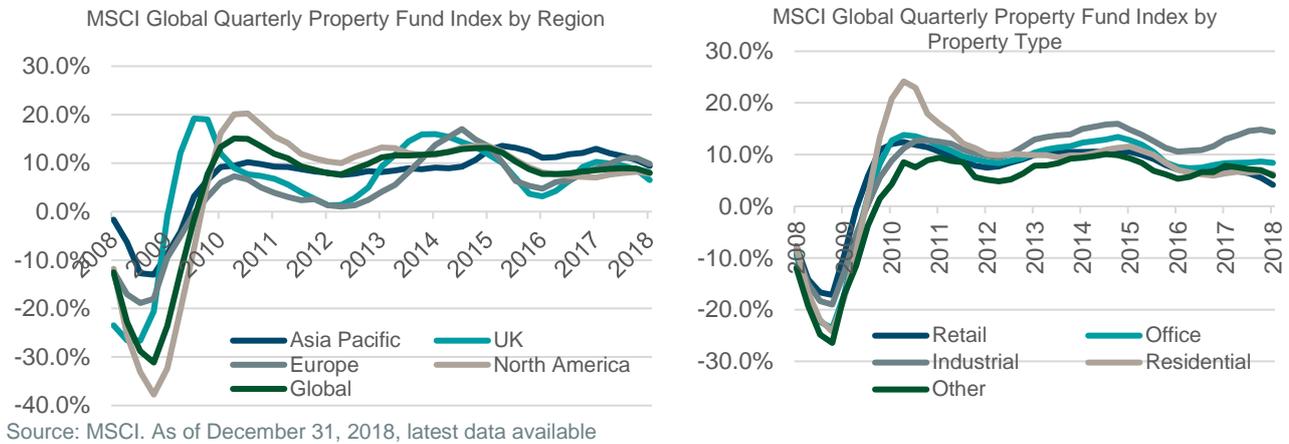
Methodology: The MSCI Global Quarterly Property Fund Index is based on the contributions of fund-level data of participating funds.[8] MSCI's methodology is consistent across its real estate indices. Total returns are calculated on a monthly basis and time-weights (chain-links) them over longer periods.[9] Asset-level returns are computed at the building level and exclude properties held indirectly through investment funds, the impact of debt, fund management fees, taxation and cash.[9] At the fund level, the effect of leverage, fund management fees and cash drag is included.[9] Total returns are appraisal-based and is net of capital expenditures.[9] MSCI runs an internal data quality assessment process during each data update period to identify errors that may have been missed by data contributors, as well as unusual or expected changes in values over the period.[9] Exceptions include omitted data, illogical data, and data outside specified numerical changes.[9] Acceptable ranges are based on local market conditions and previous results. MSCI may also collect publicly available data to increase coverage in certain markets, such as in Pan-Asian markets (China, Hong Kong, Indonesia, Malaysia, Singapore, Taiwan, and Thailand).[9] As of Q4 2018, the index included 101 funds with GAV of $484.2 billion, with leverage levels of 20.7% and cash holdings of 2.4%.[6]

EXHIBIT 7: MSCI GLOBAL QUARTERLY PROPERTY FUND INDEX COMPOSITION BY REGION AND PROPERTY TYPE
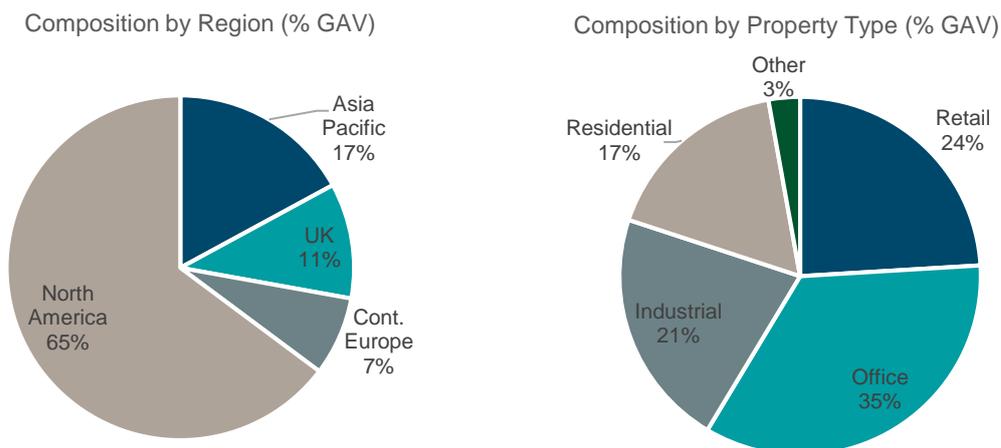
Composition by Region (% GAV)

Composition by Property Type (% GAV)

Source: MSCI. As of December 31, 2018, latest data available.

Issues and Limitations:
- The MSCI Global Quarterly Property Fund Index is heavily weighted towards North America at 64%, making returns more skewed towards the U.S. and Canada
- The index is weighted by the NAV of the fund (for the fund-level index) or property gross asset value (asset-level index)
- The index starts in 4Q 2008, which means it only has history for the current business cycle.

5.3 NCREIF Property Index (NPI)

EXHIBIT 8: NCREIF PROPERTY INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	20Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
9.7%	6.6%	9.1%	27.6%	-18.1%	66.5%	52.7%	14.8%	8.2%	0.95

Source: Bloomberg, NCREIF, Oxford Economics, and DWS. As of December 31, 2018, latest data available.
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; GDP refers to U.S. GDP growth; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The NCREIF Index started in 1978 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 20 years.

Description: The NCREIF Property Index (NPI) is a quarterly, unleveraged composite total return for private commercial real estate properties in the U.S. held for investment purposes only.[10] All properties in the NPI have been acquired, at least in part, on behalf of tax-exempt institutional investors and held in a fiduciary environment.[10] The NCREIF NPI is published by the National Council of Real Estate Investment Fiduciaries. Data is sourced from NCREIF members who provide data on their assets. [10] As of 12/31/2018, the NPI consisted of 7,883 properties valued at $611.7 billion.[11]

Start date and release: The index was launched in June 1982 and has data history starting in 12/31/1977 and is released the 25th calendar day following end of quarter.[10]

Access: Publicly available data are for total returns for the four most recent quarters (National, Property Type, and Region) on the website http://www.ncreif.org/data-products/property/; quarterly press release and "Snapshot" reports available on http://www.ncreif.org/news. Full history including sub-indices available to members and by subscription to others without real estate assets under management in the US.

Return types: Total return, Income return, and Appreciation

Weighting: Market-value by property

Usage: Benchmarking, research on cap rates, vacancy and NOI growth

Inclusion criteria: Properties must be institutionally held, wholly-owned or in joint venture with a tax-exempt institutional investor. [10] Only includes apartment, retail, industrial, office and hotel. [10] Properties must be operating (no developments), and for newly developed properties, at least 60% occupied or one year after receiving the certificate of occupancy. [10] Redeveloped properties are considered operating when at least 60% occupied. [10]

Available indices: National, Region, Division, State, Metro area, and zip code; Regional breakdown: West, Midwest, East, South Divisions: West North Central, East North Central, Northeast, Mideast, Southeast, Mountain, Pacific. Property Type: Apartment, Industrial, Office, Retail, Hotel. Property Sub-type: *Apartment:* high-rise, low-rise, garden; *Industrial:* flex, R&D, warehouse, manufacturing, office showroom, other; *Office:* CBD, Suburban; *Retail:* neighborhood, community, regional, super-regional, single-tenant, fashion/specialty center, theme center, power center.[11]

- Members and subscribers can create queries at a more disaggregate level.
- "Cashflow" versions of indices, in which capital expenditures are deducted from income, are also available to members.
- Property fundamentals such as occupancy, cap rates, NOI, etc. also available to members and subscribers.

Methodology: The NPI is based on stabilized properties and returns are reported on an unleveraged basis. [10] The NPI is a frozen index, which means that a snapshot of the index was taken each quarter and changes are not made historically unless there is a significant error that is caught later that would require the restatement of the NPI. [10] The NPI is an appraisal-based index, which reflects a smoothing due to the appraisal process. Therefore, the NPI also tends to be less volatile compared to transaction-based indices, and changes in the index tend to lag transaction prices. [10] Below are some key points on methodology:

- Total returns are calculated as income plus appreciation returns[10]
- Returns are gross of portfolio level management fees but net of property level operating expenses[10]
- Capital improvements are deducted from appreciation return[10]

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[10] NCREIF Data, Index and Products Guide (2016-2017, latest available)
[11] NCREIF Property Index- Quarterly Detail Report (4Q 2018, latest available)

- All properties are valued quarterly. NPI requires an independent appraisal at least once every three years on all properties.[12]
- In quarters in which a property is sold, the transaction price is booked to be the ending value for the quarter. When a property is purchased, the property only enters the index after a full quarter of ownership and enters at its appraised value (which will likely be close to its purchase price).[12]
- The sector composition of the NPI will drift over time as properties (and data-contributing members) are added or deleted. This change in compositon may be advantageous for some applications as the index will continue to reflect the property types of interest to tax-exempt institutional investors.
- As of 4Q'2018, the largest weighted sector in the NPI was office at 35%, followed by apartment at 25%, retail at 23%, industrial at 16.5% and hotel at 0.5%.[13]

EXHIBIT 9: NCREIF PROPERTY INDEX COMPOSITION BY MSA AND PROPERTY TYPE
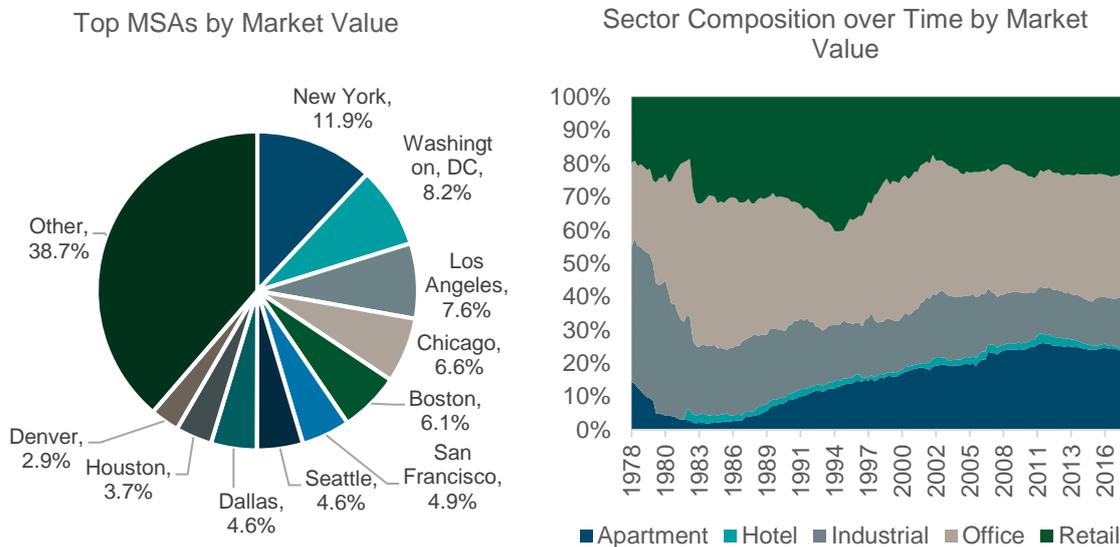
Source: NCREIF. As of December 31, 2018.

Issues and Limitations:
- The NPI is a market-weighted index, therefore larger properties will have more weight than smaller properties
- As capital improvements (capex) are deducted from the appreciation return, instead of the income return, the income returns tend to be higher and the appreciation returns lower compared to transaction-based indices. However, the income return less capex reflects the income available for distribution. Thus, investors can subtract capex from income and add capex to appreciation.
- The NPI is an unlevered index, which means it may not be directly comparable to certain asset classes that automatically include the effects of leverage, such as publicly-traded real estate investment trusts (REITs).

5.4   NCREIF Fund Index – Open-End Equity (NFI-OE)

EXHIBIT 10: NFI-OE INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	20Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
11.6%	5.8%	8.8%	28.4%	-22.8%	66.5%	48.7%	7.0%	11.5%	0.67

Source: Bloomberg, NCREIF, Oxford Economics, and DWS. As of December 31, 2018, latest data available
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; GDP refers to U.S. GDP growth; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The NCREIF Open End Equity Index started in 1978 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 20 years.

Description: The NCREIF Fund Index – Open-End Equity (NFI-OE) is an aggregate of open-end, commingled equity real estate funds with diverse investment strategies.[14] Funds included in the NFI-OE have varied concentrations of sector and region, mixes of core and non-core, leverage levels and life cycles.[14] The NFI-OE is a market index for real estate vehicles with provisions of liquidity, but would not make a relevant performance benchmark due to the varied composition. [14] The NFI-ODCE is a subset of the NFI-OE. As of December 31, 2018, the NFI-OE included data from 41 funds with net assets of $248.4 billion and gross assets of $323.2 billion, leverage at 23.7% and cash drag of 2.5%.[14]

Start date and release: The index was launched in Q2 2012 and has historical data starting in Q3 1978. The index gets released approximately 45 days after quarter-end. [14]

Access: Total returns for the four most recent quarters are publicly available on the NCREIF website at https://www.ncreif.org/data-products/funds/. Quarterly press release and "Snapshot" reports publicly available at https://www.ncreif.org/news/. Full history including all subindices are available to NCREIF members and by subscription to non-members.

Return types: Total return, appreciation return, and income return. Fund-level returns are reported both gross and net of fees. Quartile returns for quarterly and annual returns are also reported.

Weighting: Value-weighted by fund NAV. Equal weighting also reported.

Usage: Research on market trends, etc.

Inclusion criteria: Open-ended funds of various styles (those included in the NFI-ODCE index and not eligible for the NFI-ODCE index such as value-add funds). [14] To be eligible, the funds must have at least 80% of assets in real estate, 80% of net real estate assets invested in the U.S. and in the form of private equity real estate. [14] There is no restriction on leverage and all funds must comply with the NCREIF PREA Reporting Standards. [14]

Available indices: NFI-OE value-weighted index, equal-weighted index, gross and net of fees.

Methodology: The index is based on the contributions of fund-level data from NCREIF members. [14] The modified Dietz method is used to calculate each fund's returns in order to account for timing of cash inflows and outflows. [14] Fund returns are reported to NCREIF by the funds themselves and NCREIF does not calculate the participating funds' returns. [14] Funds have to comply with the NCREIF PREA reporting standards and must submit data in accordance with NCREIF procedures to ensure accuracy and standardization. [14] As the NFI-OE index is a fund-level index, performance data includes the effects of leverage, cash drag, and fund management fees (for the net returns). [14] Therefore, the NFI-OE should not be used to compare against property-level indices such as the NPI. As the NFI-OE includes non-core open-ended funds, metrics such as leverage and property type composition varies from the NFI-ODCE index.

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[14] NCREIT Fund Index – Open End Equity (4Q 2018 Report, latest available)

EXHIBIT 11: NFI-OE INDEX COMPOSITION BY PROPERTY TYPE AND REGION

Composition by Property Type

Regional Breakdown
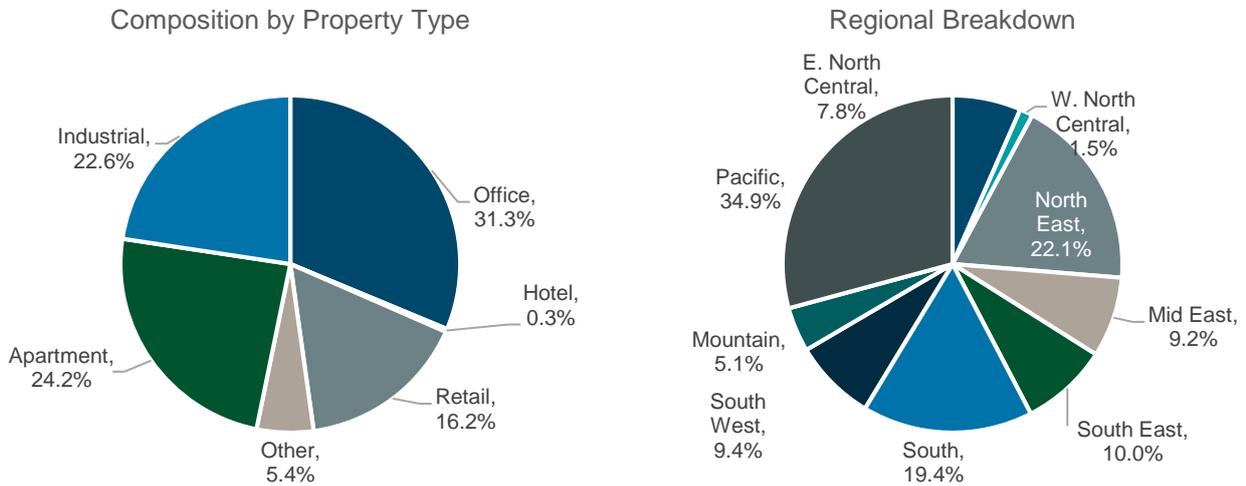
Source: NCREIF. As of December 31, 2018, latest data available.

Issues and Limitations:

- Similar to the NFI-ODCE index, the main NFI-OE index is value-weighted with a fairly limited number of funds. Therefore, the larger funds will have a disproportionate impact on the index returns.
- The NFI-OE index includes open-ended real estate funds with a variety of investment strategies and property type concentrations as well as life cycles.

5.5 NCREIF Fund Index – Open End Diversified Core Equity (NFI-ODCE)

EXHIBIT 12: NFI-ODCE INDEX (GROSS) TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	20Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
10.9%	5.7%	8.7%	28.9%	-21.8%	67.6%	49.5%	9.4%	11.0%	0.69

Source: Bloomberg, NCREIF, Oxford Economics, and DWS. As of December 31, 2018, latest data available.
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; GDP refers to U.S. GDP growth; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The NCREIF ODCE Index started in 1978 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 20 years.

Description: The NCREIF Fund Index – Open End Diversified Core Equity (NFI-ODCE) is a quarterly index of U.S. open-end core fund-level returns.[15] This index is a subset of the NFI-OE (see section 5.4). This differs from the NPI which is an index of property-level returns. The NFI-ODCE is produced by NCREIF and includes the effect of leverage and cash holdings. [15] The headline index (data included in the table above) is gross of fees, but data net of fees are also available. [15] The NFI-ODCE was launched in 2005 and the data series starts in Q1 1978. [15] Contributing funds submit data to be included in the index. As of September 30, 2018, the NFI-ODCE index consisted of 25 funds with net asset value of $195.2 billion and gross asset value of $252.6 billion. [15]
Start date and release: The index was launched in 2005 and has historical data dating back to March 31, 1978. [15] The index is released 30 days following quarter end. The preliminary release is typically 8 to 10 days following quarter end when 80% of fund data is submitted.
Access: Total returns for the four most recent quarters are publicly available on the NCREIF website at https://www.ncreif.org/data-products/funds/. Quarterly press release and "Snapshot" reports publicly available at https://www.ncreif.org/news/. Full history including all subindices are available to NCREIF members and by sub-scription to non-members.
Return types: Total return, appreciation return, and income return. Fund-level returns are reported both gross and net of fees. Quartile returns for quarterly and annual returns are also reported.
Weighting: Value-weighted by fund. Equal weighting also reported.
**Usage:** U.S. core fund benchmarking.
Inclusion criteria: Open-end core diversified real estate funds must have at least 80% of net assets in real estate of which at least 95% must be in the U.S. [15]; at least 80% of property must be in office, industrial, retail and apartment; at least 80% of properties must be operating (not a development/redevelopment); no more than 65% in any one property type or region. [15] Also, leverage must not be more than 40%.[15] Funds must comply with the NCREIF PREA Reporting Standards. [15]
Available indices: NFI-ODCE value-weighted index, equal-weighted index, gross and net of fees.
Methodology: The NFI-ODCE index is based on the contributions of fund-level data from contributing NCREIF members. The NFI-ODCE index is a fund-level performance index, which therefore includes the effects of lever-age and cash drag, in contrast to property-level indices such as the NPI. As of 4Q 2018, the NFI-ODCE lever-age was at 21.5% and the cash drag was 2.5%.
In order to mitigate "survivorship bias" (bias that arises if an index is only based on funds that have performed well enough in the past to still exist), historic returns to the NFI-ODCE are not adjusted when funds are added or removed from the index. [15]
Since the NFI-ODCE is based on open-end funds (open to investment), it is investable and therefore well-suited for benchmarking.
Attribution: NCREIF provides the breakdown and contribution of returns from each component to managers and third party service providers. This allows member funds to compare various operating and performance at-tributes against the index.

EXHIBIT 13: NFI-ODCE INDEX COMPOSITION BY PROPERTY TYPE AND REGION

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[15] NCREIF Fund Index – ODCE Quarterly Detailed Report. 4Q 2018.

Composition by Property Type (% NAV)

Regional Breakdown (% NAV)
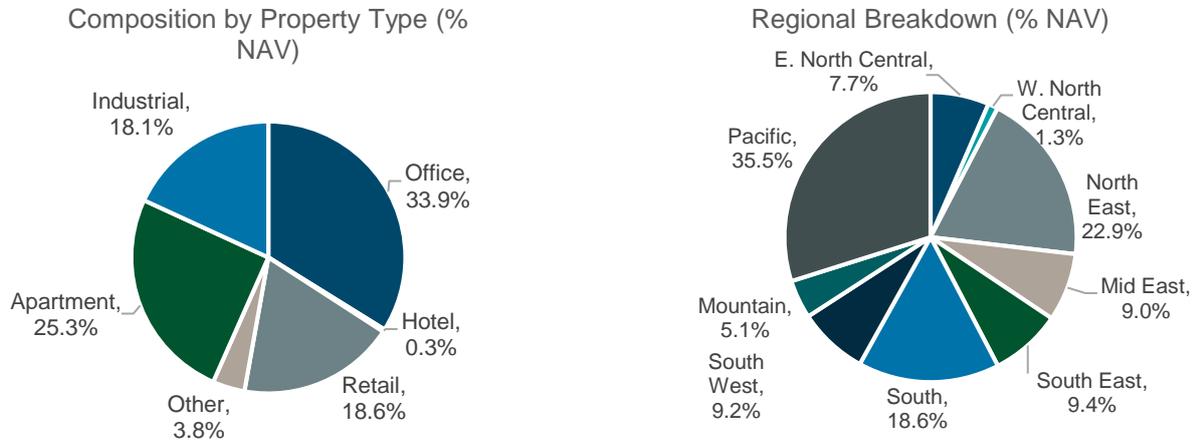
Source: NCREIF. As of December 31, 2018.

Issues and Limitations:
- The main NFI-ODCE index is value-weighted. Therefore, the larger funds will have a disproportionate impact on the index returns.
- The impact of leverage makes this index not directly comparable to property-level indices, such as the NPI, which are unlevered. The leverage and cash drag effects offset each other (leverage magnifies returns which leads to more volatility while cash drag will typically reduce returns and volatility).
- The property type breakdown is similar to the NPI, but the NFI-ODCE also includes land and "other" properties which are not included in the NPI.
- The properties and funds underlying the index are required to undertake quarterly appraisals at a mini-mum to be included in the index.

5.6 MSCI U.S. Quarterly Property Index

EXHIBIT 14: MSCI U.S. QUARTERLY PROPERTY INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	19Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
9.5%	6.5%	8.6%	30.4%	-17.3%	70.5%	51.9%	10.8%	8.4%	0.86

Source: Bloomberg, MSCI, Oxford Economics, and DWS. As of December 31, 2018, latest data available.
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; GDP refers to U.S. GDP growth; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The MSCI U.S. Quarterly Property Index started in 1998 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 19 years.

Description: The MSCI U.S. Quarterly Property Index ("MSCI US") is a quarterly appraisal-based index that measures performance for stabilized properties ("standing investments").[16] Properties transacting during the period would be excluded. The MSCI U.S. is an unleveraged index, and gross of any fund management fees (asset level management fees are deducted).[16] The index is unfrozen which means returns are revised as the pool of properties changes.[16] Valuations are only done by external appraisals. The MSCI US index is smaller than the NPI but more broadly based, and its universe includes any type of investors (not only tax exempt as in the NPI) and all property types. During Q4 2018, the MSCI real estate indices underwent a rebranding from "MSCI IPD" to only "MSCI". As of 4Q 2018, the MSCI US index included 4,967 properties valued at $360.8 billion. [16]

Start date and release: The index was launched in 2009 with data history starting in 12/31/1998. [16] The index is released approximately 41 days after quarter-end, subject to data collection and validation.[17]

Access: Full history and subindices are available via subscription. PREA members can have access to the last four quarters' (eight quarters for investor-members) results at www.prea.org/research/ipd-intro/. Headline numbers for most recent period publicly available at www.msci.com/real-estate-fact-sheet-search.

Return types: Total return, appreciation return, and income return. All returns are unlevered.

Weighting: Market value by property

Usage: Cross-border comparison of real estate markets. MSCI US is the only index that comes from a family of international indices. All MSCI real estate indices internationally are calculated using a consistent methodology to ensure comparability.

MSCI specifically states that the index is not authorized as a benchmark, as it represents only a subset of the universe of property investments, therefore only representative of stabilized properties and market movements.

Inclusion criteria: All property and portfolio types are allowed as long as valuation standards are met. Properties must be operating, or completed and leasable ("standing property investments"). Development projects and properties under major refurbishment are excluded, and properties are not included in index calculations in the period in which they are bought and sold.[18]

Available indices:[19] National; Property Type: Retail, Office, Industrial, Apartment, Hotel, Other; Regional: East, Midwest, South, West (same definitions as the NPI); Property subtypes: *Apartment:* high rise, low rise, garden; *Industrial:* warehouse, flex, R&D, self-storage, other; *Office:* CBD, suburban, medical; *Retail:* super/regional mall, community/neighborhood center, power center, other; *Hotel; Other*

Methodology: The MSCI US index is based on properties held by real estate portfolio managers and large investors. Contributors must provide data on all properties.[18] The MSCI US index is unlevered, similar to the NPI. Capital expenditure is deducted from the appreciation returns, similar to the NPI. Income and capital appreciation returns are based on compounding monthly returns, and therefore, total return on a quarterly basis does not equal the sum of income and capital appreciation components. [18] Capital appreciation are based on third party appraisal values, and properties transacting during the period are excluded (differs from the NPI which includes properties transacting). [18] All properties must be appraised at least once per year. [18] Properties are also included at the actual percentage ownership, [18] which differs from the NPI in which all properties are treated as 100% owned by the investor.

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[16] MSCI U.S. Quarterly Property Index Factsheet, as of Q4 2018
[17] MSCI Indexes release schedule 2019
[18] MSCI Global Methodology Standards for Real Estate Investment. September 2018.
[19] MSCI Global Intel – USA (Q)

EXHIBIT 15: MSCI U.S. QUARTERLY PROPERTY INDEX COMPOSITION BY PROPERTY TYPE AND REGION

Composition by Property Type

Regional Breakdown
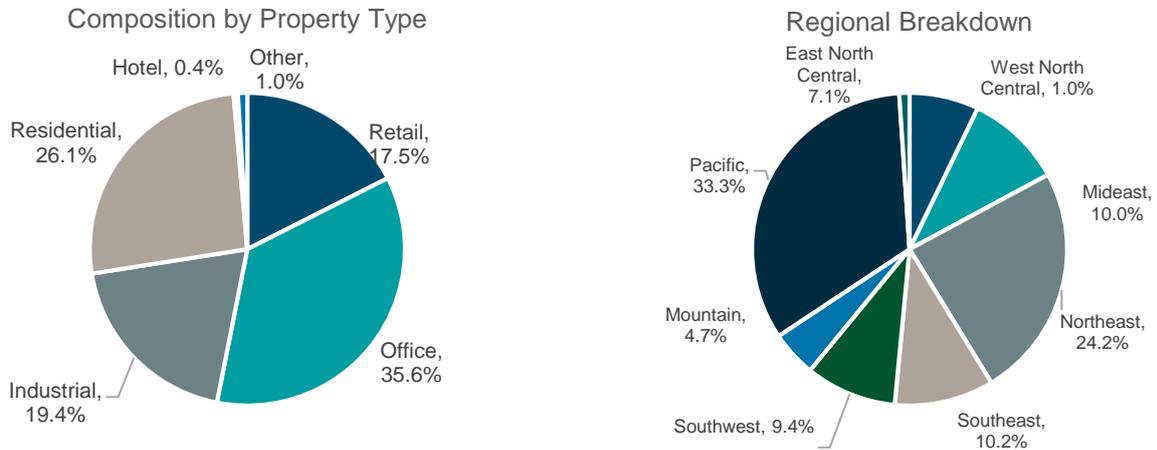
Source: MSCI. As of December 31, 2018.

Issues and Limitations:

- The MSCI US index is value-weighted, which means larger properties will have larger influence on the index.
- The index has 1.0% weighted towards hotel and other category as of 4Q'2018.

5.7 MSCI/PREA U.S. AFOE Quarterly Property Fund Index (All Funds)

EXHIBIT 16: MSCI/PREA U.S. AFOE QUARTERLY PROPERTY INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	10Y	Equi.	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
11.4%	6.7%	6.7%	36.2%	-35.3%	75.1%	48.8%	-56.5%	15.0%	0.41

Source: Bloomberg, MSCI, Oxford Economics, and DWS. As of December 31, 2018, latest data available.
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; GDP refers to U.S. GDP growth; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The MSCI/PREA U.S. AFOE Quarterly Property Fund Index started in Q1 2008 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 10 years.

Description: The MSCI/PREA U.S. AFOE Quarterly Property Fund Index ("PREA AFOE") is a quarterly, open-end fund index that only includes professionally managed commingled property funds.[20] The PREA IPD US index is published by MSCI and PREA.[20] An index that only includes core funds is also available, the MSCI/PREA U.S. ACOE Quarterly Property Fund Index. Constituent funds must subscribe to MSCI's portfolio analysis services. [20] The index history is unfrozen, and as new funds are added to the index, their history is incorporated and historical index returns are adjusted. There are plans to freeze the index in the future. The headline index expresses returns gross of fees (in the exhibit above), but net total returns are also available. As of Q4 2018, the index comprised of 35 funds with GAV of $305.8 billion and NAV of $225.3 billion. Leverage was at 24.4% and cash percentage is at 2.7%.[21]

Start date and release: The index was launched in Q2 2012 and data history starts in 3/31/2008. The index is released on the third day of the second month following quarter-end for the core, diversified sub-index. The full index is released one week later.[22]

Access: Full history and sub-indices are available via subscription. PREA members can have access to the last four quarters' (eight quarters for investor-members) results at www.prea.org/research/ipd-intro/. MSCI clients can also have access to the data. Headline numbers for most recent period publicly available at www.msci.com/real-estate-fact-sheet-search.

Return types: Total return, appreciation return, and income return at fund level (net and gross of fees) and property level based on the underlying properties of the fund. The reports break out the difference between fund and property level return into components: effects of leverage, cash holdings, other investments, fund costs, and other effects.

Weighting: Value-weighted by fund

Usage: Benchmarking (with license agreement) and return attribution

Inclusion criteria: Funds must be professionally managed, open-ended or semi open-ended, comingled, and provide access to direct property returns. [20] To be eligible, funds must have a GAV greater than USD $150 million or that of the 9th decile of the current index sample, whichever is smaller. [20] At least 95% of the GAV must be invested in the U.S., 85% invested in real estate and 70% in private equity real estate assets, including joint ventures, but excluding investments in other property funds, mortgages, mezzanine debt, unfunded forward commitments and investments in operating companies. [20] Funds are only included if they are part of the MSCI Portfolio Analysis Service. [20]

Available indices: All open-ended funds gross and net of fees; core, diversified open-end funds gross and net of fees (PREA ACOE); direct, unlevered real estate held by funds in the index, also reported by property type, property sub-type, census region, market, geographic location, asset strategy (stabilized, development, reposition, lease-up), active status of the property (stabilized, unstabilized, purchased or sold); fund return attribution (effects of leverage, cash holdings, fund costs, etc.)[23]

Methodology: The funds that contribute data to the index must subscribe to MSCI's portfolio analysis services.[20] The index tracks returns at the fund level as well as at the direct unlevered property level. [20] The PREA AFOE index includes an attribution which breaks down the difference into the effects of leverage, cash drag, fund costs, other real estate investments, and other effects. [20] Due to the attribution system, the PREA AFOE

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[20] PREA/IPD U.S. Property Fund Index: Open End Funds 3Q 2018 Index Summary Report
[21] MSCI/PREA U.S. AFOE Quarterly Property Fund Index (Unfrozen) – USD as pf December 31, 2018
[22] MSCI Indexes release schedule 2019
[23] MSCI/PREA U.S. AFOE Quarterly Property Fund Index data file (4Q 2018 report)

index is the only index which provides a full look through at the sources of fund-level returns. This can be important to those wishing to use the index to understand the sources of returns, and can potentially be used to construct bespoke benchmarks.[24]

Property valuations are based on appraised values, and properties held in open-end funds are typically valued on a more frequent basis than other properties, therefore stale appraisals will be less of a problem and the index will likely exhibit less smoothing than other property level indices.

Calculation of returns is done on a monthly basis, which are compounded to arrive at the quarterly returns. This methodology is consistent with the methodology applied by MSCI globally.[25] This process also means that income and appreciation returns will not sum exactly to the total returns.

The PREA AFOE index is part of a suite of fund and property level indices produced by MSCI for many real estate markets globally. These indices are consistent in construction and therefore allows for performance comparisons across global markets.

EXHIBIT 17: MSCI/PREA AFOE COMPOSITION BY PROPERTY TYPE AND REGION

Composition by Property Type

Composition by Region
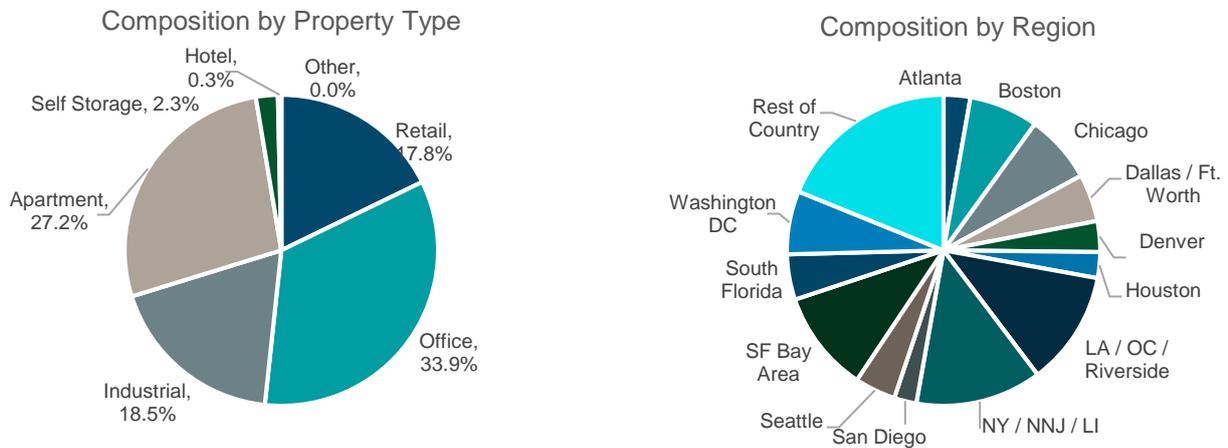
Source: PREA. As of December 31, 2018.

Issues and Limitations:

- The PREA IPD US is value-weighted, which means larger funds will have larger influence on the index. Median returns are also reported, independent of fund size, which is useful for investors who want to understand the market better or see where their investments rank against the universe.
- Limited history as the index only goes back to Q1 2008 which only covers one economic cycle.
- Returns are appraisal-based and are done more frequently for open-ended funds.

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[24] A Primer on Commercial Real Estate Indices, Pension Real Estate Association (PREA). December 2016.
[25] MSCI Global Methodology Standards for Real Estate Investment. September 2018.

5.8 MSCI Continental Europe Property Level Index

EXHIBIT 18: MSCI CONTINENTAL EUROPE PROPERTY LEVEL INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std. Dev.*	Sharpe Ratio*
5Y	10Y	10Y	Equi-ties	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld		
10.2%	6.1%	5.8%	20.3%	-46.0%	85.4%	-7.9%	-83.3%	5.6%	1.07

Source: Bloomberg, MSCI, Oxford Economics, and DWS. As of December 31, 2018, latest data available.
Note: Equities refer to the Stoxx 600 Index; Fixed Income refer to the Bloomberg Barclays European Aggregate Index; GDP and CPI refers to the Eurozone GDP and CPI from Oxford Economics; and the 10-year government bond yield refers to Germany's 10-Year government bond yield.
*The MSCI Continental Europe Property Level Index started in Q4 2007 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 10 years.

Description: The MSCI Continental Europe Property Level Index is a subset of the MSCI Global Property Fund Index (asset-level) and is included in the MSCI Global Property Fund report. The index is released quarterly, at the same time as the MSCI Global Property Fund Index, and reflects the performance of European underlying assets of funds included in the MSCI Global Property Fund Index.[26] The index history is unfrozen, and fund-level performance numbers are also available in the same MSCI Global Property Fund report. [26] Returns are appraisal-based and in local currency. [26] As of September 30, 2018, the index comprised 764 properties with capital value of US$ 32.2 billion. [26] A Continental Europe fund level index is also available, and as of December31, 2018, the fund level index comprised of 13 funds with NAV of US$ 27.8 billion and GAV of US$ 35.8 billion.[26]

Start date and release: The index has data history starting in Q4 2007 and similar to the MSCI Global Property Fund Index, is released approximately 75 days after year-end for Q4 results and 65 days after quarter-end for other quarters.[27]

Access: Full history and sub-indices are available via subscription or license agreement. Headline numbers for most recent period publicly available at www.msci.com/real-estate-fact-sheet-search.

Return types: Total return, Income return, and Capital return

Weighting: Fund Net Asset Value for the fund-level index, and Gross Asset Value for the asset-level index

Usage: internal research and strategy, utility in external research materials, performance attribution / risk management analytics.

Inclusion criteria: All funds are core (diversified and specialized), open-ended or semi-open, and valued quarterly; have at least USD $100 million in GAV, at least 85% of which in real estate; and maintain maximum leverage of 60%.[26]

Available indices: Asset-level and fund-level indices. Further breakdown of returns is available at the asset-level, including by property type (office, retail, industrial, residential, other)

Methodology: The methodology of constructing the index is consistent with MSCI's methodology for its real estate indices. Please refer to the methodology section of the MSCI Global Quarterly Property Fund Index for more details. The only difference being the MSCI Continental Europe Property Level Index is an asset-level index which excludes the effects of leverage, management fees, and cash drag. Returns are appraisal-based and net of capital expenditures.

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[26] MSCI Global Property Fund Index Digest. As of September 30, 2018.
[27] MSCI Indexes release schedule 2019

EXHIBIT 19: MSCI CONTINENTAL EUROPE PROPERTY LEVEL INDEX BY SECTOR
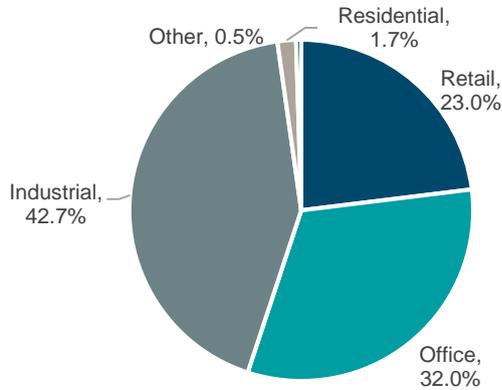
Source: MSCI. As of December 31, 2018, latest available.

Issues and Limitations:
- The MSCI Continental Europe Property Level index only comprises USD $35.8 billion of properties, a fairly small amount. The properties are held by open-ended core, diversified funds and are therefore generally of a higher quality.
- The index is weighted by property gross asset value, therefore results is skewed towards larger assets
- The index started in Q4 2007, which means it only has history for the current business cycle.

5.9 MSCI Pan-European Quarterly Property Fund Index (PEPFI)

EXHIBIT 20: MSCI PAN-EUROPEAN QUARTERLY PROPERTY FUND INDEX (PEPFI) TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std. Dev.*	Sharpe Ratio*
5Y	10Y	14Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld		
9.9%	2.9%	4.7%	43.6%	-41.6%	89.2%	10.3%	-17.2%	10.4%	0.43

Source: Bloomberg, MSCI, Oxford Economics, and DWS. As of December 31, 2018, latest data available.
Note: Equities refer to the Stoxx 600 Index; Fixed Income refer to the Bloomberg Barclays European Aggregate Index; GDP and CPI refers to the Eurozone GDP and CPI from Oxford Economics; and the 10-year government bond yield refers to Germany's 10-Year government bond yield.
*The MSCI Pan-European Quarterly Property Fund Index started in Q1 2004 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 14 years.

Description: The MSCI Pan-European Quarterly Property Fund Index (PEPFI) is an index of unlisted and open-ended real estate funds with a Pan-European mandate.[28] Returns are reported net of fees, appraisal-based, and in local currency. [28] As of Q3 2018, the PEPFI comprised on 13 property funds, 11 of which are balanced funds. The total net asset value was US$ 22.1 billion, and leverage was at 22.7%.[28]
Start date and release: The index has data history dating starting in Q1 2004 and is released approximately 60 days after quarter-end.[29]
Access: Full history and sub-indices are available via subscription or license agreement. Headline numbers for most recent period publicly available at www.msci.com/real-estate-fact-sheet-search.
Return types: Total return, Income return, and Capital return
Weighting: Fund net asset value
Usage: benchmarking (official and unofficial), performance attribution, risk management analytics, research and strategy
Inclusion criteria: All funds are unlisted, open-ended, have third party valuations on a quarterly basis, a Pan-European mandate (at least three regions of Europe), leverage of <60% GAV, asset-level data must be measured by MSCI to enable validation and reconciliation between asset and fund returns.[28]
Available indices: Pan-European property funds index, balanced Pan-European property funds index. Returns are also available by percentile for all funds and balanced funds.
**Methodology:** The methodology of constructing the index is consistent with MSCI's methodology for its real estate indices. Please refer to the methodology section of the MSCI Global Quarterly Property Fund Index for more details. Returns at the fund level are net of capital expenditures and management fees and includes the effects of leverage and cash drag.

EXHIBIT 21: MSCI PEPFI COMPOSITION BY PROPERTY TYPE AND REGION

Composition by Property Type

Other, 1.0%
Industrial, 18.0%
Retail, 38.0%
Office, 43.0%

Asset Allocation by Region

Nordics, 12.0%
Benelux, 12.0%
CEE, 8.0%
Germany, 21.0%
France, 20.0%

Source: MSCI. As of September 2018.

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[28] Pan-European Property Fund Index Overview Presentation (Q3 2018, latest available overview presentation although data released is as of Q4 2018).
[29] MSCI Indexes release schedule 2019

Issues and Limitations:
- The PEPFI only comprises 13 funds with total net asset value of USD $22.1 billion of properties, a fairly small amount. MSCI aims to increase the number of participating funds in the future.
- The index is weighted by fund net asset value, therefore results are skewed towards larger funds.

5.10 INREV Quarterly Index

EXHIBIT 22: INREV QUARTERLY INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	17Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
8.1%	3.7%	5.6%	44.5%	-26.8%	83.8%	8.7%	-1.5%	7.4%	0.62

Source: Bloomberg, INREV, Oxford Economics, and DWS. As of December 31, 2018, latest data available.
Note: Equities refer to the Stoxx 600 Index; Fixed Income refer to the Bloomberg Barclays European Aggregate Index; GDP and CPI refers to the Eurozone GDP growth and CPI from Oxford Economics; and the 10-year government bond yield refers to Germany's 10-Year government bond yield.
*The INREV Quarterly Index started in Q2 2001 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 17 years.

Description: The INREV Quarterly Index measures net asset value performance of European non-listed real estate funds, and performance is measured net of fees and costs.[30] The index is unfrozen, which means historical data can change with future updates. [30] Returns are appraisal-based and in local currency. [30] INREV members and non-members contribute data to be included in the index. EY performs a quarterly review on the INREV Quarterly Index and provides an assurance report and opinion on a yearly basis.[30] As of 12/31/2018, the index comprised of 256 funds with gross asset value of EUR 214.7 billion, net asset value of EUR 170.7 billion, and leverage was at 18.6%. Core funds comprise 84.4% of the index, while value-add funds were 15.6%.[30]
Start date and release: The index was launched in 2011 and is released eight weeks after quarter-end. Data history starts in Q2 2000 (previously, the INREV Quarterly Index started in Q1 2010; the index history was extended due to successfully collecting historical data). [30]
Access: Full history is available to INREV members through the website (https://www.inrev.org/library/inrev-quarterly-index). The latest quarterly press release is available publicly on the INREV website (https://www.inrev.org/news/inrev-news/).
Return types: Total return, Income return, and Capital growth
Weighting: Net asset value
Usage: Research and information purposes only. INREV specifically outlines in its quarterly report that the results may not be used to determine the value of a fund or financial instrument, to determine the amount payable under a financial instrument, calculate performance fees, or the allocation of a portfolio. [30]
Inclusion criteria: Funds must be non-listed or have a stock market listing only for technical purposes. Both open-ended and closed-ended funds are included. At least 50% institutional holding, >90% of GAV invested in European real estate, commingled funds of at least two investors, core or value-add funds while opportunity funds are excluded. Funds should report figures based on calendar years. [30]
Available indices: Only fund-level indices available. All funds, core, value-add, closed-end, open-end, and by country (Finland, France, Germany, Italy, Netherlands, U.K.), by region and by sector. [30]
Methodology: The modified Dietz methodology is used to calculate quarterly net asset value fund performance. [30] The total return measures the performance over a specific period and does not include projections to the end of the fund's life. [30] The index is based on fund level data that is provided to INREV directly from managers using a data input tool. Data collection starts immediately after quarter-end for a period of up to 6 weeks.[30]

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[30] INREV Quarterly Index, Q4 2018

EXHIBIT 23: INREV ALL FUNDS INDEX COMPOSITION BY COUNTRY AND FUND TYPE

Composition by Country

Composition by Fund Type
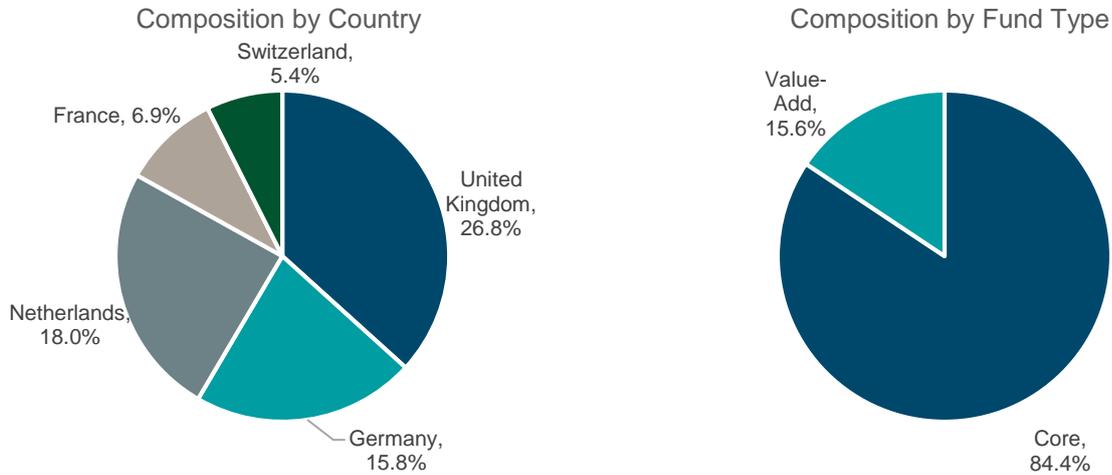
Source: INREV. As of December 2018.

Issues and Limitations:

- The index is heavily weighted towards the United Kingdom, the Netherlands and Germany at 26.8%, 18.0% and 15.8%, respectively as of Q4 2018. Together, the U.K., the Netherlands and Germany make up 60.6% of the index.
- The index includes both open-ended and closed-end funds, which means the index is not completely investable.

5.11 ANREV Index

EXHIBIT 24: ANREV INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std. Dev*	Sharpe Ratio*
5Y	10Y	11Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld		
11.2%	6.9%	7.2%	20.2%	8.6%	49.8%	23.8%	-46.2%	7.5%	1.02

Source: ANREV, Bloomberg, Oxford Economics, and DWS. As of September 30, 2018, latest data available.
Note: Equities refer to the MSCI AC Asia Pacific Index net Total Return USD; Fixed Income refer to the Bloomberg Barclays Asia Pacific Aggregate Index; GDP and CPI refers to the Asia Pacific GDP growth and CPI from Oxford Economics; and the 10-year government bond yield refers to the Japan 10-year government bond yield.
*The ANREV Index started in 2006 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 11 years.

Description: The ANREV Index measured net asset value (NAV) based performance on an annual and quarterly basis using data supplied by vehicle managers.[31] The ANREV index is produced by the Asian Association for Investors in Non-listed Real Estate Vehicles Limited, a non-profit organization for institutional investors in Asian unlisted property funds. [31] All return data are net of fees and other costs, representing the aggregate investor return. The ANREV index includes non-listed real estate funds of which 90% or more of their GAV is targeted to be invested in Asia Pacific. [31] The approach and methodology is similar to the INREV index for European funds, therefore allowing for comparisons between the European and Asia Pacific regions. Note that not all funds included in the annual index are included in the quarterly index as some funds do not have quarterly data available. The annual index is frozen at the date of publication of quarterly performance (unfrozen before that). The quarterly index is unfrozen, and there is no target date set to freeze the quarterly index. Returns are in local currency, appraisal-based and net of fees and costs. Returns are also available in USD. As of Q3 2018, the ANREV quarterly index comprised of 98 funds with total GAV of US$ 130.2 billion, NAV of US$ 94.2 billion, and leverage level of 24.0%.[31] As of March 6, 2018, ANREV started releasing the ANREV Pan-Asia Open End Diversified Core Fund Index, which is a subset of the ANREV quarterly index, and only includes four funds.

Start date and release: The ANREV index was launched in 2011 with annual data starting in 2006 and quarterly data going back to 3/31/2010.[32] The annual index is published in April each year. The quarterly index is published 12 weeks after each quarter end. [31]

Access: The latest All Funds index results is publicly available under the latest news on the ANREV website (www.anrev.org). ANREV members have access to the full report (PDF and Excel) and sub-indices and can also use the ANREV Online Analysis Tool to create and analyze tailor-made indices.

Return types: Total return, Income return, and Capital growth

Weighting: Value-weighted by the funds' net asset value

Usage: Benchmarking, unofficial performance comparison, performance attribute, research and strategy

Inclusion criteria: Core, value add and opportunity funds can be included (style is manager-defined). [31] Fund of funds are excluded as they do not invest directly into real estate. [31] Funds must have at least 50% of the investor base by NAV institutional investors. [31] There should also be at least three different institutional investors in the vehicle. [31] The fund should be 90% invested in Asia Pacific. [31] Data should be provided on a quarterly or annual basis. [31] The funds should not have a stock market listing or have a stock market listing for technical purposes. [31] Funds will only be eligible if there is sufficient data to calculate an annual NAV return and other relevant data has been provided by the fund manager. [31] Funds should be active for at least a full year, and should report figures based on the calendar year. [31]

Available indices: ANREV produces 14 indices: All funds index, Core Funds Index, Value Added Funds Index, Opportunity Funds Index, All funds ex-Australia Index, All funds ex-Australia and Japan Index, China Funds Index, Japan Funds Index, Australia Funds Index, Multi-country Funds Index, Closed-End Funds Index, Open-End Funds Index, Single Sector Funds Index, Multi-Sector Funds Index. The index results are available in six currencies: local currency, US Dollar, Japanese Yen, Australian Dollar, Euro and British Sterling. [31]

Methodology: Each fund manager may have compiled the information under a different accounting standard and ANREV does not follow any particular accounting standard.[33] ANREV also does not confirm accuracy or completeness of the data.[33] Data is submitted by the fund managers using the data input tool. [33] ANREV uses the Modified Dietz calculation methodology to calculate quarterly and annual returns. [33] All return data are net of

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[31] ANREV Quarterly Index Q3 2018
[32] ANREV Index description (https://anrev.org/en/page/industry-data/page/anrev-index/89)
[33] ANREV Index FGuide, updated April 2015

fees and other costs. [33] As of Q3 2018, the ANREV quarterly index comprised of 98 funds with total GAV of $130.2 billion and leverage level of 24.0%.[31] The composition by style is quite evenly split with core at 33.7%, value-added at 35.7%, and opportunity at 30.6%.[31] Australia makes up most of the all-funds index at 63.9%, followed by China at 8.0% and Japan at 6.8%.[31] The core funds index mostly consists of Australia at 83.1%.[31]

EXHIBIT 25: ANREV INDEX COMPOSITION BY COUNTRY AND INVESTING STYLE

ANREV All-Funds Index by Country

ANREV All-Funds Index by Style
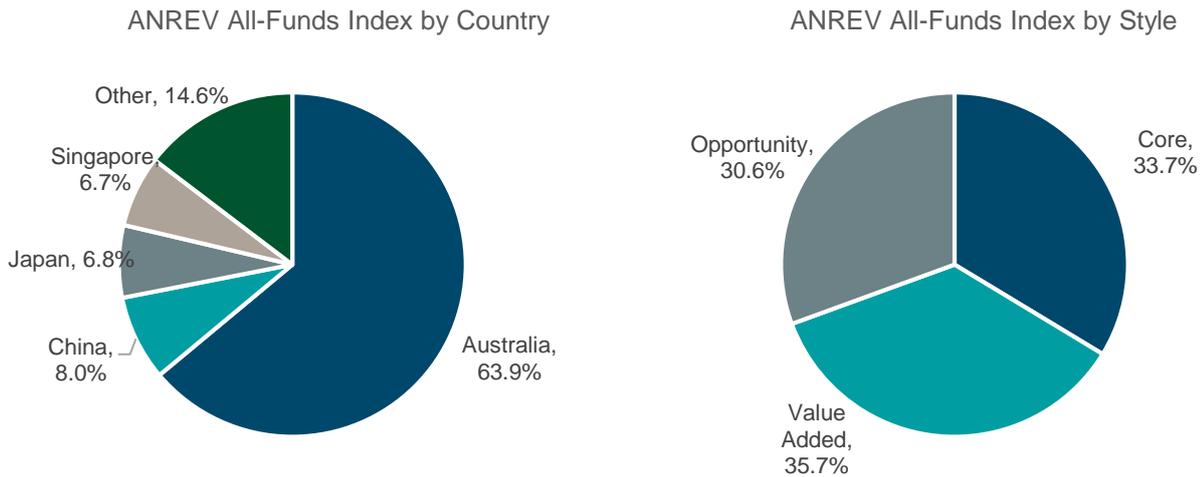
Source: ANREV. As of September 2018, latest available.

Issues and Limitations:
- The index is value-weighted and therefore, larger funds would account for a larger portion of the index.
- The data submitted by fund managers may be based on varying accounting methodologies. ANREV does not follow any specific accounting standard, but has a fixed methodology
- The index results are heavily weighted towards Australia at 63.9% of the All Funds index as of September 30, 2018, and 83.1% of the core funds index.

5.12 MSCI Asia Annual Property Index

EXHIBIT 26: MSCI ASIA ANNUAL PROPERTY INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	12Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
8.0%	5.9%	6.9%	6.8%	19.4%	66.0%	16.3%	-9.2%	3.9%	1.75

Source: Bloomberg, MSCI, Oxford Economics, and DWS. As of December 2017, latest data available.
Note: Equities refer to the MSCI AC Asia Pacific Index net Total Return USD; Fixed Income refer to the Bloomberg Barclays Asia Pacific Aggregate Index; GDP and CPI refers to the Asia Pacific GDP growth and CPI from Oxford Economics; and the 10-year government bond yield refers to Japan's 10-Year government bond yield.
*The MSCI Asia Annual Property Index started in 2005 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using annual data over the past 12 years.

Description: The MSCI Asia Annual Property Index (MSCI Asia) measured the unlevered total returns of directly held standing property investments.[34] The MSCI Asia index was formerly known as the IPD Pan-Asia Annual Property Index, and includes properties in China, Hong Kong, Indonesia, Japan, Korea, Malaysia, Singapore, Taiwan and Thailand.[36] In contrast to the ANREV index which is fund-level, the MSCI Asia index is a property-level index and returns do not include the effects of leverage, fees and cash holdings. The index is unfrozen, which means historical data can change based on new properties added to the index. Data users can seek more granular data by property type, standing (completed and lettable) and non-operating investments. As of YE 2017, the index comprised of 4,969 property investments with total capital value of US$ 375.0 billion[34]. The returns are quoted in USD (Fixed) which means monthly fixed exchange rates are used and the returns do not reflect any impact from currency movements. Therefore, returns are closer to local currency returns.
Start date and release: Data goes back to 2005[34] and is released approximately 23 weeks after year-end (close to six months after year-end).[35]
Access: Full index history is available to MSCI subscribers. The index factsheet is downloadable on MSCI's website: (https://www.msci.com/www/ipd-factsheets/ipd-pan-asia-annual-property/0164840053)
Return types: Total return, Income return, and Capital growth
Weighting: Market size
Usage: Performance attribution and research
Inclusion criteria: Direct property investment in MSCI's database comprised of all property sectors, ownership structures and interests located in the countries outlined above.[36]
Available indices: All assets; returns by 25th, 50th and 75th percentile; by property type (retail, office, industrial, residential, hotel, other); same store; standing investment; by city (all property, by property type, by percentile); by currency (USD, USD (Fixed), EUR, GBP, JPY)
Methodology: The methodology of constructing the index is consistent with MSCI's methodology for its real estate indices. Please refer to the methodology section of the MSCI Global Quarterly Property Fund Index for more details. Returns are computed at the building level and exclude properties held indirectly through investment funds, the impact of debt, fund management fees, taxation and cash.[34] The MSCI Asia Annual Property Index also includes additional data from public sources to increase the coverage in those markets. The data derived from the public domain isn't signed off by the asset owners[36]. As of YE 2017, the MSCI Asia index tracked 254 portfolios, 4,969 property investments with total capital value of USD 375.0 billion[34].

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[34] IPD Pan-Asia Annual Property Index Factsheet. As of December 2017.
[35] MSCI Indexes release schedule 2019
[36] MSCI Global Methodology Standards for Real Estate Investment, September 2018

EXHIBIT 27: MSCI ASIA ANNUAL PROPERTY INDEX BY SECTOR (% GAV)

Hotel, 7.7%
Residential, 9.2%
Retail, 31.5%
Industrial, 10.1%
Office, 38.5%
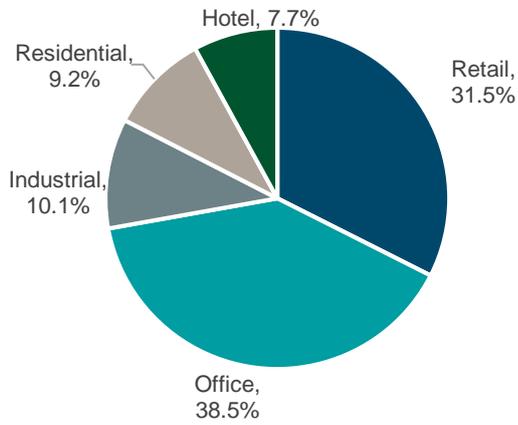
Source: MSCI. As of December 2017.

Issues and Limitations:

- The top five properties comprise of larger weights within the property types. For example, the top five properties in the retail sector comprise 22.6%, a fairly high percentage[34].
- Data history and frequency is limited. Data starts in 2006 at an annual frequency.

5.13 MSCI Asia Pacific Annual Property Index

EXHIBIT 28: MSCI ASIA PACIFIC ANNUAL PROPERTY INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std. Dev.*	Sharpe Ratio*
5Y	10Y	12Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld		
8.4%	6.2%	7.3%	8.7%	17.0%	66.9%	13.1%	-8.4%	4.2%	1.73

Source: Bloomberg, MSCI, Oxford Economics, and DWS. As of December 2017, latest data available.
Note: Equities refer to the MSCI AC Asia Pacific Index net Total Return USD; Fixed Income refer to the Bloomberg Barclays Asia Pacific Aggregate Index; GDP and CPI refers to the Asia Pacific GDP growth and CPI from Oxford Economics; and the 10-year government bond yield refers to Japan's 10-Year government bond yield.
*The MSCI Asia Pacific Annual Property Index started in 2005 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using annual data over the past 12 years.

Description: The MSCI Asia Pacific Annual Property Index (MSCI Asia Pacific) measures the unlevered total returns of directly held standing property investments in the Asia Pacific region.[37] The MSCI Asia Pacific index includes returns from countries included in the MSCI Asia Annual Property Index (MSCI Asia) as well as Australia and New Zealand.[39] Therefore, the countries included in the MSCI Asia Pacific Index are China, Hong Kong, Indonesia, Japan, Korea, Malaysia, Singapore, Taiwan Thailand, Australia and New Zealand. [39] In contrast to the ANREV index which is fund-level, the MSCI Asia Pacific index is a property-level index and returns do not include the effects of leverage, fees and cash holdings. The index is unfrozen, which means historical data can change based on new properties added to the index. Data users can seek more granular data by property type, standing (completed and lettable) and non-operating investments, as well as return data by percentiles and currencies. As of YE 2017, the MSCI Asia Pacific index comprised of 6,909 property investments with total capital value of US$ 534.5 billion[37]. The returns are quoted in USD (Fixed) which means monthly fixed exchange rates are used and the returns do not reflect any impact from currency movements. Therefore, returns are closer to local currency returns.
Start date and release: Data starts in December 2005. Timing of release is similar to the MSCI Asia Annual Property Index, approximately 23 weeks after year-end (close to six months after year-end).[38]
Access: Full index history is available to MSCI subscribers.
Return types: Total return, Income return, and Capital growth
Weighting: Market size
Usage: Performance attribution and research
Inclusion criteria: Direct property investment in MSCI's database comprised of all property sectors, ownership structures and interests located in the countries outlined above.[39]
Available indices: All assets; returns by 25th, 50th and 75th percentile; by property type (retail, office, industrial, residential, hotel, other); same store; standing investment; by city (all property, by property type, by percentile); by currency (USD, USD (Fixed), EUR, GBP, JPY).
**Methodology:** The methodology of constructing the index is consistent with MSCI's methodology for its real estate indices. Please refer to the methodology section of the MSCI Global Quarterly Property Fund Index for more details. Returns are computed at the building level and exclude properties held indirectly through investment funds, the impact of debt, fund management fees, taxation and cash. The MSCI Asia Pacific Annual Property Index also includes additional data from public sources to increase the coverage in those markets (similar to the MSCI Asia Annual Property Index). The data derived from the public domain isn't signed off by the asset owners[39]. As of YE 2017, the MSCI Asia Pacific index tracked 328 portfolios, 6,909 property investments with total capital value of USD 534.5 billion[37].

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[37] MSCI Asia Pacific Global Intel. As of December 2017.
[38] MSCI Indexes release schedule 2019
[39] MSCI Global Methodology Standards for Real Estate Investment, September 2018

EXHIBIT 29: MSCI ASIA PACIFIC ANNUAL PROPERTY INDEX BY SECTOR AND CITY (% GAV)
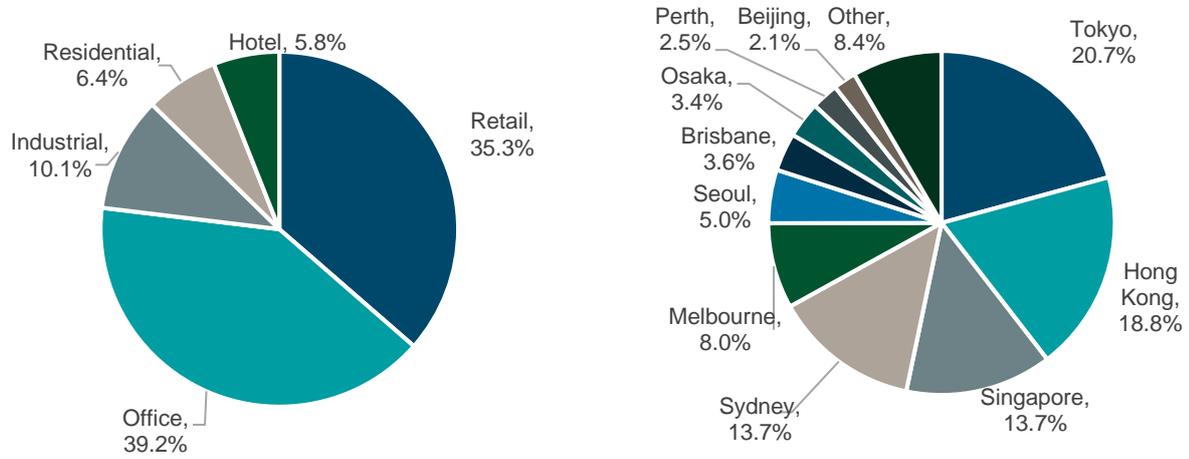
Source: MSCI. As of December 2017, latest data available.

Issues and Limitations:

- Three cities make up more than half the index. Tokyo (20.7%), Hong Kong (18.8%), and Singapore (13.7%) total 53.2% of the index as of December 2017. Australian cities make up 27.8% of the index as of December 2017.
- Data history and frequency is limited. Data starts in 2006 at an annual frequency.

5.14 FTSE EPRA Nareit Index Series

EXHIBIT 30: FTSE EPRA/NAREIT DEVELOPED INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std. Dev.*	Sharpe Ratio*
5Y	10Y	13Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld		
5.0%	6.0%	4.6%	87.4%	16.5%	57.3%	-2.3%	18.9%	23.0%	0.30

Source: Bloomberg, FTSE, Oxford Economics and DWS. As of December 31, 2018 using latest quarterly data. For the latest available month-end returns, please refer to the Appendix.
Note: Equities refer to the MSCI All Country World Index; Fixed Income refer to the Bloomberg Barclays Global Aggregate Index; GDP and CPI refers to a weighted average GDP growth of the U.S., Eurozone and Asia Pacific from Oxford Economics; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The FTSE EPRA/NAREIT Developed Index started in 2005 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 13 years.

Description: The FTSE EPRA Nareit Index Series is designed to represent general trends in eligible global real estate equities.[40] The index series tracks the performance of listed real estate companies and REITs worldwide. [40] Available indices include Global, Developed and Emerging, as well as UK's AIM market. The index series is created jointly by the European Public Real Estate Association (EPRA) and The National Association of Real Estate Investment Trusts (Nareit). [40] EPRA is a common interest group that represents the European public real estate sector. Nareit is the trade association for REITs and publicly traded real estate companies. The index series is designed for index tracking funds, derivatives and as a performance benchmark. [40] The index series is typically used to benchmark non-U.S. REIT equity funds. Constituents are free-float market cap weighted to ensure investability, and also screened for liquidity to ensure that the index is tradeable. [40] The index is calculated based on price and total return methodologies, both real time and end of day. [40] The index is reviewed quarterly in March, June, September and December. [40] The index series is available in five currencies—Euro, USD, GBP, JPY and AUD.[40]

The index series was launched in February 2005 with base date on January 27, 2005. [40] According to the EPRA Global REIT Survey 2016, the FTSE EPRA Nareit index series is tracked by 50% of global real estate sector equity funds.

Start date and release: History is available from December 1989. As all constituents are publicly traded, pricing adjusts in real time.

Access: Full index history and methodology is available on the FTSE website: https://www.ftse.com/products/indices/epra-nareit. The index history is also available on Bloomberg and other financial data sources.

Return types: Total return, Capital return (excludes dividends)

Weighting: Free-float market capitalization

Usage: Benchmarking, to construct index tracking funds and derivatives

Inclusion criteria: Listed real estate stocks and REITs. [40] The common stock must be listed on an eligible stock exchange (not an LLP, LP, MLP, LLC or BDC). The constituent must also be classified in ICB Supersector Real Estate, ICB Supersector Heavy Construction or ICB Subsector Home Construction. [40] The company must also derive at least 75% of EBITDA from relevant real estate activities. [40] The stock must also have a minimum free float of 5% and reach certain minimum thresholds for size and liquidity. [40]

Available indices: Indices are available by region, country and property sectors. The table below depicts the indices available by region and country.

EXHIBIT 31: FTSE EPRA/NAREIT INDEX SERIES BY REGION AND COUNTRY

Region	Regional indices	Developed indices	Emerging indices
Global	Global Global ex-US		
Americas	Americas North America	Canada, United States	Emerging Americas Brazil, Chile, Colombia, Mexico, Peru
Asia	Asia Pacific	Developed Asia	Emerging Asia

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[40] FTSE EPRA/NAREIT Global Real Estate Index Series Methodology Overview.

Region	Regional indices	Developed indices	Emerging indices
		Australia, Hong Kong, Japan, New Zealand, Singapore, South Korea	China, India, Indonesia, Malaysia, Pakistan, Philippines, Taiwan, Thailand
EMEA	EMEA Eurozone	Developed Europe Developed Europe ex-US Developed Middle East & Africa Developed EMEA Austria, Belgium/Luxembourg, Denmark, Finland, France, Germany, Ireland, Israel, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom	Emerging EMEA Emerging Europe Emerging Middle East & Africa Czech Republic, Egypt, Greece, Hungary, Poland, Qatar, Russia, South Africa, Turkey, United Arab Emirates

Source: FTSE

The following depicts indices that we are choosing to highlight as being the most representative of listed real estate equities by region. We also recommend using the net withholding tax version of the indices.

EXHIBIT 32: A SHORTLIST OF FTSE EPRA/NAREIT INDICES

Index	Region	Bloomberg ticker
FTSE EPRA Nareit Developed	Global	TRNGLU Index
FTSE EPRA Nareit Developed ex-U.S.	Global	TRGXUU Index
FTSE EPRA Nareit Developed Europe	Europe	NEPRA Index
FTSE EPRA Nareit Developed Europe ex-UK	Europe	NUXUK Index
FTSE EPRA Nareit UK	Europe	NUPUK Index
FTSE EPRA Nareit Asia Index	Asia Pacific	TRGASU Index
FTSE EPRA Nareit Asia ex-Australia	Asia Pacific	TRPAAU Index

Source: DWS, FTSE

The FTSE EPRA Nareit Property Sector Index series includes nine different property sectors: industrial, office, retail, residential, lodging/resorts, industrial/office, diversified, self-storage, and healthcare. [40] A company is included in one of these property sectors if 75% or more of its gross invested book assets are invested in that sector. A company is considered diversified when its gross invested book assets do not meet the 75% threshold for a single property sector. [40]

Methodology: The index is reviewed for rebalancing quarterly in Mach, June, September and December with changes implemented on the third Friday of the month. [40] The index constituents also go through a semi-annual liquidity testing period. [40] IPOs are reviewed quarterly, and there is a 20-day trading requirement before the stock would be eligible to be included in the index. [40] The index methodology is reviewed quarterly by the FTSE EPRA Nareit Global Real Estate Index Series Supervisory and Regional Advisory Committees to advise on optimal construction and maintenance of the indices. [40]

Issues and Limitations:
- The index series captures most publicly traded real estate stocks and REITs. All the indices are weighted by free-float market cap, which means larger constituents will be a bigger driver of performance of the index. For the FTSE EPRA Nareit Developed index as of December 31, 2018, Simon Property Group (SPG) is the largest constituent at 3.76%, followed by Prologis (PLD) at 2.67% and Public Storage at 2.18%. The top 10 constituents make up 20.4% of the index.

5.15 MSCI US REIT Total Return Index

EXHIBIT 33: MSCI US REIT INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std. Dev.*	Sharpe Ratio*
5Y	10Y	20Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld		
7.8%	8.5%	9.3%	54.1%	15.8%	43.4%	17.6%	5.4%	22.5%	0.44

Source: Bloomberg, MSCI, Oxford Economics, and DWS. As of December 31, 2018 using latest quarterly data. For the latest available month-end returns, please refer to the Appendix..
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury. The MSCI US REIT Total Return Index started in December 1994 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 20 years.

Description: The MSCI US REIT Index (RMZ) is a free float-adjusted market capitalization weighted index that is comprised of publicly traded equity Real Estate Investment Trusts (REITs).[41] The index is based on the MSCI USA Investable Market Index (IMI), its parent index, which captures the large, mid and small cap segments of the USA market. [41] As of December 31, 2018, the index had 153 constituents, representing 99% of the US REIT universe. [41] The securities are classified under the Equity REITs Industry (under the Real Estate Sector) according to the Global Industry Classification Standard (GICS), have real estate exposure and carry REIT tax status. [41] The RMZ is constructed according to the MSCI Global Investable Indexes (GIMI) Methodology, which takes into account the index's liquidity, investability and replicability.[41]
Start date and release: History is available from December 1994. [41] As all constituents are publicly traded, pricing adjusts in real time.
Access: Full index history and methodology is available on the MSCI website: https://www.msci.com/msci-us-reit-index. The index history is also available on Bloomberg and other financial data sources.
Return types: Total return, price-only return (excludes dividends)
Weighting: Free-float market capitalization
Usage: Benchmarking, unofficial performance comparison, to construct index tracking funds and derivatives.
Inclusion criteria: The listed REIT must carry REIT tax status, have the equity REIT structure, and have real estate exposure (only specific specialized REITs can be included). [41] MSCI classifies REIT securities into one of the REIT subindustries within the Global Industry Classification Standard (GICS) structure, which includes eight equity REITs subindustries and one mortgage REIT subindustry. [41] The eight equity REIT subindustries eligible are: diversified, health care, hotel & resort, industrial, office, residential, retail, and specialized REITs (only some are eligible). [41] Mortgage REITs are excluded and specialized REITs are eligible if they own one of the following property types: storage and self-storage facilities, data centers, correctional facilities, theaters, casino and gaming facilities and restaurants. [41]
Available indices: No subindices are readily available. However, the MSCI US REIT index is composed of eight different equity REIT subindustries, and custom indices can be made using these categories.
Methodology: The index undergoes its Semi-Annual Index Review in May and November, and its Quarterly Index Review in February and August. [41] Ongoing event-related changes are implemented as they occur. During the Semi-Annual and Quarterly Index Reviews, the parent index, the MSCI USA Investable Markets Index, is reviewed under the guidelines of the MSCI Global Investable Market Indexes methodology (https://www.msci.com/eqb/methodology/meth_docs/MSCI_GIMIMethodology_Jan2019_v2.pdf). During this review, some constituents may be deleted and some may be added based on minimum size requirements, liquidity, foreign inclusion factors and number of shares. In addition, the list of property types allowed for REITs classified in the Specialized REITs subindustry is reviewed during each Semi-Annual Index Review and Quarterly Index Review.

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[41] MSCI US REIT Index (USD) Factsheet. As of December 31, 2018.

EXHIBIT 34: MSCI US REIT INDEX COMPOSITION BY SECTOR AND TOP 10 CONSTITUENTS

Composition by Sector (% GAV)
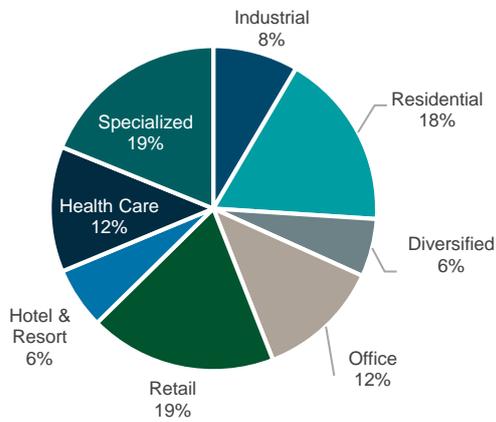
Source: MSCI. As of December 31, 2018.

Top 10 Constituents	Index Weight
Simon Property Group	6.61%
Prologis	4.70%
Public Storage	4.04%
Equinix	3.57%
Welltower Inc.	3.29%
Equity Residential	3.09%
AvalonBay Communities	3.06%
Digital Realty Trust	2.79%
Ventas	2.66%
Realty Income Corp.	2.33%
Total for top 10 constituents	**36.14%**

Issues and Limitations:

- The index series captures most publicly traded real estate stocks and REITs. All the indices are weighted by free-float market cap, which means larger constituents will be a bigger driver of performance of the index. As of December 31, 2018, Simon Property Group (SPG) is the largest constituent at 6.61%, followed by Prologis (PLD) at 4.70% and Public Storage at 4.04%. The top three constituents alone make up 15.4% of the index.

5.16 Wilshire U.S. REIT Index

EXHIBIT 35: WILSHIRE U.S. REIT INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	20Y*	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
8.3%	7.2%	9.4%	50.3%	12.6%	42.2%	19.9%	6.0%	23.2%	0.44

Source: Bloomberg, Oxford Economics, Wilshire, and DWS. As of December 31, 2018 using latest quarterly data. For the latest available month-end returns, please refer to the Appendix..
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The Wilshire U.S. REIT Index started in December 1977 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 20 years.

Description: The Wilshire U.S. Real Estate Investment Trust Index (Wilshire US REIT) measures the performance of publicly traded REITs based in the U.S.[43] The Wilshire US REIT index is a subset of the Wilshire U.S. Real Estate Securities Index (Wilshire RESI),[43] which is also a commonly used benchmark. The Wilshire U.S. Real Estate Securities Index was created to offer a market-based index that is reflective of U.S. real estate held by pension funds.[43] The main difference between the Wilshire RESI and the Wilshire REIT indices is that the Wilshire REIT index only includes companies that are structured as REITs. The Wilshire US REIT index and the Wilshire RESI index are both designed to be proxies for direct real estate investing by excluding securities whose values are not always tied to the underlying real estate.[43] However, this is debatable as some traditional real estate sectors can potentially trade with a large gap to its underlying asset value, such as retail REITs during 2018. Exclusions in the Wilshire US REIT index include mortgage REITs, net lease REITs, real estate finance companies, mortgage brokers and bankers, commercial and residential real estate brokers, home builders, large landowners and sub-dividers of unimproved land, hybrid REITs and timber REITs.[42] Additional real estate indices that Wilshire produces include Wilshire US Real Estate Operating Company (Wilshire REOC), Wilshire ex-US RESI, Wilshire ex-US REIT, Wilshire Global RESI and Wilshire Global REIT.
Start date and release: Monthly history from December 31, 1977 and daily history from January 31, 1996.
Access: Full index history is available on https://wilshire.com/indexcalculator/index.html#. The index history is also available on Bloomberg and other financial data sources. On Bloomberg, the ticker for the Wilshire US REIT index is WILREIT. Methodology is also available from Wilshire's website: https://wilshire.com/indexes/wilshire-real-estate-family/wilshire-us-reit.
Return types: Total return, price-only return (excludes dividends)
Weighting: Free-float adjusted market capitalization
Usage: Benchmarking, unofficial performance comparison
Inclusion criteria: The REIT must be an equity owner and operator of commercial or residential real estate with minimum market capitalization of $200 million at the time of inclusion.[43] The REIT must also be included in the Wilshire 5000 Total Market Index.[43] The REIT would be removed if the total market capitalization falls below $100 million for two consecutive quarters.[43] The REIT must also have 75% of its revenue derived from ownership and operation of real estate, and the stock liquidity must commensurate with that of other institutionally-held real estate securities.[43] As mentioned above, several REIT sectors are excluded, including mortgage REITs, net lease REITs, real estate finance companies, hybrid REITs and timber REITs.[43]
Available indices: Subindices by property type are available: Apartments, Diversified, Factory Outlets, Health Care, Hotels, Industrial, Industrial/Office, Manufactured Homes, Malls, Mixed, Office, Residential, Retail, Strip Centers, and Self-Storage.[43]
Methodology[43]: The index is reviewed periodically according to a set of rules. Routine additions and deletions to the indicies and share updates are made quarterly after the close of trading on the third Friday of March, June, September and December. The changes become effective the next business day. During the quarter, the constituent's shares outstanding will be adjusted whenever and at the same time as a change in that company is made in the Wilshire 5000 Total Market Index. A constituent will be removed if the direct mortgage investments represent more than 25% of the company's assets for two consecutive quarters or if the company is reclassified as a mortgage or hybrid REIT. If a constituent drops its REIT status and become taxes as a C corporation, I will be removed from the Wilshire US REIT index.

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[42] Wilshire US REIT Index Fact Sheet. June 30, 2018.
[43] Wilshire US RESI and REIT Methodology

A constituent will be removed from the index if: (1) less than 50% of total revenue is generated from ownership and operation of real estate for two consecutive quarters, (2) the stock becomes illiquid or has more than 10 trading days during the previous quarter, (3) the stock is delisted by its primary market due to failure to meet financial or regulatory requirements, (3) total market capitalization falls below $100 million and remains at that level for two consecutive quarters, (4) if the constituent enters bankruptcy proceedings (however, the Wilshire Index Oversight Committee may decide to keep the company in the index following a review, and (5) the constituent is in extreme financial distress and the Wilshire Index Oversight Committee has determined to remove the company from the index if removal is necessary to protect the integrity of the index and interests of investors in products linked to the index.

EXHIBIT 36: WILSHIRE U.S. REIT INDEX COMPOSITION BY PROPERTY TYPE
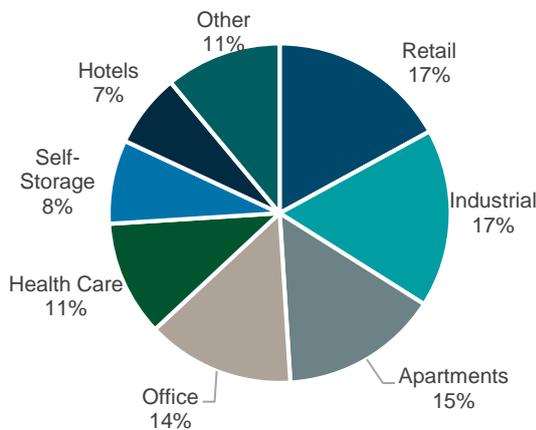
Source: Wilshire Associates Incorporated, as of June 30, 2018, latest available publicly.

Issues and Limitations:

- The index series captures most publicly traded real estate REITs. All the indices are weighted by free-float market cap, which means larger constituents will be a bigger driver of performance of the index. As of December 31, 2018, Simon Property Group (SPG) is the largest constituent at 7.8%, followed by Prologis (PLD) at 5.5% and Public Storage (PSA) at 4.7%. The top three constituents alone make up 18.0% of the index.
- The index does not have a meaningful specialty REIT exposure (specialty refers to the towers, timber, prisons, and casinos sectors) which has experienced significant growth over the last decade. WILREIT only got its first and only stock in the specialty category in March 2018.

5.17 Bloomberg Barclays Investment Grade REITs Total Return Index

EXHIBIT 37: BLOOMBERG BARCLAYS INVESTMENT GRADE REITS INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std. Dev.*	Sharpe Ratio*
5Y	10Y	20Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld		
3.5%	7.6%	6.5%	23.5%	51.1%	0.9%	-6.4%	3.1%	10.0%	0.52

Source: Bloomberg, Oxford Economics, and DWS. As of December 31, 2018 using latest quarterly data. For the latest available month-end returns, please refer to the Appendix..
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The Bloomberg Barclays Investment Grade REITs Total Return Index started in September 1997 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 20 years.

Description: The Bloomberg Barclays Investment Grade REIT Total Return Index (BIGRTRUU) tracks the total return of investment-grade, US dollar-denominated, fixed-rate taxable bonds issued by U.S.-based REITs. [44] The index includes the corporate debt of U.S. REITs that are rated investment grade. The BIGRTRUU index is a part of the Bloomberg Barclays U.S. Aggregate Index, which is a more comprehensive index that also includes Treasuries, government-related and corporate securities, fixed-rate agency MBS, AMB and CMBS.[44]
Start date and release: Data history goes back to September 1997.[45] Index constituents are publicly traded, therefore, pricing updates every day.
Access: Full index history is available on the Bloomberg terminal with the ticker BIGRTRUU Index. Methodology is according to the Bloomberg Barclays U.S. Aggregate Index, which can be obtained here: https://data.bloomberglp.com/indices/sites/2/2016/08/2017-02-08-Factsheet-US-Aggregate.pdf
Return types: Total return
Weighting: Market value of outstanding securities
Usage: Benchmarking
Inclusion criteria: Corporate bonds issued by U.S. REITs with at least $300 million par value outstanding. [44] Principal and interest must be denominated in USD, and securities must be rated investment grade (Baa3/BBB-/BBB-) or higher. [44] The middle rating of Moody's, S&P and Fitch will be used. [44] When a rating from only two agencies is available, the lower is used. [44] Only fixed-rate securities are included, and for callable fixed-to-floating rate bonds are eligible during their fixed-rate term only[44]. Bonds with a step-up coupon that changes according to a predetermined schedule are eligible[44]. Bonds must have at least one year until final maturity to be included. [44] Senior and subordinated issues and fully taxable issues are eligible. [44] Bonds with equity type features such as warrants, convertibles and preferreds are excluded. [44] Private placement bonds are also excluded. [44]
Available indices: No sub-indices available. Hedged returns are also available in other currencies such as EUR and JPY.
Methodology: The index is rebalanced at the end of every month. During the month, indicative changes to securities (credit rating changes, sector reclassification, amount outstanding changes, corporate actions, and ticker changes) are reflected daily in a "Projected Universe" and integrated into the index at the end of the month. [44] Cash flow from interest and principal payments contribute to monthly index returns but are not reinvested at a short-term reinvestment rate between rebalance dates. [44] At each rebalancing, cash is reinvested into the index for the following month so that the index results over two or more months reflect monthly compounding. [44] Qualifying new issues that have not settled on or before month-end rebalancing dates qualify for inclusion in the following month's index if the required security reference information and pricing are readily available. [44]
Most of the bonds are priced on a daily basis by Bloomberg's pricing service, BVAL. [44] Prices are taken as of 3pm NY time for all bonds, and on days the bond market closes early, pricing is taken as of 1pm. Bonds are priced on the bid side. [44] The index pricing team analyses the daily price moves for each security to identify outliers. [44] Bloomberg allows index users to challenge price levels, which are then reviewed and updated as needed using input from various sources. [44] The index follows the US bond market holiday schedule. [44]

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[44] Bloomberg Barclays US Aggregate Index Factsheet, February 8, 2019
[45] Bloomberg

EXHIBIT 38: BLOOMBERG BARCLAYS INVESTMENT GRADE REITS INDEX COMPOSITION BY SECTOR AND TOP 10 ISSUERS

Composition by Sector of Issuer

Other 21%	Retail 20%
Triple Net 10%	Office 13%
Apartments 14%	Healthcare 22%
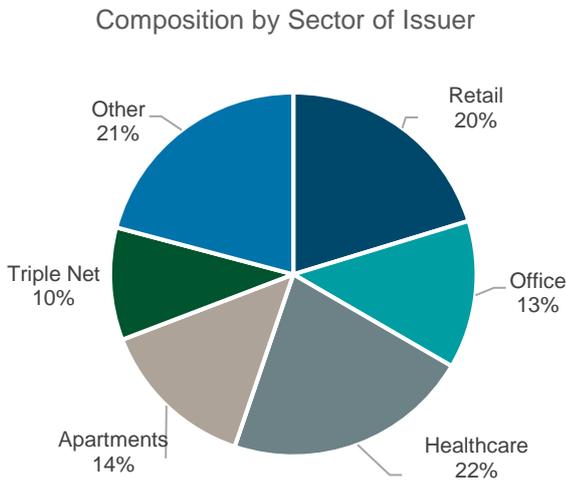
Top 10 Issuers	Index Weight
Simon Property Group	9.9%
Boston Property Group	5.8%
Welltower, Inc.	5.2%
Ventas	5.1%
Equity Residential	4.2%
HCP	4.1%
Realty Income	3.8%
AvalonBay	3.7%
Digital Realty	3.2%
Kimco	3.2%
Total for top 10 issuers	**48.1%**

Source: Bloomberg. As of December 2018.

Issues and Limitations:

- The index captures the returns of investment grade corporate bonds of U.S. REITs which are usually unsecured, with a minimum issue outstanding of USD 300 million. Therefore, the index is represented mostly by large cap REIT issuers. As of December 31, 2018, Simon Property Group (SPG) make up close to 10% of the index, followed by Boston Property Group (BXP) at 5.8% and Welltower (WELL) at 5.2%. The top ten issuers make up close to 50% of the index.

5.18 Bloomberg Barclays CMBS Investment Grade Total Return Index

EXHIBIT 39: BLOOMBERG BARCLAYS CMBS INVESTMENT GRADE INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	20Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
2.4%	5.8%	5.3%	26.0%	53.9%	20.7%	4.9%	6.5%	9.1%	0.43

Source: Bloomberg, Oxford Economics, and DWS. As of December 31, 2018 using latest quarterly data. For the latest available month-end returns, please refer to the Appendix..
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The Bloomberg Barclays CMBS Investment Grade Total Return Index started in Q1 1997 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 20 years.

Description[46]: The Bloomberg Barclays CMBS Investment Grade Total Return Index (LC09TRUU) tracks the total return of investment-grade, US dollar-denominated, fixed-rate commercial mortgage-backed securities (CMBS).[46] The LC09TRUU index is a part of the Bloomberg Barclays U.S. Aggregate Index, which is a more comprehensive index that also includes Treasuries, government-related and corporate securities, fixed-rate agency MBS, ABS and CMBS. [46] For CMBS securities, a minimum deal size of $500 million is required, with at least $300 million outstanding remaining in the deal. [46] The minimum tranche size is $25 million. [46] As of February 2019, the index included 3,341 securities with total market value of $453.5 billion. [46] Multifamily housing makes up 41% of the index given the prevalence of Agency CMBS issued by Freddie Mac and Fannie Mae. [46] Other related indices that may be helpful are the CMBS BBB Investment Grade Index (LC31TRUU Index), Non-Agency CMBS (BNA1TRUU Index), and US Agency CMBS (BAGETRUU Index). [46]

Start date and release: Data history goes back to Q1 1997.[47] Index constituents are publicly traded, therefore, pricing updates every day.

Access: Full index history is available on the Bloomberg terminal, which requires a subscription, with the ticker LC09TRUU Index. Methodology is according to the Bloomberg Barclays U.S. Aggregate Index, which can be obtained here: https://data.bloomberglp.com/indices/sites/2/2016/08/2017-02-08-Factsheet-US-Aggregate.pdf

Return types: Total return
Weighting: Market value of outstanding securities
Usage: Benchmarking
Inclusion criteria: Commercial mortgage-backed securities (CMBS) issued in the U.S. with minimum deal size of $500 million, and with at least $300 million amount outstanding. [46] The minimum tranche size is $25 million. Principal and interest must be denominated in USD, and securities must be rated investment grade (Baa3/BBB-/BBB-) or higher. [46] The middle rating of Moody's, S&P and Fitch will be used. When a rating from only two agencies is available, the lower is used. [46] Securities must have remaining average life of at least one year. [46] Only fixed-rate securities are included. Senior and subordinated issues and fully taxable issues are eligible. [46] Private placement securities are also excluded. CMBS A1A tranches and Non-ERISA eligible CMBS are excluded as of January 1, 2011. [46]

Available indices: Bloomberg produces many other related indices and subindices. Above, we highlighted three related indices: CMBS BBB Investment Grade Index (LC31TRUU Index), Non-Agency CMBS (BNA1TRUU Index), and US Agency CMBS (BAGETRUU Index). Other indices available include by rating (AAA and non-investment grade high yield), ERISA eligible, and non-Agency CMBS. A full list is available on the Bloomberg terminal which requires a subscription.

Methodology: The index methodology is similar to the Bloomberg Barclays Investment Grade REITs Index. The index is rebalanced at the end of every month. [46] During the month, indicative changes to securities (credit rating changes, sector reclassification, amount outstanding changes, corporate actions, and ticker changes) are reflected daily in a "Projected Universe" and integrated into the index at the end of the month. [46] Cash flow from interest and principal payments contribute to monthly index returns but are not reinvested at a short-term reinvestment rate between rebalance dates. [46] At each rebalancing, cash is reinvested into the index for the following month so that the index results over two or more months reflect monthly compounding[46]. Qualifying new issues that have not settled on or before month-end rebalancing dates qualify for inclusion in the following month's index if the required security reference information and pricing are readily available. [46]

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[46] Bloomberg Barclays US Aggregate Index Factsheet, February 8, 2019
[47] Bloomberg

Most of the bonds are priced on a daily basis by Bloomberg's pricing service, BVAL. [46] Prices are taken as of 3pm NY time for all bonds, and on days the bond market closes early, pricing is taken as of 1pm. [46] Bonds are priced on the bid side. [46] The index pricing team analyses the daily price moves for each security to identify outliers. [46] Bloomberg allows index users to challenge price levels, which are then reviewed and updated as needed using input from various sources. [46] The index follows the US bond market holiday schedule. [46]

EXHIBIT 40: BLOOMBERG BARCLAYS CMBS INVESTMENT GRADE INDEX BY SECTOR AND TYPE

Composition by Property Sector

Industrial 0.14%
Hospitality 0.39%
Retail Unanchored 0.38%
Mixed Use 1.09%
Retail Anchored 25.27%
Multi Family Housing 40.40%
Office 32.33%

Composition by Type

CMBS Subordinated 18%
Agency CMBS 35%
CMBS Other 47%
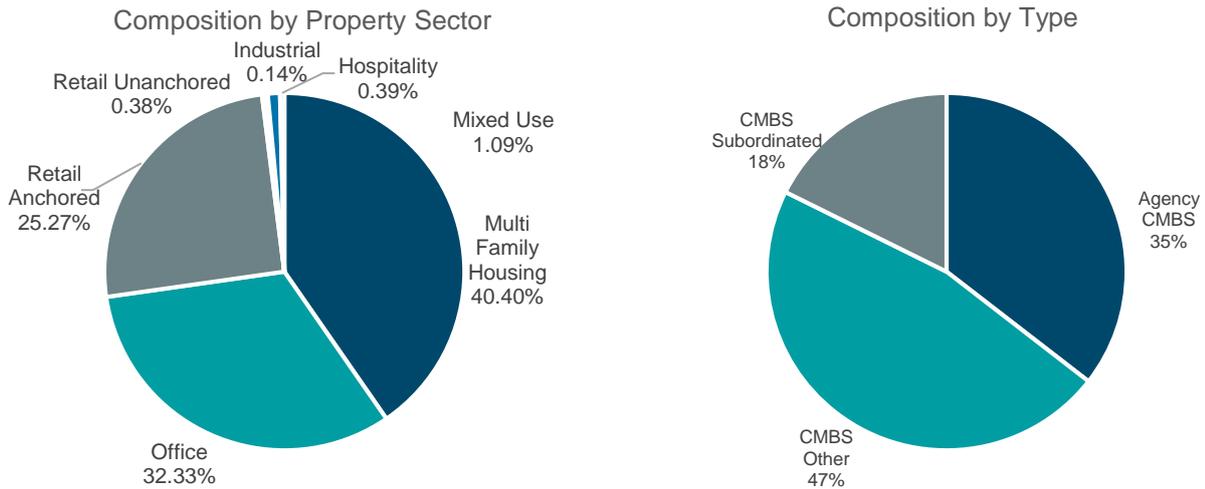
Source: Bloomberg. As of February 2019.

Issues and Limitations:

- The Bloomberg Barclays CMBS investment grade index is heavily weighted towards multifamily housing at 41%, and Agency CMBS makes up 35% of the index. Multifamily CMBS originated by an Agency (Freddie Mac/Fannie Mae) tend to be lower priced, which weighs down the weighted average yield and total return of the index. Specifically, the yield on multifamily housing CMBS securities are 3.2% on average, compared to office at 3.8% and retail at 3.9%.[48]

5.19 Giliberto-Levy Commercial Mortgage Performance Index (G-L 1)

EXHIBIT 41: GILIBERTO-LEVY COMMERCIAL MORTGAGE PERFORMANCE INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std. Dev.*	Sharpe Ratio*
5Y	10Y	20Y*	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld		
4.1%	5.3%	6.0%	-13.2%	73.4%	10.1%	13.7%	17.2%	4.5%	0.93

Source: Bloomberg, Giliberto-Levy, Oxford Economics and DWS. As of December 31, 2018, latest data available.
Note: Equities refer to the S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; GDP and CPI refers to the U.S. GDP growth and CPI from Oxford Economics; and the 10-year government bond yield refers to the U.S. 10-Year government bond yield.
*The Giliberto-Levy Commercial Mortgage Performance Index started in Q1 1972 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 20 years.

Description: The Giliberto-Levy Commercial Mortgage Performance Index (GL-1) tracks investment results produced by private market debt investments in commercial real estate within the U.S. The GL-1 tracks fixed-rate, fixed-term senior loans that are made by and held in the investment portfolios of institutional lenders. These loans would be on the balance sheet of institutional lenders. Life insurance companies, pension funds and GSEs currently contribute most of the data. The underlying collateral is commercial real estate across all major property types, including lodging and mixed-use properties. The G-L 1 is frozen, which means historical values do not change. As of Q4 2018, the index comprised of $232.4 billion of loans with an average duration of 5.56 years, coupon rate of 4.35% and LTV of 48.1%.[49]

Start date and release: Data starts in Q1 1973 and the index was launched in 1993.[49] The index is released approximately 30 days after quarter-end, although delays from data providers can affect delivery date.

Access: The index is available to subscribers

Return types: Total return, Income return, and Capital growth

Weighting: Market value

Usage: Benchmarking, unofficial performance comparison, performance attribute, research and strategy

Inclusion criteria: Only fixed-rate, fixed-term loans that are originated to be held on a lender's balance sheet is included.[50] In addition, the collateral must be a property in the U.S., is a senior whole loan and not subordinated debt.[50] Pari passu participations are, however, eligible. The loan must be "permanent" on an existing structure, and not a construction or bridge loan, and not a credit line. [50]

Available indices: All sectors, office, multi-family, retail, industrial, other sectors, and aggregate (includes the main four property types, office, multi-family, retail and industrial).[49]

Methodology: The GL-1 initially used information published by the American Council of Life Insurance (ACLI) as its primary source for loan origination information, and combined this with monthly pricing information captured in the Barron's/John B. Levy & Co. National Mortgage Survey. [50] Starting in 2003, the data was sourced from proprietary data collected by John B. Levy & Co. through a survey. The loan survey would provide granular loan information, including size, coupon, property type, and loan-to-value ratio (LTV) and debt service coverage (DSC). [50]

The GL-1 has a proprietary pricing matrix that is recalculated every month using the latest loan survey data, which allows every loan in the index to be marked to market using current pricing information. [50] The pricing matrix is based on the pricing of a ten-year term on a major property sector (office, industrial, retail and multifamily) with a loan-to-value of 60-65%.[50] The price is calculated as a spread to the U.S. 10-year Treasury. The pricing matrix is then filled by measuring spread variation produced by differences such as property sector, LTV or DSC, loan size, amortization, and loan on a single asset or a group of assets. [50]

Each loan is marked to market at month end to calculate its return. [50] Credit losses are estimated using a proprietary model derived from several data sources, including CMBS. [50] Note that credit loss information is not obtained through survey data. [50]

New loans are added with a one-month lag. [50] The monthly returns are chain-linked to produce quarterly and annual returns. [50] As a result, the index is a standard time-weighted return series and is directly comparable to the S&P 500, the Bloomberg Barclays Fixed Income indices and the MSCI property indices. As of Q4 2018, the index comprised of $232.4 billion of loans with an average duration of 5.56 years, coupon rate of 4.35% and LTV of 48.1%. The portfolio consists of 15,247 loans; 96.2% of the portfolio is investment-grade and 3.8% is in

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[49] Giliberto-Levy Monitor. 4Q 2018 Results and Analysis.
[50] GIliberto-Levy Index Commercial Mortgage Performance Index White Paper, 2017

the crossover category (marked-to-market LTVs between 70% and 85%).[49]

EXHIBIT 42: GILIBERTO-LEVY COMMERCIAL MORTGAGE PERFORMANCE INDEX BY PROPERTY TYPE AND LOAN YIELD BY SECTOR
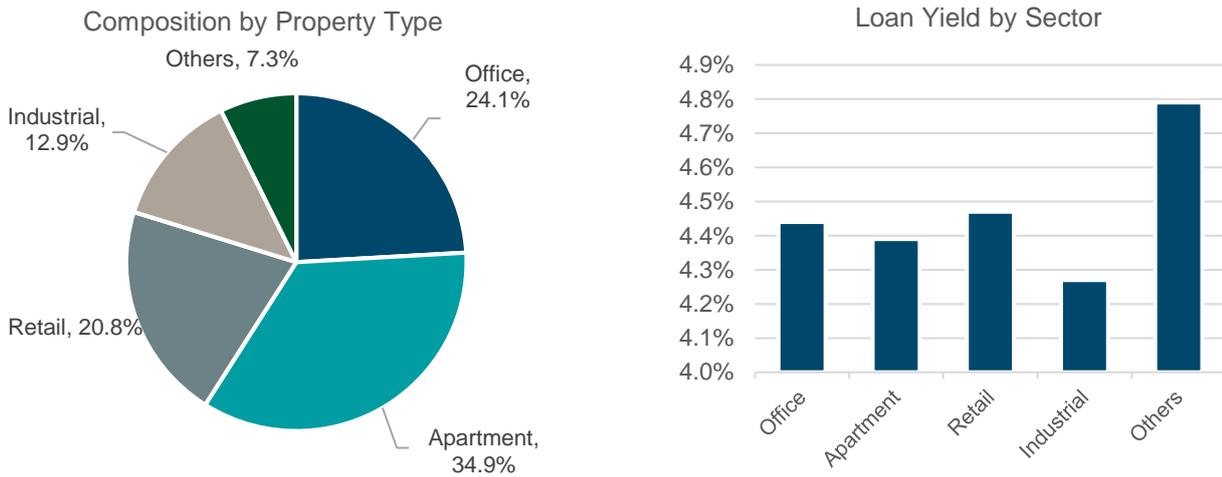
Composition by Property Type

Others, 7.3%
Office, 24.1%
Industrial, 12.9%
Retail, 20.8%
Apartment, 34.9%

Loan Yield by Sector

Source: Giliberto-Levy. As of December 2018.

Issues and Limitations:
- The index is owned and produced by the John B. Levy & Company, a real estate investment bank, and Michael Giliberto. John B. Levy & Company is a real estate investment bank which is not a completely impartial and independent entity.

5.20 Giliberto-Levy High Yield CRE Debt Index (G-L 2)

EXHIBIT 43: GILIBERTO-LEVY HIGH YIELD CRE DEBT INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std. Dev.*	Sharpe Ratio*
5Y	8Y	8Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld		
9.9%	8.9%	8.9%	12.9%	-43.0%	48.6%	-26.1%	9.8%	2.0%	4.19

Source: Bloomberg, Giliberto-Levy, Oxford Economics and DWS. As of December 31, 2018, latest data available.
Note: Equities refer to the S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; GDP and CPI refers to the U.S. GDP growth and CPI from Oxford Economics; and the 10-year government bond yield refers to the U.S. 10-Year government bond yield.
*The Giliberto-Levy High Yield CRE Debt Index started in 2010 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 8 years.

Description: The Giliberto-Levy High Yield CRE Debt Index (G-L 2) measures the total return and components of high yield commercial real estate debt within the U.S.[51] The methodology is consistent with G-L 1. G-L 2 includes a wide range of high yield commercial real estate debt, including mezzanine, subordinated tranche and senior whole loan, second mortgages and preferred equity.[51] Participants of the index includes investment managers (of third-party capital) and balance-sheet lenders. [51] Total return for the index comprises income return and capital value return. Capital value return reflects fundings, principal receipts (including dispositions) and change in investment value (excluding accrued interest and interest paid, which is included in the income return). Starting in Q4 2018, G-L 2 returns include the full effect of leverage for leveraged whole loans which comprise 65% of the index value. Data history is also revised to reflect the full effects of leverage. The other loan categories (mezzanine and other subordinated loans) do not use third party leverage. Therefore the index is a mixture between leveraged and unlevered returns.[52] There is no restriction on property type.[52] The G-L 2 is not frozen, which means historical data can be revised as more participants are added to the index. The G-L 2 mostly consists of floating rate debt, at 78.9% as of Q4 2018. As of December 31, 2018, the G-L 2 comprised of 125 loans valued at $4.0 billion, and equity value of $2.9 billion (overall leverage of 29.3%).[53]

Start date and release: Data starts in 2010. The index is released approximately 60 days after quarter-end, although delays from data providers can affect delivery date.

Access: The index is available to subscribers. Detailed G-L 2 data is only available to data contributors.

Return types: Total return, Income return, and Capital growth

Weighting: Market value

Usage: Benchmarking, unofficial performance comparison, performance attribute, research and strategy

Inclusion criteria: High yield commercial real estate debt such as such as second mortgages, mezzanine loans and preferred equity.[51] Debt included in G-L 1 is not eligible to also be included in G-L 2. There is no strict inclusion or exclusion criteria although this can change in the future.[52]

Available indices: All loans, subordinate, mezzanine, floating rate, and fixed rate[53]

Methodology: The methodology of G-L 2 is similar to G-L 1. A key difference is that G-L 2 is set up to handle unique situations such as advance rates on investments.[52] In addition, the returns reported by index participants are a mix of unlevered and levered. [52] Giliberto-Levy includes the leveraged returns for leveraged whole loans, and other loans do not utilize third-party leverage. Returns are meant to reflect what investors would experience before considering fund management expenses.

Index data contributors submit data using proprietary templates. [52] G-L reviews and validates data in consultation with contributors as part of index production. [52]

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[51] Giliberto-Levy High Yield Real Estate Debt Presentation, 2018
[52] Giliberto-Levy
[53] GIliberto-Levy High Yield CRE Debt Index Performance Report. As of December 31, 2018.

EXHIBIT 44: GILIBERTO-LEVY HIGH YIELD CRE DEBT INDEX BY TYPE AND COLLATERAL

Composition by Type

Second mortgages and pref. equity 9%
Mezzanine Loans 24%
B notes, other and unknown 2%
Leveraged Whole Loans 65%

Composition by Collateral

Unknown 9%
Stabilized Asset 13%
Value-Add 78%
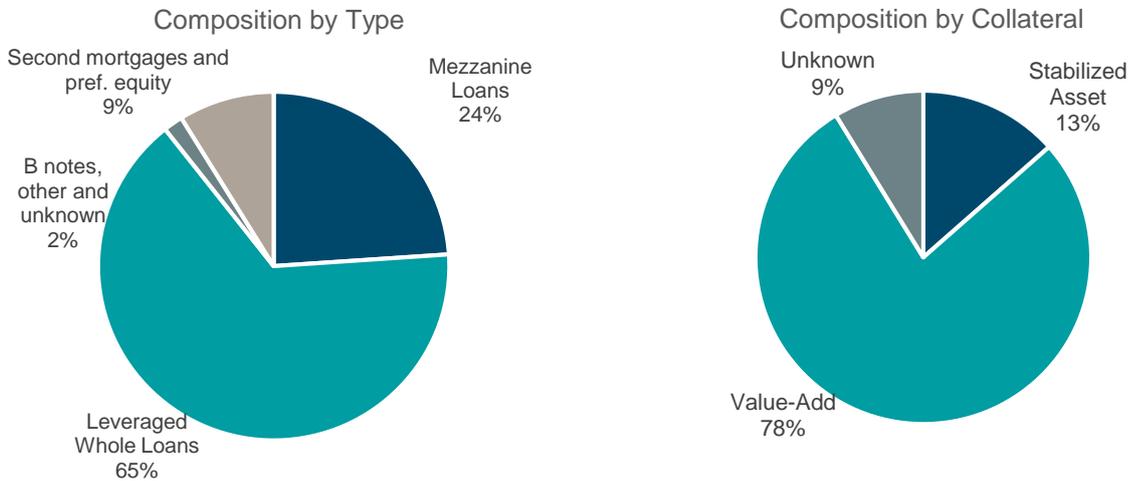
Source: Giliberto-Levy. As of December 2018, latest data available.

Issues and Limitations:

- The index is owned and produced by the John B. Levy & Company, a real estate investment bank, and Michael Giliberto. John B. Levy & Company is a real estate investment bank which is not a completely impartial and independent entity.
- Returns reported by index participants includes the effects of leverage for leverage whole loans and unlevered for other loans, making comparison to other asset classes difficult. Returns are meant to reflect what the investor experiences before accounting for fund management fees.
- The index is still going through many changes, with the latest being for Q4 2018 reporting which was released on March 25, 2019. Going forward, index users should expect further revisions as needed.

5.21 MSCI Global Quarterly Private Infrastructure Index

EXHIBIT 45: MSCI GLOBAL QUARTERLY PRIVATE INFRASTRUCTURE INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	10Y	Equities	Fix Inc.	GDP	CPI	10Y Gov. Bnd Yld	Dev.*	Ratio*
14.9%	13.1%	13.1%	-4.8%	-38.6%	63.4%	32.4%	-69.3%	3.7%	3.43

Source: Bloomberg, MSCI, Oxford Economics, and DWS. As of September 30, 2018, latest data available.
Note: Equities refer to the MSCI All Country World Index; Fixed Income refer to the Bloomberg Barclays Global Aggregate Index; GDP and CPI refers to a weighted average GDP growth of the U.S., Eurozone and Asia Pacific from Oxford Economics; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The MSCI Global Infrastructure Asset Index started in 1Q 2008 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 10 years.

Description: The MSCI Global Quarterly Private Infrastructure Index measures the equity performance of infrastructure assets globally.[56] Currency movements are excluded from return metrics. The index is currently unfrozen, which means historic data may be revised as new funds are added[56]. The returns data includes leverage at the asset level, which differs from most real estate asset level indices which are unlevered. [56] MSCI categorizes this index as a consultative index[54], which means MSCI is still building the index for representativeness and users should use the results with caution. MSCI is still expanding the index coverage and plans to include new participants, especially in North America, to mitigate the large Australia exposure.[55] Valuations are appraisal-based instead of transaction-based. As of Q3 2018, 11 managers contributed to the index, and the index consisted of 96 investments with enterprise value of USD 67.0 billion and equity value of USD 35.4 billion.[56] Leverage was at 47.1%. MSCI also has a fund-level index in Australia, but not currently at the global level.
Start date and release: Historical data starts in Q1 2008, and the index was launched in 2014. The index is released approximately 90 days after quarter-end for the first through third quarters, and approximately four and a half months after year-end for the fourth quarter.[57]
Access: Full history is available to index participants and MSCI subscribers. The quarterly summary, which contains the headline numbers are available on MSCI's website for subscribers
Return types: Total return, Distributed income, and Capital return
Weighting: The index is weighted by invested capital.
Usage: Benchmarking (with license agreement) and attribution analysis, and risk assessment.
Inclusion criteria: Managers can contribute to the index if the manager has direct ownership or management of individual investments (the asset itself).[54] The manager's vehicle must be an unlisted fund, mandate, separate account, or listed vehicle. [54] Fund-of-fund investment vehicles are not allowed. [54] The assets must have a valuation, either external or internal. [54]
Available indices: headline index; power (generation, transmission and renewable), transport (incl. airports); uncontracted, contracted; low risk, moderate risk, high risk[56]
Methodology: Consistent with other MSCI indices, the index uses a monthly time-weighted calculation methodology. As mentioned above, the index is appraisal-based and not transaction-based. Data is sourced from index participants, and as of Q3 2018, there were 11 contributing managers.[56]

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[54] IPD Global Infrastructure Asset Index results webinar, November 19, 2014
[55] MSCI
[56] MSCI Global Quarterly Private Infrastructure Index Digest. As of September 2018.
[57] MSCI Indexes release schedule 2019

EXHIBIT 46: MSCI GLOBAL QUARTERLY PRIVATE INFRASTRUCTURE INDEX BY SECTOR AND GEOGRAPHY
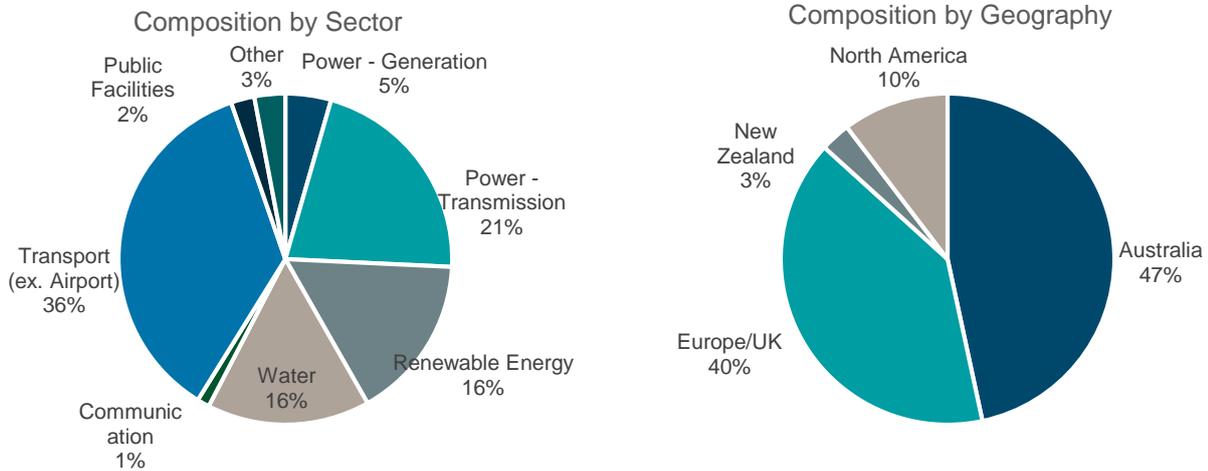
Composition by Sector

Composition by Geography

Source: MSCI. As of September 2018, latest data available.

Issues and Limitations:
- The index is appraisal-based on a set of very diverse assets which inherently have limited comparable assets (regulated vs. unregulated, contracted vs. uncontracted, geographically). Appraisal values may be lagged.
- Returns are leveraged at a level above what is typically seen for core real estate, averaging at 48.2% from 2014 onwards. Therefore, returns are not directly comparable against unleveraged asset level real estate fund indices. In addition, as returns are not net of fees and other costs, they are also not completely comparable against the real estate fund indices.
- Data collection is still an issue, which is why MSCI categorizes this index as a consultative index. There is a heavy tilt towards Australia at 47% as of September 30, 2018, which is likely not representative of the global market. As mentioned above, MSCI aims to increase participation, especially from North America.

5.22 Dow Jones Brookfield Global Infrastructure Index

EXHIBIT 47: DOW JONES BROOKFIELD GLOBAL INFRASTRUCTURE INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	16Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
5.6%	8.7%	8.6%	87.4%	38.4%	62.9%	14.0%	34.8%	17.5%	0.67

Source: Bloomberg, S&P Dow Jones Indices, Oxford Economics, and DWS. As of December 31, 2018 using latest quarterly data. For the latest available month-end returns, please refer to the Appendix..
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury. The Dow Jomes Brookfield Global Infrastructure Index started in December 2002 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 16 years.

Description: The Dow Jones Brookfield Global Infrastructure Indices (DJBGI) are modified market capitalization weighted indices that are comprised of publicly traded pure-play infrastructure companies.[58] There are two main Dow Jones Brookfield Infrastructure indices: (1) The Dow Jones Brookfield Global Infrastructure Composite Index comprises pure-play infrastructure companies and includes Master Limited Partnerships (MLPs), whereas (2) The Dow Jones Brookfield Global Infrastructure Index comprises pure-play infrastructure companies and excludes MLPs. For both indices, constituents must derive at least 70% of cash flows from infrastructure lines of business, which includes airports, toll roads, ports, communication, electricity transmission and distribution, oil & gas storage and transportation, water and diversified sectors.[59] These indices is produced jointly by S&P Dow Jones Indices and Brookfield Asset Management.[59] The index is available in USD, AUD, CAD, and EUR.[59] Returns are available in gross and net total return (net of withholding taxes).[59] As of December 31, 2018, the Dow Jones Brookfield Global Infrastructure Index had a total market cap of US1.1 trillion.[60]
Start date and release: History is available from December 2002. As all constituents are publicly traded, pricing adjusts in real time.
Access: Full index history and methodology is available on the S&P Dow Jones indices website: https://us.spindices.com/indices/equity/dow-jones-brookfield-global-infrastructure-local-currency-index-usd. The index history is also available on Bloomberg and other financial data sources.
Return types: Total return, price-only return (excludes dividends)
Weighting: Modified market capitalization weighted
Usage: Benchmarking
Inclusion criteria: For the Dow Jones Brookfield Global Infrastructure Index, the securities must have a minimum float-adjusted market capitalization of USD $500 million, and current constituents must fail the minimum market capitalization requirement two rebalances in a row to be ineligible.[59] The securities must also have a minimum three-month average daily value traded (ADVT) of USD $1 million.[59] Current constituents must fail the ADVT minimum requirement two rebalances in a row to be ineligible.[59] The constituent must also have a developed market listing, and 70% of developed market cash flow must be derived from pure-play infrastructure assets.[59] Current index constituents that meet other eligibility requirements will remain in the index if at least 60% of cash flows is derived from infrastructure assets.[59]
Available indices: The following are available subindices for the Dow Jones Brookfield Global Infrastructure Indices:

EXHIBIT 48: DOW JONES BROOKFIELD GLOBAL INFRASTRUCTURE INDEX SUBINDICES

DJ Brookfield Global Infrastructure Composite Index	DJ Brookfield Infrastructure Index
Regions:	*Regions:*
Americas	Americas
Asia Pacific	Asia Pacific
Europe	Europe
Global ex-U.S.	

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[58] S&P Dow Jones Indices (https://us.spindices.com/indices/equity/dow-jones-brookfield-global-infrastructure-local-currency-index-usd)
[59] Dow Jones Brookfield Infrastructure Indices Methodology, September 2018.
[60] Bloomberg

| DJ Brookfield Global Infrastructure Composite Index	DJ Brookfield Infrastructure Index
Sectors: MLP	*Sectors:* Airports Communication Diversified Electricity Transmission & Distribution Oil and Gas Storage & Transportation Ports Toll Roads Water

Source: S&P Dow Jones Indices

Other available indices are:
- Dow Jones Brookfield Global Infrastructure Equal Weight Index: Equal-weighted version of the Dow Jones Brookfield Infrastructure Index
- Dow Jones Brookfield Emerging Markets Index: Includes companies in emerging markets that are owners and operators of pure-play infrastructure assets. Includes MLPs.
- Dow Jones Brookfield Global Infrastructure Composite Yield Index: Highest yielding companies of the Dow Jones Brookfield Global Infrastructure Composite Index
- Dow Jones Brookfield Infrastructure Yield ex-MLP Index: This index represents the highest yielding companies of the Dow Jones Brookfield Global Infrastructure Composite Index, and excludes MLPs.
- Dow Jones Brookfield Global Infrastructure North American Listed Index: the index measures the performance of companies that display strong pure-play infrastructure characteristics. Only companies in Canada and the U.S. qualify.

Methodology: The indices are rebalanced semi-annually, on the third Friday in June and December. [59] The changes are effective prior to the market open on the Monday following that Friday of rebalancing. [59] The indices are reweighted on a quarterly basis on the third Friday in March, June, September, and December. [59] A new stock must have three months of trading history before being considered for inclusion. [59]

EXHIBIT 49: DOW JONES BROOKFIELD GLOBAL INFRASTRUCTURE INDEX BY COUNTRY AND TOP 10 CONSTITUENTS

Composition by Country

Other 4%
Japan 2%
Hong Kong 3%
Italy 4%
China 4%
Spain 5%
Australia 4%
United Kingd…
France 6%
Canada 15%
United States 47%
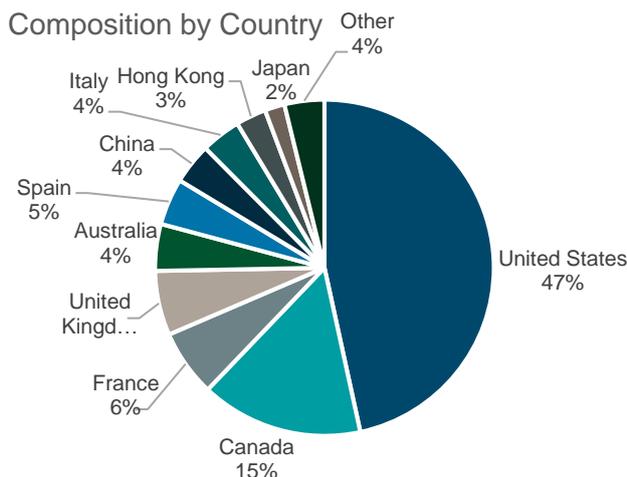
Source: S&P Dow Jones Indices, LLC. As of December 31, 2018.

Issues and Limitations:
- The Dow Jones Brookfield Global Infrastructure indices are weighted by free-float market cap, which means larger constituents will be a bigger driver of performance of the index. The top 10 constituents make up 43.1% of the index weight as of January 31, 2019.

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5.23 Markit iBoxx Infrastructure Investment Grade Bond Indices

EXHIBIT 50: MARKIT IBOXX IG USD INFRASTRUCTURE BOND INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	12Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
3.9%	6.3%	3.5%	8.6%	65.0%	-31.1%	-18.1%	4.8%	6.1%	0.84

Source: Bloomberg, IHS Markit, Oxford Economics, and DWS. As of December 31, 2018 using latest quarterly data. For the latest available month-end returns, please refer to the Appendix.
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The Markit iBoxx USD Infrastructure Bond Index started in Q4 2005 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 12 years.

EXHIBIT 51: MARKIT IBOXX IG EUR INFRASTRUCTURE BOND INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	12Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
3.4%	5.5%	2.8%	30.7%	90.0%	-56.8%	-36.4%	3.1%	4.7%	0.93

Source: Bloomberg, IHS Markit, Oxford Economics, and DWS. As of December 31, 2018 using latest quarterly data. For the latest available month-end returns, please refer to the Appendix..
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The Markit iBoxx EUR Infrastructure Bond Index started in Q1 2006 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 12 years.

EXHIBIT 52: MARKIT IBOXX IG GBP INFRASTRUCTURE BOND INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	12Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
6.2%	7.8%	3.8%	34.7%	80.4%	-14.6%	-21.6%	-25.6%	6.4%	0.83

Source: Bloomberg, IHS Markit, Oxford Economics, and DWS. As of December 31, 2018 using latest quarterly data. For the latest available month-end returns, please refer to the Appendix.
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The Markit iBoxx GBP Infrastructure Bond Index started in Q1 2006 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 12 years.

Description: The Markit iBoxx Infrastructure Investment Grade Bond indices track the total return performance of the investment grade USD, EUR and GBP markets. [61] The indices are a subset of the existing Markit iBoxx corporate indices and use a targeted infrastructure classification system based on sector criteria to determine bond eligibility. The iBoxx sector classification system is used to classify bonds as infrastructure, as in the table below. Generally, bonds in the sectors electricity, gas distribution, pipelines or water are considered to be infrastructure bonds. Bonds in the sectors integrated oil & gas, mobile telecommunications, multi-utilities, railroads, specialty REITs, transportation services, and waste and disposal services are reviewed for material infrastructure exposure and may be classified as infrastructure based on the profile of the issuer.**Error! Bookmark not defined.**

EXHIBIT 53: MARKIT IBOXX SECTOR CLASSIFICATION

iBoxx Sector Classification	Infrastructure Definition
Specialty REITs	The business behind the REIT owns and operates telecommunications towers and contracted fiber optic networks
Railroads	Railroad companies that own the land or rights of way, track and terminals over which they operate, plus motive power and most rolling stock. Also any project bond related to long-term concessions in Light Rail Transit.
Transportation Services	Firms that own or operate airports, public or private highways and toll roads, and/or ports.
Waste & Disposal Services	Providers of pollution control and environmental services for the management, recovery and disposal of solid and hazardous waste materials. These firms typically own waste facilities, such as landfills and recycling centers, and have long-term contracts in place or are natural monopolies.
Integrated Oil & Gas	Companies that transmit, store, and/or distribute oil and gas. For firms involved with oil and gas, significant E&P activity would disqualify the firm from infrastructure consideration.
Pipelines	Firms that operate pipelines for the transport of fuel, such as oil and gas.
Mobile Telecommunications	The business owns and operates telecommunications towers and contracted fiber optic networks (would exclude mobile carrier firms).

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[61] Markit iBoxx infrastructure bond indices – measuring an emerging asset class. February 2017

iBoxx Sector Classification	Infrastructure Definition
Electricity	Companies that generate and/or distribute electricity
Gas Distribution	Firms that operate distribution of gas to end users.
Multi-utilities	Firms with substantial ownership and operations in more than one infrastructure utility business.
Water	Firms that deliver water to end users or that treat water via water treatment plants.

Source: IHS Markit

Start date and release: Data history goes back to 2005.[62] Index constituents are publicly traded, therefore, pricing updates every day.

Access: Full index history is available on the Bloomberg terminal, which requires a subscription, with the tickers IBXXINFE (Markit iBoxx EUR Infrastructure Index), IBXXINFG (Markit iBoxx GBP Infrastructure Index), IBXXINFR (Markit iBoxx USD Infrastructure Index), and IBXXINFH (Markit iBoxx USD Liquid High Yield Infrastructure Index). Index history is also available on Reuters. Data is also available through the IHS Markit website, www.markit.com/indices for registered users and on the FTP server.

Index components can only be accessed through the IHS Markit website or the FTP server.

Return types: Total return and price-only returns.

Weighting: Market value of outstanding bonds. The amount outstanding of a bond is only adjusted within the monthly rebalancing process at the end of each month. However, bonds that are fully redeemed intra-month are taken into account immediately.

Usage: Benchmarking, performance attribution

Inclusion criteria: The bond indices includes EUR, GBP, and USD-denominated bonds and the issuer's domicile is not relevant. [63] The Markit iBoxx EUR Infrastructure Index includes EUR-denominated bonds, the Markit iBoxx GBP Infrastructure Index includes GBP-denominated bonds, and the Markit iBoxx USD Infrastructure Index includes USD-denominated bonds.

Only fixed-rate bonds whose cash flows can be determined in advance are eligible for the index.[63] Zero coupon bonds and bonds with step-ups are also eligible. [63] Event-driven bonds, such as rating- or tax-driven bonds, with a maximum of one coupon change per period. [63] Dated and undated callable subordinated corporate bonds, including fixed-to-floater bonds that change to a floating rate note at or after the first call date. [63] Undated bonds must be callable. [63] In all calculations, these bonds are assumed to be redeemed at first call date. [63] Soft bullet bonds, with an initial fixed-coupon period and a variable or step-up coupon period thereafter that are structured so that they are expected to be redeemed at the end of the initial period. [63]

Excluded bonds include perpetual, pay-in-kind (during the pay-in-kind period), zero step-ups, sinking funds and amortizing bonds, other callable and undated bonds, floating rate notes and other fixed-to-floater bonds, and optionally and mandatory convertible bonds. [63] In addition, subordinated bank or insurance debt with mandatory contingent conversion features or with any conversion options before the first call date is ineligible for the index. CDOs and bonds collateralized by CDOs are also ineligible. [63] Bonds with differences between accrual and coupon payment periods and monthly-paying bonds are also ineligible. [63] Retail bonds are also excluded. Partial private placements where information on the specific amounts publicly placed and privately placed can be ascertained are included in the indices with the amount publicly placed. If the amount publicly placed is below the cut-off, the bond is not included in the indices. [63]

All bonds must be investment grade, have at least one year to maturity at rebalancing. [63] Minimum amounts outstanding required are EUR 500 million for the Markit iBoxx EUR Infrastructure Index, GBP 250 million for the Markit iBoxx GBP Infrastructure Index, and USD 500 million for the Markit iBoxx USD Infrastructure Index. [63]

Available indices: Sub-indices are available by duration (1-3, 5-10, 7-10, 1-10, 5-7, 5-15, 10-15, 10+, and 15+), by sector (energy, transportation, utilities, and telecommunications), and by rating (AAA through BBB). A full list of indices are available on Markit's website: http://www.markit.com/Documentation/Product/IBoxx

Methodology: The indices are rebalanced monthly on the last business day of the month after close of business. [63] Changes to amounts outstanding are only taken into account if they are publicly known at least three trading days before the end of the month. [63]

Three preview lists of eligible bonds are published on the ten, four and three trading days before end of the month. The preview membership list is published on the FTP server and in the indices section on the Markit website: www.markit.com/indices.

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[62] Markit IHS
[63] Markit iBoxx EUR Infrastructure Index Guide, December 2017, Markit iBoxx GBP Infrastructure Index Guide, July 2016, and Markit iBoxx USD Infrastructure Index Guide, July 2016.

Two business days before the end of each month, the rating information for the constituents is updated and the list is adjusted for all rating changes which are known to have taken place two trading days before the end of the month are not included, but bonds which are known to have been downgraded to sub-investment grade two trading days before the end of the month do get excluded from the membership. [63]

On the last business day of each month, Markit will publish the final membership with closing prices for the bonds, and various bond analytics based on the index prices of the bonds. [63]

Markit also publishes an index calculation calendar which is available on the IHS Markit website, www.markit.com/indices

The index rules are reviewed once per year during the annual index review process to ensure that the index provides a balanced representation of the EUR, GBP and USD investment grade infrastructure market. [63]

EXHIBIT 54: MARKIT IBOXX INFRASTRUCTURE EUR INVESTMENT GRADE INDEX BY SECTOR AND TOP 10 ISSUERS
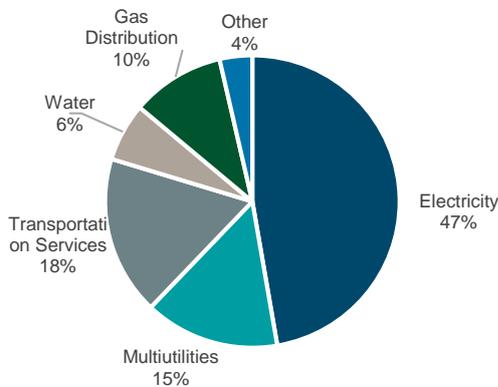
Top 10 Issuers	Weight
Electricite de France SA	9.4%
Engie	5.9%
Enel Finance International NV	3.6%
Autoroutes du Sud de la France SA	3.0%
Veolia Environnement SA	3.0%
Iberdrola International BV	2.9%
Suez	2.8%
innogy Finance BV	2.4%
RTE Reseau de Transport d'Electricite SA	2.4%
TenneT Holding BV	2.3%
Total for top 10 constituents	**37.6%**

Source: IHS Markit. As of February 2019.

EXHIBIT 55: MARKIT IBOXX INFRASTRUCTURE GBP INVESTMENT GRADE INDEX BY SECTOR AND TOP 10 ISSUERS
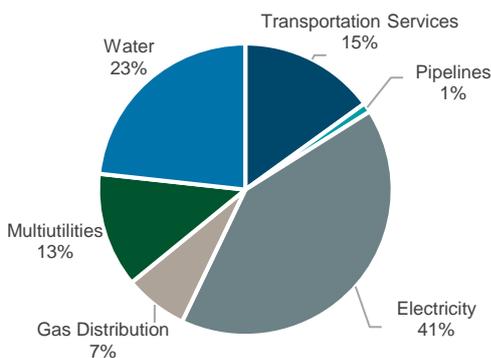
Top 10 Issuers	Weight
Electricite de France SA	12.0%
Heathrow Funding Ltd	7.4%
innogy Finance BV	5.1%
Thames Water Utilities Cayman Finance Ltd	4.5%
EON International Finance BV	3.7%
National Grid Gas Finance Plc	3.2%
Centrica Plc	3.2%
SSE Plc	3.0%
Gatwick Funding Ltd	3.0%
Enel Finance International NV	2.8%
Total for top 10 constituents	**48.0%**

Source: IHS Markit. As of February 2019.

EXHIBIT 56: MARKIT IBOXX INFRASTRUCTURE USD INVESTMENT GRADE INDEX BY SECTOR AND TOP 10 ISSUERS
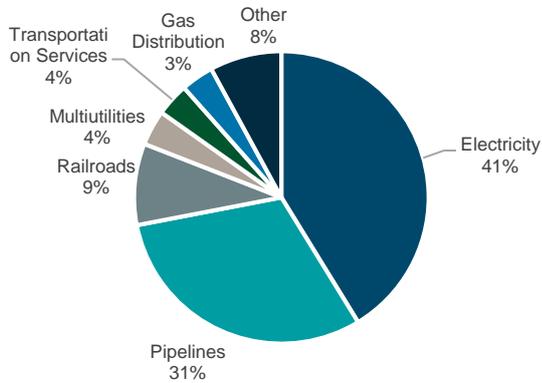
Top 10 Issuers	Weight
Enterprise Products Operating LLC	3.2%
Energy Transfer Partners LP	2.9%
Burlington Northern Santa Fe LLC	2.7%
Williams Cos Inc/The	2.4%
Electricite de France	2.3%
Enel Finance International NV	2.2%
MPLX LP	2.2%
Sabine Pass Liquefaction LLC	2.2%
Union Pacific Corp	2.1%
Kinder Morgan Energy Partners LP	2.1%
Total for top 10 constituents	**24.2%**

Source: IHS Markit. As of February 2019.

Issues and Limitations:

- The index is market-weighted and therefore issuers with larger amounts of eligible bonds outstanding will account for a larger share of the market. Electricite de France SA is has weights of 9.0% and 12.0% for the EUR and GBP indices, respectively. The electricity sector accounts for a large portion of all three indices, at 47% for the EUR index, 41% for the GBP index and 41% for the USD index.

5.24 Markit iBoxx USD Liquid High Yield Infrastructure Bond Index

EXHIBIT 57: MARKIT IBOXX USD LIQUID HIGH YIELD INFRASTRUCTURE BOND INDEX

Total Return			Long-term* Correlation					Std. Dev.*	Sharpe Ratio*
5Y	8Y	8Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld		
6.2%	6.7%	6.7%	55.1%	20.3%	-16.1%	24.9%	-15.6%	5.6%	1.19

Source: Bloomberg, IHS Markit, Oxford Economics, and DWS. As of December 31, 2018 using latest quarterly data. For the latest available month-end returns, please refer to the Appendix.
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The Markit iBoxx USD Liquid High Yield Infrastructure Bond Index started in Q4 2010 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 8 years.

Description: The Markit iBoxx USD Liquid High Yield Infrastructure Bond Index reflects the USD denominated high yield corporate bond universe with material infrastructure exposure. [64] The index is a subset of the Markit iBoxx USD Liquid High Yield index.[64] The sectors that are automatically eligible for inclusion are Electricity, Gas Distribution, Pipelines, and Water. [64] Corporate debt for companies in sectors that can have material infrastructure exposure are reviewed based on the profile of the issuer. [64] These sectors include Integrated Oil & Gas, Multi-utilities, Railroads, Specialty REITs, Transportation Services, Mobile Telecommunications, and Waste & Disposal Services. [64] Please refer to Exhibit 53 for more detailed information on these sectors. As of February 2019, the market value of the index was $63.2 billion, the average yield was 5.76% and close to 6 years on average to maturity.[65]

Start date and release: Data history goes back to Q4 2010.[65] Index constituents are publicly traded, therefore, pricing updates every day.

Access: Full index history is available on the Bloomberg terminal, which requires a subscription, with the ticker IBXXINFH. Index history is also available on Reuters. Data is also available through the IHS Markit website, www.markit.com/indices for registered users and on the FTP server. Index components can only be accessed through the IHS Markit website or the FTP server.

Return types: Total return and price-only returns.

Weighting: Market value of outstanding bonds. The amount outstanding of a bond is only adjusted within the monthly rebalancing process at the end of each month. However, bonds that are fully redeemed intra-month are taken into account immediately.**Error! Bookmark not defined.**

Usage: Benchmarking

Inclusion criteria: Bonds must be fixed-rate, denominated in USD and classified as corporate debt. [66] Government debt, quasi-sovereign debt and debt guaranteed or backed by governments is not eligible.[66] Bonds with step-ups with coupon schedules known at issuance (or as functions of the issuer's rating) and sinking funds are eligible. Medium term notes (MTNs), Rule 144A offerings, callable and putable bonds are also eligible. [66]

Excluded bonds include preferred shares, convertible bonds, bonds with other equity features attached (e.g. options/warrants), perpetual bonds, floating rate notes, pay-in-kind bonds (during the pay-in-kind period, zero coupon bonds, zero step-ups (GAINS) and Reg S offerings. [66]

The minimum time to maturity is 1.5 years for new bonds and 1 year for existing index constituents. [66] The maximum time to maturity at issuance should be 15 years or less. [66]

The minimum amount outstanding is $400 million, with a lockout period of three months and minimum run of six months. [66]

All bonds need to have an average rating of sub-investment grade. [66] Ratings from Fitch Ratings, Moody's Investor Service and Standard & Poor's Rating Services are considered. If there is more than one rating, the average rating is taken. [66]

Available indices: Sub-indices are available by duration (1-3, 3-5, 5-7, 7-10, and 10+), by sector (transportation, utilities, and telecommunications), and by rating (BB to C). A full list of indices are available on Markit's website: http://www.markit.com/Documentation/Product/IBoxx

Methodology: The index is rebalanced monthly on the last business day of the month after close of business. Changes to amounts outstanding are only taken into account if they are publicly known at least three trading days before the end of the month. [66]

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[64] Markit iBoxx USD High Yield Infrastructure Index, July 2016
[65] Markit IHS
[66] Markit iBoxx USD Infrastructure Index Guide, July 2016.

Three preview lists of eligible bonds are published on the ten, four and three trading days before end of the month. The preview membership list is published on the FTP server and in the indices section on the Markit website: www.markit.com/indices.

Two business days before the end of each month, the rating information for the constituents is updated and the list is adjusted for all rating changes which are known to have taken place two trading days before the end of the month are not included.

On the last business day of each month, Markit will publish the final membership with closing prices for the bonds, and various bond analytics based on the index prices of the bonds.

Markit also publishes an index calculation calendar which is available on the IHS Markit website, www.markit.com/indices

The index rules are reviewed once per year during the annual index review process to ensure that the index provides a balanced representation of the USD high yield infrastructure debt market.

EXHIBIT 58: MARKIT IBOXX USD HIGH YIELD INFRASTRUCTURE INDEX BY SECTOR AND TOP 10 ISSUERS
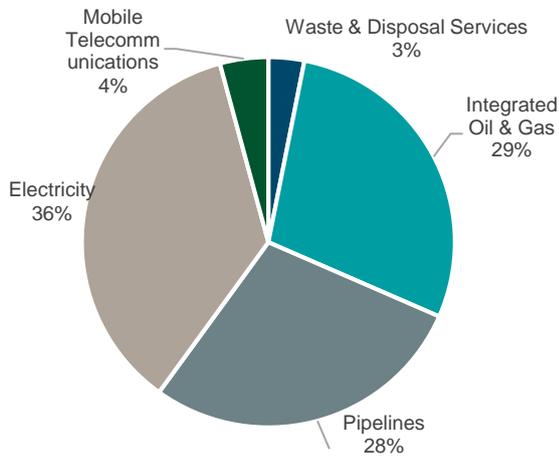
Top 10 Issuers	Weight
Targa Resources Partners LP / Targa Resources Partners Finance Corp	9.6%
Calpine Corp	9.1%
Energy Transfer Equity LP	7.3%
Cheniere Corpus Christi Holdings LLC	7.1%
NRG Energy Inc	6.4%
Vistra Energy Corp	5.8%
AES Corp/VA	5.4%
DCP Midstream Operating LP	4.7%
Cheniere Energy Partners LP	4.2%
SBA Communications Corp	4.2%
Total for top 10 constituents	**63.9%**

Source: IHS Markit. As of February 2019.

Issues and Limitations:

- The index is market-weighted and therefore issuers with larger amounts of eligible bonds outstanding will account for a larger share of the market. Targa Resources Partners LP and Targa Resources Partners Finance Corp make up 9.6% of the index. Calpine Corp, the second top issuer in the index, make up 9.1%.

5.25 Bloomberg Commodity Index (BCOM)

EXHIBIT 59: BLOOMBERG COMMODITY INDEX TOTAL RETURN AND OTHER STATISTICS

Total Return			Long-term* Correlation					Std.	Sharpe
5Y	10Y	20Y	Equities	Fixed Inc.	GDP	CPI	10Y Gov. Bond Yld	Dev.*	Ratio*
-7.7%	-6.7%	1.4%	46.2%	36.7%	62.6%	47.0%	46.6%	18.6%	0.08

Source: Bloomberg, Oxford Economics, and DWS. As of December 31, 2018 using latest quarterly data. For the latest available month-end returns, please refer to the Appendix.
Note: Equities refer to S&P 500 Index; Fixed Income refer to the Bloomberg Barclays U.S. Aggregate Index; CPI refers to the U.S. Headline CPI; and the 10-year government bond yield refers to the U.S. 10-Year Treasury.
*The Bloomberg Commodity Index started in March 1960 and therefore correlations, standard deviation and the Sharpe Ratio are calculated using quarterly data over the past 20 years.

Description: The Bloomberg Commodity Index (BCOM) provides broad-based exposure to commodities and is designed to be a highly liquid and diversified benchmark for commodity investments.[68] The index is owned by UBS, and Bloomberg, on behalf of UBS, calculates the BCOM and each of the related indices and subindices. [68] BCOM also aims to provide diversified exposure to commodities as an asset class, and therefore the index follows a set of diversification rules (described under the Methodology section below). [68] The BCOM is calculated on an excess returns basis and reflects commodity futures price movements. The index rebalances annually weighted 2/3 by trading volume and 1/3 by world production. [68] The Bloomberg Commodity Total Return index reflects returns on a fully collateralized investment in the Bloomberg Commodity Index, which combines BCOM returns with returns on cash collateral invested in 3-month U.S. Treasury Bills. [68]
Start date and release: The index was created in 1998 and data history starts on March 31, 1960.[67] Pricing is updated in real time.
Access: Full index history, methodology and outlooks is available on the Bloomberg website: https://www.bloomberg.com/professional/product/indices/bloomberg-commodity-index-family/. The index history is also available on the Bloomberg terminal and other financial data sources. The Bloomberg ticker is BCOMTR for the total return index and BCOM for the price-only index.
Return types: Total return which includes cash collateral (BCOMTR) and price-only return (BCOM)
Weighting: Bloomberg releases target weighted every year, and the 2019 target weight is described in the pie chart below. The index is rebalanced annually 2/3 based on trading volume and 1/3 on world production.[68] Diversification is also a key consideration, and therefore the index follows a number of weighting cap rules: (1) no single commodity may be more than 15% of the index, (2) no single commodity and its derivatives may constitute more than 25% of the index, (3) no related group of commodities (energy, precious metals, livestock or grains) may be more than 33% of the index, and (4) no single commodity may be less than 2% of the index as liquidity allows.[68]

EXHIBIT 60: BLOOMBERG COMMODITY INDEX TARGET WEIGHTS IN 2019 BY COMMODITY GROUP
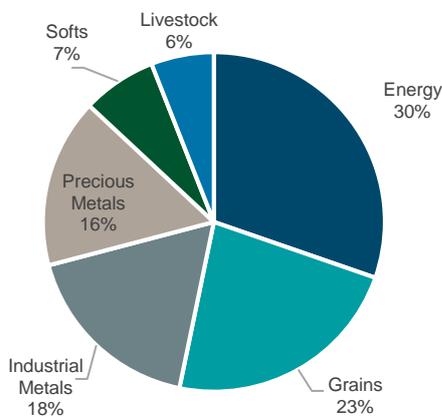
Source: Bloomberg. As of December 31, 2018.

Usage: Benchmarking, performance comparison against other asset classes.

Inclusion criteria: Commodities have been selected that are believed to be both sufficiently significant to the world economy and that are tradable through a qualifying related futures contract. [68] Each of the commodities is subject to at least one futures contract that trades on a U.S. exchange, with the exception of several metals contracts (aluminum, lead, tin, nickel and zinc) that trade on the London Metals Exchange (LME) and the contract for Brent crude oil. [68] There are 27 commodities eligible for inclusion in the index, as below:

EXHIBIT 61: BLOOMBERG COMMODITY ELIGIBLE COMMODITIES

Commodity	Designated Contract	Group	Tgt. Wt.	Ticker	Exchange
Aluminum	High Grade Primary Aluminum	Industrial Metals	4.4%	LA	London Metals Exchange
Brent Crude Oil	Brent Crude Oil	Energy	7.3%	CO	ICE Futures Europe
Chicago SRW Wheat	Soft Wheat	Grains	3.1%	W	CBOT
Cocoa	Cocoa	Softs	0.0%	CC	ICE Futures U.S.
Coffee	Coffee "C"	Softs	2.5%	KC	ICE Futures U.S.
Copper	Copper	Industrial Metals	7.3%	HG	COMEX
Corn	Corn	Grains	5.9%	C	CBOT
Cotton	Cotton	Softs	1.4%	CT	ICE Futures U.S.
Gold	Gold	Precious Metals	12.2%	GC	COMEX
Hard Red Wheat	Hard Red Winter Wheat	Grains	1.3%	KW	CBOT
Lead	Refined Standard Lead	Industrial Metals	0.0%	LL	London Metals Exchange
Lean Hogs	Lean Hogs	Livestock	1.8%	LH	CME
Live Cattle	Live Cattle	Livestock	4.1%	LC	CME
Low Sulfur Gas Oil	Low Sulfur Gas Oil	Energy	2.6%	QS	ICE Futures Exchange
Natural Gas	Henry Hub Natural Gas	Energy	8.3%	NG	NYMEX
Nickel	Primary Nickel	Industrial Metals	2.7%	LN	London Metals Exchange
Platinum	Platinum	Precious Metals	0.0%	PL	NYMEX
RBOB Gasoline (Unlead)	RBOB Gasoline	Energy	2.3%	XB	NYMEX
Silver	Silver	Precious Metals	3.9%	SI	COMEX
Soybean Meal	Soybean Meal	Grains	3.4%	SM	CBOT
Soybean Oil	Soybean Oil	Grains	3.1%	BO	CBOT
Soybeans	Soybeans	Grains	6.0%	S	CBOT
Sugar	World Sugar No. 11	Softs	3.1%	SB	ICE Futures U.S.
Tin	Refined Tin	Industrial Metals	0.0%	LT	London Metals Exchange
ULS Diesel	ULS Diesel	Energy	2.2%	HO	NYMEX
WTI Crude Oil	Light, Sweet Crude Oil	Energy	7.7%	CL	NYMEX

Source: Bloomberg; Target Weight data as of January 2019

However, not all eligible commodities will be included as all commodities will have to undergo a weighting test, 2/3 by trading liquidity, and 1/3 by production value. Commodities weighted less than 0.4% will be discarded.

Available indices: BCOM and BCOMTR are available in AUD, EUR, GBP, CHF, and JPY. Available sub-indices are available by single commodities and commodity type groupings. A full list of indices and sub-indices are available on Bloomberg's website: https://www.bloomberg.com/professional/product/indices/bloomberg-commodity-index-family/

Methodology: The index construction starts with a list of commodities eligible for index inclusion, as noted above[68]. One or more designated contracts is selected by Bloomberg for each of the eligible commodities, as in the table above. The selection process is subject to review by the Index Oversight Committee and may receive input from the Index Advisory Council. [68] Each commodity is then assigned to a group, as in the table above, and diversification rules are applied, as described in the weighting section. The index includes both primary commodities and derivative commodities (produced or derived from other commodities). Currently, ULS Diesel and RBOB Gasoline are derivative commodities of crude oil (WTI and Brent). Soybean oil and soybean meal are derivative commodities of soybean. Adjustments are made to avoid double-counting of primary commodities. [68]

Liquidity percentages: Each designated contract is assigned a liquidity weighting based on the average volume of trading for the year and the average settlement price based on the first business day of each month. [68] The annual volume is multiplied by the average settlement price in USD for each of the last five years. [68] The results for each of the last five years are then averaged for each designated contract. [68] The results for all the designated contracts are then summed, and for each designated contract, then divided by the total to calculate the liquidity percentages. [68]

Production percentages: Each designated contract is assigned a production weighting based on its average U.S.-dollar adjusted value of production. [68] The production percentages are calculated over a five-year period. Bloomberg outlines the sources for annual production for each commodity[69]. The production data for each year is determined for all commodities eligible for inclusion in the index. However, data for derivative commodities are not included to avoid double-counting. For each commodity, a conversion factor is determined to convert the production data into the pricing terms of each designated contract. For example, crude oil production is reported in metric tons, whereas crude oil futures are denominated in barrels. By multiplying the production data by the crude oil conversion factor, the data is converted into barrels. This results in the Commodity Production Weight.[69]

The average settlement prices is calculated on the first business day of each month, and then converted into USD. The production weight is multiplied by the average settlement prices for each of the past five years, and then averaged. The results for all commodities are then summed, and for each commodity, divided by the total to calculate the production percentages. [69]

Commodity index percentages calculation: The commodity index percentages are a function of the liquidity percentages and production percentages, where 2/3 of the weighting of each commodity is determined by the liquidity percentages, and 1/3 by the production percentages. The commodities with weighting under 0.4% is subsequently eliminated from the index, and all the commodities are then reweighted without the commodities removed. [69]

Diversification rules: (1) If any commodity sector (primary and derivative commodities) sums up to more than 25%, its weight is then reduced to 25%. The difference is allocated equally among commodity sectors not affected by this rule. (2) If any commodity's weight is more than 15%, its weight is reduced to 15%. The difference is allocated equally among the other index commodities not affected by this rule. (3) If any commodity group weight sums up to more than 33%, its weight is then reduced to 33%. The difference is allocated equally among the other commodities not affected by this rule. [69]

There are further steps to address gold and silver weightings and increase sector weightings under 2% to 2%. For further details on the methodology, please refer to the Bloomberg Commodity Index Methodology paper from January 2018. [69]

Issues and Limitations:
- The BCOM index is based on the futures of the underlying commodities, not the commodities themselves. These futures contracts are never taken to delivery and are instead rolled forward. As the expiration date approaches, the contract expiring in January may be replaced by a contract for delivery in March. The futures roll approximately every other month according to a contract schedule. The timing of the roll can impact pricing of the index, as pricing can reflect the returns of a futures contract expiring soon or the returns of a futures contract expiring further out in the future.

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[69] Bloomberg Commodity Index Methodology, January 2018.

6 / Summary of Indices

EXHIBIT 62: ALTERNATIVE ASSET CLASSES SUMMARY OF INDICES

Index	Asset Class	Region	Listed/ Non-Listed	Fund-level/ Asset-level	Size	GAV/ NAV[70]	Freq.	Start Date
Global Real Estate Fund Index (GREFI)	Real Estate	Global	Non-Listed	Fund	734.8	GAV	Quarterly	3/31/2010
MSCI Global Property Fund Index	Real Estate	Global	Non-Listed	Fund	379.6	NAV	Quarterly	12/31/2008
NCREIF Property Index (NPI)	Real Estate	U.S.	Non-Listed	Asset	611.7	GAV	Quarterly	12/31/1977
NCREIF Fund Index – Open-End Diversified Core Equity Fund Index (NFI-ODCE)	Real Estate	U.S.	Non-Listed	Fund	195.2	NAV	Quarterly	3/31/1978
NCREIF Fund Index- Open-End Equity (NFI-OE)	Real Estate	U.S.	Non-Listed	Fund	248.4	NAV	Quarterly	9/30/1978
NCREIF Fund Index – Closed-End Value-Add (NFI-CEVA)	Real Estate	U.S.	Non-Listed	Fund	13.6	NAV	Quarterly	9/30/1997
MSCI U.S. Quarterly Property Index	Real Estate	U.S.	Non-Listed	Asset	314.9	GAV	Quarterly	12/31/1998
MSCI/PREA U.S. ACOE Quarterly Property Fund Index	Real Estate	U.S.	Non-Listed	Fund	222.5	NAV	Quarterly	3/31/2008
MSCI Continental Europe Property Level Index	Real Estate	Europe	Non-Listed	Asset	32.2	GAV	Quarterly	12/31/2007
MSCI Pan-European Quarterly Property Fund Index (PEPFI)	Real Estate	Europe	Non-Listed	Fund	22.1	NAV	Quarterly	3/31/2004
INREV Quarterly Index	Real Estate	Europe	Non-Listed	Fund	203.1	NAV	Quarterly	6/30/2000
MSCI/AREF UK Quarterly Property Fund Index	Real Estate	Europe	Non-Listed	Fund	67.8	NAV	Quarterly	3/31/1990
MSCI UK Quarterly Property Fund Index	Real Estate	Europe	Non-Listed	Asset	207.9	GAV	Quarterly	12/31/2000
MSCI German OFIX (German Open-Ended Funds)	Real Estate	Europe	Non-Listed	Fund	95.6	NAV	Quarterly	12/31/2000
MSCI German SFIX (German Spezial Funds)	Real Estate	Europe	Non-Listed	Fund	70.2	NAV	Quarterly	12/31/2004
ANREV All Funds Index	Real Estate	Asia P.	Non-Listed	Fund	94.2	NAV	Quarterly	12/31/2006
MSCI Asia Annual Property Index	Real Estate	Asia P.	Non-Listed	Asset	375.0	GAV	Annual	12/31/2005
MSCI Asia Pacific Annual Property Index	Real Estate	Asia P.	Non-Listed	Asset	534.5	GAV	Annual	12/31/2005
MSCI/Mercer Australia Core Wholesale Property Fund Index	Real Estate	Asia P.	Non-Listed	Fund	58.8	NAV	Quarterly	6/30/2008
MSCI/PCA Australia Property Index	Real Estate	Asia P.	Non-Listed	Asset	141.8	GAV	Quarterly	12/31/1984
ARES Japan Property Index	Real Estate	Asia P.	Non-Listed	Asset	190.7	GAV	Quarterly	12/31/2001

[70] Gross Asset Value or Net Asset Value
*Indices highlighted are featured in this report

Index	Asset Class	Region	Listed/ Non-Listed	Fund-level/ Asset-level	Size	GAV/ NAV[70]	Freq.	Start Date
ARES Japan Fund Index	Real Estate	Asia P.	Non-Listed	Fund	116.8	NAV	Quarterly	12/31/2001
Giliberto-Levy Commercial Mortgage Performance Index (G-L 1)	R. E. Debt	U.S.	Non-Listed	Asset	224.5	GAV	Quarterly	3/31/1973
Giliberto-Levy High Yield CRE Debt Index (G-L 2)	R. E. Debt	U.S.	Non-Listed	Asset	2.8	GAV	Monthly	3/31/2010
FTSE EPRA/NAREIT Developed Index	Real Estate	Global	Listed	Asset	1,800.0	NAV	Daily	12/31/1989
FTSE EPRA/NAREIT Developed ex US	Real Estate	Global	Listed	Asset	945.8	NAV	Daily	12/31/1989
MSCI US REIT Total Return Index	Real Estate	U.S.	Listed	Asset	892.5	NAV	Daily	12/31/1994
Wilshire US REIT Index	Real Estate	U.S.	Listed	Asset	772.4	NAV	Daily	12/31/1977
FTSE EPRA/NAREIT Developed Europe	Real Estate	Europe	Listed	Asset	281.3	NAV	Daily	12/31/1989
FTSE EPRA NAREIT Europe Ex UK	Real Estate	Europe	Listed	Asset	240.6	NAV	Daily	12/31/1989
FTSE EPRA NAREIT UK	Real Estate	Europe	Listed	Asset	77.6	NAV	Daily	12/31/1989
FTSE EPRA/NAREIT Asia Index	Real Estate	Asia P.	Listed	Asset	573.7	NAV	Daily	12/31/1999
FTSE EPRA/NAREIT Asia ex Aust. Index	Real Estate	Asia P.	Listed	Asset	498.9	NAV	Daily	2/28/2005
Bbg Barclays IG Reits TR Index	R. E. Debt	U.S.	Listed	Asset	132.1	GAV	Daily	9/30/1997
Bbg Barclays CMBS IG TR	R. E. Debt	U.S.	Listed	Asset	453.3	GAV	Daily	3/31/1997
MSCI Global Infrastructure Asset Index	Infrastructure	Global	Non-Listed	Asset	35.4	NAV	Quarterly	3/31/2008
DJ Brookfield Global Infrastructure Net TR	Infrastructure	Global	Listed	Asset	1,067.9	NAV	Daily	12/31/2002
Alerian MLP Infrastructure TR	Infrastructure	Global	Listed	Asset	256.0	NAV	Daily	12/29/1995
Alerian MLP Index	Infrastructure	Global	Listed	Asset	275.0	NAV	Daily	12/29/1995
Markit iBoxx EUR Infrastructure Bond Index	Infrastructure	Europe	Listed	Asset	325.0	GAV	Daily	12/31/2005
Markit iBoxx GBP Infrastructure Bond Index	Infrastructure	Europe	Listed	Asset	125.6	GAV	Daily	12/31/2005
Markit iBoxx USD Infrastructure Bond Index	Infrastructure	U.S.	Listed	Asset	629.7	GAV	Daily	12/31/2005
Markit iBoxx USD Liquid High Yield Infra. Bond Index	Infrastructure	U.S.	Listed	Asset	63.6	GAV	Daily	12/31/2010
Bloomberg Commodity Index	Commodity	Global	Listed	Asset	N/A	N/A	Daily	3/31/1960

Source: Alerian, ARES, Bloomberg, Cambridge Associates, FTSE, Giliberto-Levy, IHS Markit, MSCI, NCREIF, Red Rocks, S&P Dow Jones Indices, Wilshire, and DWS. As of December 2018.
*Indices highlighted are featured in this report.

7 / Performance during Different Economic Conditions

We analyzed the alternative asset classes for performance during four different economic scenarios: (1) low GDP, high CPI, (2) low GDP, low CPI, (3) high GDP, low CPI, and (4) high GDP, high CPI. GDP and CPI data are specific to the country/region from Oxford Economics. Therefore, global indices would use global GDP and CPI data, U.S. indices would use U.S. GDP and CPI data, European indices would use Europe GDP and CPI data, and so on. We categorize periods of low GDP or low CPI as being below the simple average of GDP and CPI over the specified timeframe. Conversely, we categorize periods of high GDP or high CPI as being above the simple average of GDP and CPI over the same specific timeframe.

We selected representative indices as proxies for the various asset classes, as in the exhibit below:

EXHIBIT 63: ALTERNATIVE ASSET CLASSES AND SELECTED REPRESENTATIVE INDICES

Asset Class	Representative Index	Time Frame	Currency
Global Non-Listed Real Estate	Global Real Estate Fund Index (GREFI)	March 31, 2011 – September 30, 2018	LC
U.S. Non-Listed Real Estate	NCREIF Fund Index – Open-End Diversified Core Equity Fund Index (NFI-ODCE)	March 31, 1990 – December 31, 2018	USD
European Non-Listed Real Estate	INREV Quarterly Index	June 30, 2001 – September 30, 2018	LC
U.K. Non-Listed Real Estate	MSCI/AREF UK Quarterly Property Fund Index	December 31, 1990 – September 30, 2018	GBP
Asia Pacific Non-Listed Real Estate	ANREV All Funds Index	December 30, 2006 – September 30, 2018	LC
Australia Non-Listed Real Estate	MSCI/Mercer Australia Core Wholesale Property Fund Index	June 30, 2008 – December 31, 2018	AUD
Japan Non-Listed Real Estate	ARES Japan Fund Index	December 31, 2002 – September 30, 2018	JPY
U.S. Non-Listed Real Estate Debt	Giliberto-Levy Commercial Mortgage Performance Index (G-L 1)	December 31, 1990 – December 31, 2018	USD
Developed Markets Listed Real Estate	FTSE EPRA/NAREIT Developed Index	March 31, 2006 – December 31, 2018	USD
U.S. Listed Real Estate	MSCI US REIT Total Return Index	December 31, 1995 – December 31, 2018	USD
Developed Europe Listed Real Estate	FTSE EPRA/NAREIT Developed Europe	March 31, 1991 – December 31, 2018	EUR
Asia Listed Real Estate	FTSE EPRA/NAREIT Asia Index Net TRI USD	March 31, 2006 – December 31, 2018	USD
Investment Grade REIT Bonds	Bbg Barclays IG Reits TR Index	September 30, 1998 – December 31, 2018	USD
Investment Grade CMBS	Bbg Barclays CMBS IG TR	March 31, 1998 – December 31, 2018	USD
Global Non-Listed Infrastructure	MSCI Global Infrastructure Asset Index	March 31, 2009 – September 30, 2018	USD
European Listed Infrastructure Bonds	Markit iBoxx EUR Infrastructure Bond Index	December 31, 2006 – December 31, 2018	EUR
U.S. Listed Infrastructure Bonds	Markit iBoxx USD Infrastructure Bond Index	March 31, 2007 - December 31, 2018	USD
U.S. Listed High Yield Infrastructure Bonds	Markit iBoxx USD Liquid High Yield Infrastructure Bond Index	December 31, 2010 - December 31, 2018	USD
Commodities	Bloomberg Commodity Index	March 31, 1991 – December 31, 2018	USD

Source: ANREV, ARES, Bloomberg, Dow Jones Indices, FTSE, Giliberto-Levy, IHS Markit, INREV, MSCI, NCREIF and DWS

Below are the asset classes that have performed the best and the worst in the four economic scenarios:

EXHIBIT 64: ALTERNATIVE ASSET CLASSES THAT HAVE PERFORMED THE BEST IN THE FOUR ECONOMIC SCENARIOS
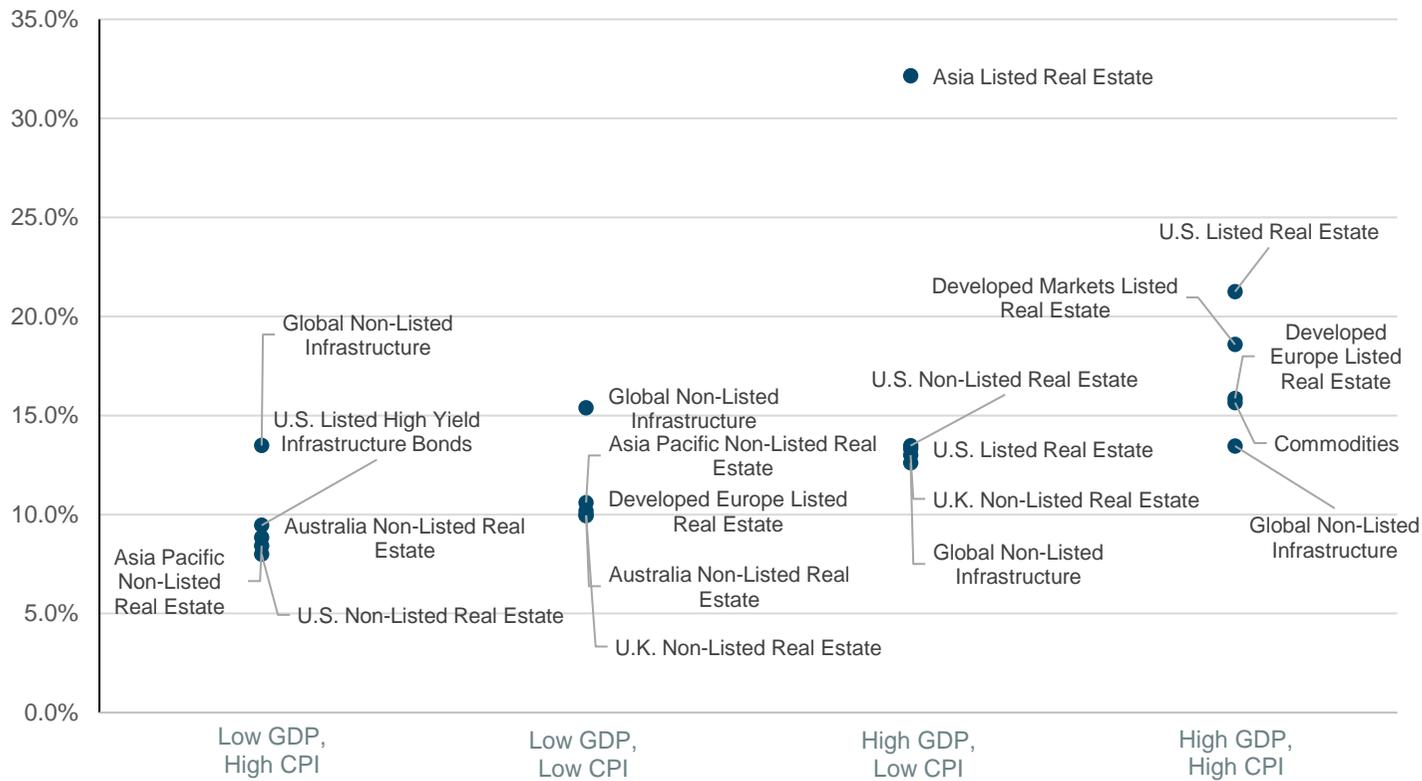
Source: ANREV, ARES, Bloomberg, FTSE, Giliberto-Levy, INREV, IHS Markit, MSCI, NCREIF, S&P Dow Jones Indices, and DWS. As of December 2018.
Note: Please refer to Exhibit 63 for a list of indices with corresponding asset classes

EXHIBIT 65: ALTERNATIVE ASSET CLASSES THAT HAVE PERFORMED THE WORST IN THE FOUR ECONOMIC SCENARIOS
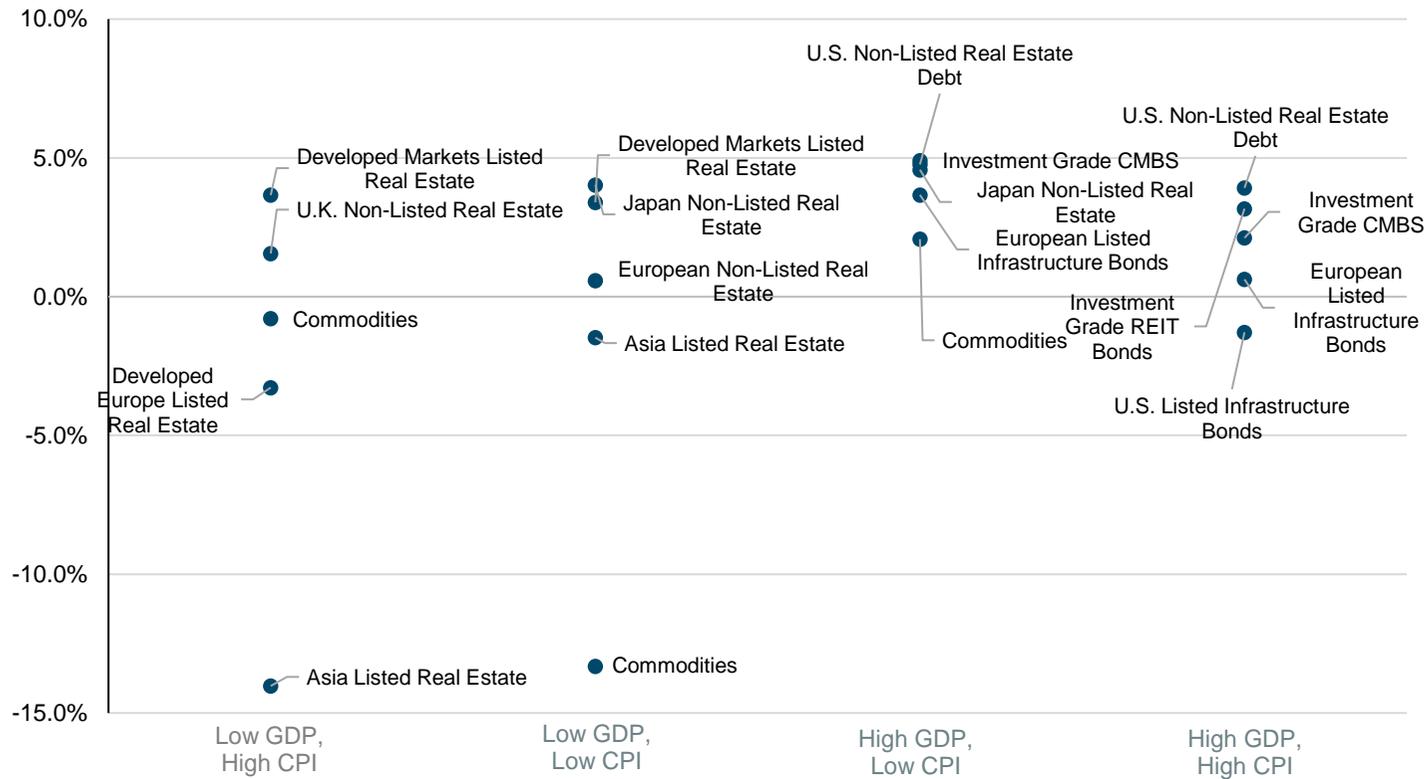
Source: ANREV, ARES, Bloomberg, FTSE, Giliberto-Levy, INREV, IHS Markit, MSCI, NCREIF, S&P Dow Jones Indices, and DWS. As of December 2018.

Note: Please refer to Exhibit 63 for a list of indices with corresponding asset classes

EXHIBIT 66: ALTERNATIVE ASSET CLASSES SORTED BY MEDIAN RETURNS DURING VARIOUS ECONOMIC SCENARIOS

Low GDP, High CPI	Median Returns	Low GDP, Low CPI	Median Returns	High GDP, Low CPI	Median Returns	High GDP, High CPI	Median Returns
Global Non-Listed Infrastructure	13.5%	Global Non-Listed Infrastructure	15.4%	Asia Listed Real Estate	32.2%	U.S. Listed Real Estate	21.3%
U.S. Listed High Yield Infrastructure Bonds	9.5%	Asia Pacific Non-Listed Real Estate	10.6%	U.S. Non-Listed Real Estate	13.5%	Developed Markets Listed Real Estate	18.6%
Australia Non-Listed Real Estate	8.8%	Developed Europe Listed Real Estate	10.2%	U.S. Listed Real Estate	13.3%	Developed Europe Listed Real Estate	15.9%

Low GDP, High CPI	Median Returns	Low GDP, Low CPI	Median Returns	High GDP, Low CPI	Median Returns	High GDP, High CPI	Median Returns
Asia Pacific Non-Listed Real Estate	8.4%	U.K. Non-Listed Real Estate	10.0%	U.K. Non-Listed Real Estate	13.0%	Commodities	15.6%
U.S. Non-Listed Real Estate	8.0%	Australia Non-Listed Real Estate	10.0%	Global Non-Listed Infrastructure	12.6%	Global Non-Listed Infrastructure	13.5%
Investment Grade REIT Bonds	7.6%	Global Non-Listed Real Estate	9.3%	Asia Pacific Non-Listed Real Estate	12.0%	Asia Listed Real Estate	13.4%
Japan Non-Listed Real Estate	7.5%	European Listed Infrastructure Bonds	8.6%	Developed Markets Listed Real Estate	10.4%	European Non-Listed Real Estate	10.5%
Investment Grade CMBS	6.1%	U.S. Listed Real Estate	8.6%	Australia Non-Listed Real Estate	9.2%	Global Non-Listed Real Estate	9.6%
U.S. Listed Infrastructure Bonds	6.0%	U.S. Non-Listed Real Estate	8.5%	Global Non-Listed Real Estate	8.9%	Asia Pacific Non-Listed Real Estate	9.5%
U.S. Non-Listed Real Estate Debt	5.8%	U.S. Listed High Yield Infrastructure Bonds	8.4%	Developed Europe Listed Real Estate	8.4%	Australia Non-Listed Real Estate	9.4%
Global Non-Listed Real Estate	5.3%	Investment Grade REIT Bonds	7.6%	European Non-Listed Real Estate	8.0%	U.S. Non-Listed Real Estate	8.8%
European Listed Infrastructure Bonds	5.2%	U.S. Listed Infrastructure Bonds	7.4%	U.S. Listed Infrastructure Bonds	7.6%	U.K. Non-Listed Real Estate	6.9%
European Non-Listed Real Estate	4.7%	Investment Grade CMBS	5.3%	Investment Grade REIT Bonds	6.6%	Japan Non-Listed Real Estate	6.9%
U.S. Listed Real Estate	4.7%	U.S. Non-Listed Real Estate Debt	4.4%	U.S. Listed High Yield Infrastructure Bonds	6.0%	U.S. Listed High Yield Infrastructure Bonds	4.0%
Developed Markets Listed Real Estate	3.7%	Japan Non-Listed Real Estate	4.0%	Investment Grade CMBS	4.9%	U.S. Non-Listed Real Estate Debt	3.9%
U.K. Non-Listed Real Estate	1.6%	Developed Markets Listed Real Estate	3.4%	U.S. Non-Listed Real Estate Debt	4.8%	Investment Grade REIT Bonds	3.2%
Commodities	-0.8%	European Non-Listed Real Estate	0.6%	Japan Non-Listed Real Estate	4.6%	Investment Grade CMBS	2.1%
Developed Europe Listed Real Estate	-3.3%	Asia Listed Real Estate	-1.5%	European Listed Infrastructure Bonds	3.7%	European Listed Infrastructure Bonds	0.6%
Asia Listed Real Estate	-14.0%	Commodities	-13.3%	Commodities	2.1%	U.S. Listed Infrastructure Bonds	-1.3%

Source: DWS, Bloomberg, MSCI, NCREIF, INREV, ANREV, ARES, and IHS Markit

Note: Please refer to Exhibit 63 for a list of indices with corresponding asset classes

8 / Correlation to GDP and CPI

EXHIBIT 67: CORRELATION OF ALTERNATIVE ASSET CLASSES TO GDP AND CPI

Source: ANREV, ARES, Bloomberg, Cambridge Associates, FTSE, Giliberto-Levy, INREV, IHS Markit, MSCI, NCREIF, S&P Dow Jones Indices, and DWS. As of December 2018.

Note: Please refer to Exhibit 63 for a list of indices with corresponding asset classes

9 / Asset Class Correlations

EXHIBIT 68: ALTERNATIVE ASSET CLASSES CORRELATIONS

	Glbl NL RE	U.S. NL RE	Euro NL RE	U.K. NL RE	Apac NL RE	Japan NL RE	Australia NL RE	U.S. NL RE D	Dev. Mkts L RE	U.S. L RE	Dev. Eur L RE	Asia L RE	IG REIT Bds	IG CMBS	Glbl NL Infra.	Euro L Infr. Bds	U.S. L Infr. Bds	U.S. L HY Infr. Bds	Commodities
Glbl NL RE	1.0																		
U.S. NL RE	0.2	1.0																	
Euro NL RE	0.9	0.7	1.0																
U.K. NL RE	0.8	0.7	0.9	1.0															
Apac NL RE	0.7	0.9	0.8	0.6	1.0														
Japan NL RE	0.6	0.8	0.7	0.5	0.9	1.0													
Aus NL RE	0.7	0.9	0.8	0.6	0.9	0.9	1.0												
U.S. NL RE Debt	0.0	-0.1	0.1	0.3	-0.1	-0.2	-0.1	1.0											
Dev. Mkts L RE	-0.3	0.3	0.6	0.7	0.2	0.2	0.1	0.5	1.0										
U.S. L RE	-0.1	0.2	0.5	0.7	0.1	0.1	0.2	0.4	0.9	1.0									
Dev. Eur L RE	0.2	0.3	0.7	0.8	0.2	0.3	0.2	0.2	0.9	0.8	1.0								
Asia L RE	-0.5	0.2	0.5	0.5	0.2	0.2	0.0	0.4	0.9	0.7	0.7	1.0							
IG REIT Bds	-0.4	-0.3	0.0	0.2	-0.3	-0.4	-0.4	0.7	0.7	0.6	0.4	0.6	1.0						
IG CMBS	-0.3	0.0	0.2	0.4	-0.1	-0.2	-0.1	0.8	0.8	0.7	0.4	0.6	0.9	1.0					
Glbl NL Infra.	0.5	0.9	0.8	0.6	0.8	0.9	0.9	-0.2	0.0	0.1	0.2	-0.2	-0.4	-0.2	1.0				
Euro L Infr. Bds	-0.6	-0.5	-0.4	-0.1	-0.6	-0.6	-0.6	0.4	0.3	0.4	0.3	0.3	0.6	0.4	-0.5	1.0			
U.S. L Infr. Bds	-0.2	-0.5	-0.2	-0.1	-0.4	-0.5	-0.6	0.5	0.2	0.2	0.0	0.2	0.6	0.4	-0.6	0.6	1.0		
U.S. L HY Infr. Bds	-0.5	-0.3	-0.3	-0.4	-0.2	-0.2	-0.2	-0.1	0.5	0.3	0.0	0.5	0.4	0.2	-0.2	0.4	0.3	1.0	
Commodities	-0.2	0.3	0.4	0.4	0.3	0.2	0.3	0.3	0.5	0.4	0.3	0.5	0.3	0.4	0.0	-0.2	0.0	0.6	1.0

Source: ANREV, ARES, Bloomberg, Cambridge Associates, FTSE, Giliberto-Levy, INREV, IHS Markit, MSCI, NCREIF, S&P Dow Jones Indices, and DWS. As of December 2018.
Note: Correlation calculated for the past 20 years or 80 quarters, or the longest time series available if data does not go back 20 years. Green highlight is for correlation less than 0.2; Red highlight is for correlation more than 0.6; Yellow highlight is for correlation between 0.2 and 0.6. The following table below has a list of indices with corresponding asset classes.

**EXHIBIT 69: ALTERNATIVE ASSET CLASSES AND SELECTED REPRESENTATIVE INDICES**

Asset Class	Asset Class Shorthand	Representative Index	Time Frame	Currency
Global Non-Listed Real Estate	Glbl NL RE	Global Real Estate Fund Index (GREFI)	March 31, 2011 – September 30, 2018	LC
U.S. Non-Listed Real Estate	U.S. NL RE	NCREIF Fund Index – Open-End Diversified Core Equity Fund Index (NFI-ODCE)	March 31, 1990 – December 31, 2018	USD
European Non-Listed Real Estate	Euro NL RE	INREV Quarterly Index	June 30, 2001 – September 30, 2018	LC
U.K. Non-Listed Real Estate	U.K. NL RE	MSCI/AREF UK Quarterly Property Fund Index	December 31, 1990 – September 30, 2018	GBP
Asia Pacific Non-Listed Real Estate	Apac NL RE	ANREV All Funds Index	December 30, 2006 – September 30, 2018	LC
Australia Non-Listed Real Estate	Aus NL RE	MSCI/Mercer Australia Core Wholesale Property Fund Index	June 30, 2008 – December 31, 2018	AUD
Japan Non-Listed Real Estate	Japan NL RE	ARES Japan Fund Index	December 31, 2002 – September 30, 2018	JPY
U.S. Non-Listed Real Estate Debt	U.S. NL RE	Giliberto-Levy Commercial Mortgage Performance Index (G-L 1)	December 31, 1990 – September 30, 2018	USD
Developed Markets Listed Real Estate	Dev. Mkts L RE	FTSE EPRA/NAREIT Developed Index	March 31, 2006 – December 31, 2018	USD
U.S. Listed Real Estate	U.S. L RE	MSCI US REIT Total Return Index	December 31, 1995 – December 31, 2018	USD
Developed Europe Listed Real Estate	Dev. Eur L RE	FTSE EPRA/NAREIT Developed Europe	March 31, 1991 – December 31, 2018	EUR
Asia Listed Real Estate	Asia L RE	FTSE EPRA/NAREIT Asia Index Net TRI USD	March 31, 2006 – December 31, 2018	USD
Investment Grade REIT Bonds	IG REIT Bds	Bbg Barclays IG Reits TR Index	September 30, 1998 – December 31, 2018	USD
Investment Grade CMBS	IG CMBS	Bbg Barclays CMBS IG TR	March 31, 1998 – December 31, 2018	USD
Global Non-Listed Infrastructure	Glbl NL Infra.	MSCI Global Infrastructure Asset Index	March 31, 2009 – September 30, 2018	USD
European Listed Infrastructure Bonds	Euro L Infr. Bds	Markit iBoxx EUR Infrastructure Bond Index	December 31, 2006 – September 30, 2018	EUR
U.S. Listed Infrastructure Bonds	U.S. L Infr. Bds	Markit iBoxx USD Infrastructure Bond Index	March 31, 2007 - September 30, 2018	USD
U.S. Listed High Yield Infrastructure Bonds	U.S. L HY Infr. Bds	Markit iBoxx USD Liquid High Yield Infrastructure Bond Index	December 31, 2010 - September 30, 2018	USD
Non-Listed Private Equity	NL PE	Cambridge Associates Private Equity Index	March 31, 1991 – September 30, 2018	USD
Listed Private Equity	L PE	S&P Listed Private Equity Index	December 31, 2004 – September 30, 2018	USD
Commodities	Commodities	Bloomberg Commodity Index	March 31, 1991 – September 30, 2018	USD

Source: ANREV, ARES, Bloomberg, Cambridge Associates, Dow Jones Indices, FTSE, Giliberto-Levy, IHS Markit, INREV, MSCI, NCREIF and DWS

10 / Historical Return vs. Risk

EXHIBIT 70: ALTERNATIVE ASSET CLASSES HISTORICAL RETURN VS. RISK
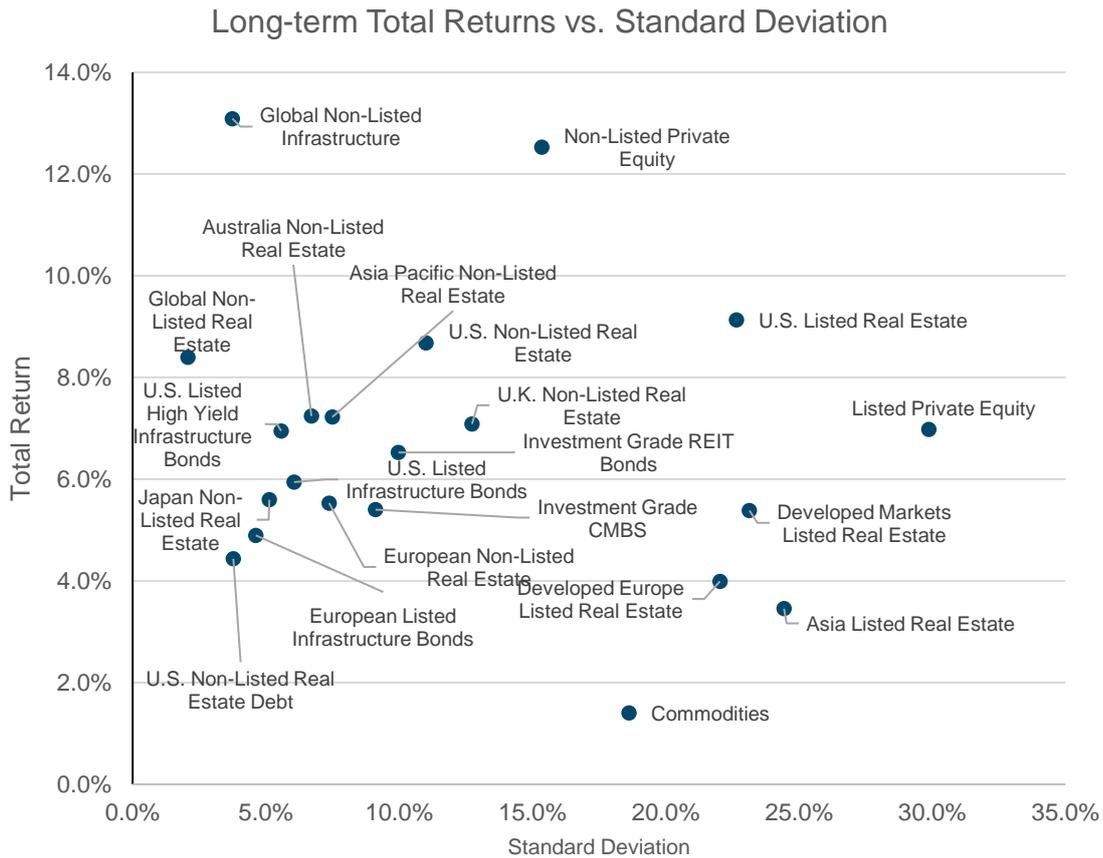
Long-term Total Returns vs. Standard Deviation

Source: ANREV, ARES, Bloomberg, Cambridge Associates, FTSE, Giliberto-Levy, INREV, IHS Markit, MSCI, NCREIF, and DWS. As of December 2018. Long-term returns and standard deviations are over 20 years or since inception if index history is less than 20 years.

Note: Please refer to Exhibit 63 for a list of indices with corresponding asset classes

11 / Appendix

EXHIBIT 71: ROLLING 12-MONTH RETURNS FROM YE 2018 FOR THE PAST FIVE YEARS, OR LATEST AVAILABLE IF BEFORE YE 2018

Index	2012	2013	2014	2015	2016	2017	2018	9/30/2018	Fre-quency	Latest Data
Global Real Estate Fund Index (GREFI)	4.4%	7.6%	9.6%	12.1%	7.6%	9.4%	NA	9.3%	Qtrly	9/30/2018
MSCI Global Property Fund Index	7.9%	11.1%	11.9%	13.1%	7.8%	8.6%	8.1%	8.7%	Qtrly	12/31/2018
NCREIF Property Index (NPI)	10.5%	11.0%	11.8%	13.3%	8.0%	7.0%	6.7%	7.2%	Qtrly	12/31/2018
NCREIF Fund Index – Open-End Diversified Core Equity Fund Index (NFI-ODCE)	10.9%	13.9%	12.5%	15.0%	8.8%	7.6%	8.3%	8.7%	Qtrly	12/31/2018
NCREIF Fund Index- Open-End Equity (NFI-OE)	11.4%	14.4%	12.9%	15.8%	9.4%	8.5%	9.1%	9.5%	Qtrly	12/31/2018
NCREIF Fund Index – Closed-End Value-Add (NFI-CEVA)	13.4%	13.9%	21.7%	22.3%	12.6%	13.3%	NA	NA	Qtrly	9/30/2018
MSCI U.S. Quarterly Property Index	10.6%	11.5%	11.6%	12.5%	7.6%	6.9%	7.2%	7.3%	Qtrly	12/31/2018
MSCI/PREA U.S. ACOE Quarterly Property Fund Index	11.6%	14.5%	13.0%	15.5%	9.3%	8.1%	8.8%	9.2%	Qtrly	12/31/2018
MSCI Continental Europe Property Level Index	3.3%	4.7%	10.9%	12.4%	8.9%	10.0%	10.9%	11.9%	Qtrly	12/31/2018
MSCI Pan-European Quarterly Property Fund Index (PEPFI)	-2.0%	5.1%	14.1%	13.6%	4.7%	8.9%	9.8%	11.2%	Qtrly	12/31/2018
INREV Quarterly Index	-0.2%	3.4%	7.9%	9.9%	6.2%	9.5%	8.3%	9.5%	Qtrly	12/31/2018
MSCI/AREF UK Quarterly Property Fund Index	1.1%	9.0%	16.4%	12.0%	2.3%	9.7%	5.5%	7.8%	Qtrly	12/31/2018
MSCI UK Quarterly Property Fund Index	2.9%	10.9%	17.9%	13.3%	3.6%	10.3%	6.2%	8.3%	Qtrly	12/31/2018
MSCI German SFIX (German Spezial Funds)	1.9%	1.1%	1.4%	3.4%	4.7%	5.8%	7.4%	6.9%	Qtrly	12/31/2018
ANREV All Funds Index	8.2%	9.5%	9.3%	12.1%	10.5%	15.1%	NA	11.3%	Qtrly	9/30/2018
MSCI Asia Annual Property Index	6.8%	7.9%	9.0%	8.2%	7.3%	7.7%	NA	NA	Annual	12/31/2017
MSCI Asia Pacific Annual Property Index	7.1%	8.1%	9.2%	8.9%	7.9%	8.2%	NA	NA	Annual	12/31/2017
MSCI/PCA Australia Property Index	9.4%	9.3%	10.7%	13.7%	11.8%	11.9%	10.3%	11.0%	Qtrly	12/31/2018
ARES Japan Property Index	4.1%	6.2%	7.9%	8.8%	7.5%	6.8%	NA	6.4%	Qtrly	9/30/2018
ARES Japan Fund Index	7.0%	11.5%	14.2%	15.3%	12.3%	10.9%	NA	9.9%	Qtrly	9/30/2018
Giliberto-Levy Commercial Mortg. Performance Index (G-L 1)	4.7%	2.9%	7.4%	2.7%	-2.9%	5.7%	2.6%	0.8%	Qtrly	12/31/2018
Giliberto-Levy High Yield CRE Debt Index (G-L 2)	7.9%	9.8%	11.5%	5.8%	10.8%	10.6%	11.3%	11.3%*	Qtrly	12/31/2018
MSCI Global Infrastructure Asset Index	13.3%	12.7%	15.5%	18.0%	15.2%	13.1%	NA	11.8%	Qtrly	9/30/2018
MSCI German OFIX (German Open-Ended Funds)	0.1%	-0.1%	0.9%	1.4%	1.9%	2.1%	3.0%	2.8%	Monthly	2/28/2019

Index	2012	2013	2014	2015	2016	2017	2018	9/30/2018	Fre-quency	Latest Data
MSCI/Mercer Australia Core Wholesale Property Fund Index	7.9%	8.8%	9.2%	12.7%	11.1%	12.8%	9.7%	11.2%	Monthly	2/28/2019
FTSE EPRA/NAREIT Developed Index	27.7%	3.7%	15.0%	-0.8%	4.1%	10.4%	-5.6%	3.7%	Daily	2/28/2019
FTSE EPRA/NAREIT Developed ex US	38.6%	6.1%	3.2%	-3.2%	2.0%	20.8%	-5.8%	5.4%	Daily	2/28/2019
MSCI US REIT Total Return Index	17.8%	2.5%	30.4%	2.5%	8.6%	5.1%	-4.6%	3.7%	Daily	2/28/2019
Wilshire US REIT Index	17.6%	1.9%	31.8%	4.2%	7.2%	4.2%	-4.8%	4.0%	Daily	2/28/2019
FTSE EPRA/NAREIT Developed Europe	27.5%	10.4%	25.0%	18.0%	-5.3%	12.4%	-8.5%	6.2%	Daily	2/28/2019
FTSE EPRA NAREIT Europe Ex UK	26.0%	8.8%	6.9%	5.6%	1.1%	30.5%	-10.6%	5.9%	Daily	2/28/2019
FTSE EPRA NAREIT UK	35.9%	26.2%	14.2%	5.7%	-23.7%	22.7%	-18.6%	0.3%	Daily	2/28/2019
FTSE EPRA/NAREIT Asia Index	45.4%	4.3%	0.1%	-7.6%	5.6%	15.6%	-1.9%	4.4%	Daily	2/28/2019
FTSE EPRA/NAREIT Asia ex Aust. Index	49.3%	7.7%	-3.7%	-9.6%	3.9%	16.6%	-0.8%	4.7%	Daily	2/28/2019
Bbg Barclays IG Reits TR Index	11.2%	0.0%	7.3%	1.4%	4.7%	5.7%	-0.2%	-0.6%	Daily	2/28/2019
Bbg Barclays CMBS IG TR	10.0%	0.2%	4.2%	0.9%	3.5%	3.5%	1.0%	-0.2%	Daily	2/28/2019
DJ Brookfield Global Infrastructure Net TR	16.3%	16.0%	16.4%	-14.3%	12.3%	15.9%	-8.3%	-1.5%	Daily	2/28/2019
Alerian MLP Infrastructure TR	4.2%	29.5%	7.6%	-31.7%	18.7%	-8.8%	-11.9%	3.3%	Daily	2/28/2019
Alerian MLP Index	4.8%	27.6%	4.8%	-32.6%	18.3%	-6.5%	-12.4%	4.9%	Daily	2/28/2019
Markit iBoxx EUR Infrastructure Bond Index	12.7%	3.1%	10.3%	-0.5%	4.9%	2.3%	-1.2%	-0.4%	Daily	2/28/2019
Markit iBoxx GBP Infrastructure Bond Index	8.2%	0.8%	8.6%	-1.6%	6.3%	3.3%	-0.8%	-2.9%	Daily	2/28/2019
Markit iBoxx USD Infrastructure Bond Index	11.1%	1.0%	14.9%	-0.1%	14.9%	3.9%	-2.2%	-0.5%	Daily	2/28/2019
Markit iBoxx USD Liquid High Yield Infra. Bond Index	11.3%	3.9%	5.8%	-5.6%	20.9%	9.0%	-0.7%	3.6%	Daily	2/28/2019
Bloomberg Commodity Index	-1.1%	-9.5%	-17.0%	-24.7%	11.8%	1.7%	-11.2%	2.6%	Daily	2/28/2019

Source: Alerian, ARES, Bloomberg, FTSE, Giliberto-Levy, IHS Markit, MSCI, NCREIF, S&P Dow Jones Indices, Wilshire, and DWS. As of December 2018 or latest available.
Note: Highlighted indices are featured in this report.
*As of 6/30/2018

EXHIBIT 72: ROLLING 12-MONTH RETURNS FROM FEBRUARY 2019 FOR THE PAST FIVE YEARS, OR LATEST AVAILABLE, FOR DATA WITH MONTHLY OR DAILY FRE-QUENCY

Index	2/28/2013	2/28/2014	2/28/2015	2/29/2016	2/28/2017	2/28/2018	2/28/2019	Fre-quency	Latest Data
MSCI German OFIX (German Open-Ended Funds)	0.0%	-0.1%	1.1%	1.3%	2.0%	2.5%	2.6%	Monthly	2/28/2019
MSCI/Mercer Australia Core Wholesale Property Fund Index	7.7%	8.7%	9.2%	12.7%	11.1%	12.5%	9.7%	Monthly	2/28/2019

Index	2/28/2013	2/28/2014	2/28/2015	2/29/2016	2/28/2017	2/28/2018	2/28/2019	Fre-quency	Latest Data
ARES Japan Property Index*	3.7%*	5.6%*	7.1%*	8.0%*	6.9%*	6.3%*	6.0%*	Monthly	11/30/2018
ARES Japan Fund Index*	7.0%*	11.1%*	13.8%*	15.4%*	12.7%*	11.0%*	10.0%*	Monthly	11/30/2018
FTSE EPRA/NAREIT Developed Index	19.0%	3.6%	15.6%	-8.5%	12.2%	-0.7%	12.0%	Daily	2/28/2019
FTSE EPRA/NAREIT Developed ex US	22.0%	1.9%	10.4%	-11.9%	10.7%	13.5%	4.6%	Daily	2/28/2019
MSCI US REIT Total Return Index	17.4%	6.8%	22.7%	-4.1%	16.7%	-10.2%	21.4%	Daily	2/28/2019
Wilshire US REIT Index	12.6%	2.5%	19.9%	-6.8%	11.4%	-13.5%	15.5%	Daily	2/28/2019
FTSE EPRA/NAREIT Developed Europe	20.8%	20.0%	38.1%	-9.4%	4.3%	4.0%	6.8%	Daily	2/28/2019
FTSE EPRA NAREIT Europe Ex UK	17.3%	15.5%	13.2%	-9.1%	6.0%	22.5%	-0.7%	Daily	2/28/2019
FTSE EPRA NAREIT UK	19.3%	46.3%	10.6%	-18.7%	-6.1%	12.4%	0.5%	Daily	2/28/2019
FTSE EPRA/NAREIT Asia Index	25.5%	-6.2%	9.6%	-12.2%	13.9%	9.7%	5.9%	Daily	2/28/2019
FTSE EPRA/NAREIT Asia ex Aust. Index	25.4%	-5.3%	7.3%	-14.4%	13.7%	12.5%	4.9%	Daily	2/28/2019
Bbg Barclays IG Reits TR Index	8.4%	1.6%	6.0%	1.3%	5.0%	2.1%	3.6%	Daily	2/28/2019
Bbg Barclays CMBS IG TR	6.5%	1.8%	3.9%	1.9%	2.2%	0.9%	4.2%	Daily	2/28/2019
DJ Brookfield Global Infrastructure Net TR	15.9%	15.1%	11.6%	-13.5%	17.1%	3.9%	10.4%	Daily	2/28/2019
Alerian MLP Infrastructure TR	10.6%	13.6%	7.0%	-40.0%	44.2%	-17.6%	4.4%	Daily	2/28/2019
Alerian MLP Index	5.7%	6.4%	-2.4%	-44.2%	30.9%	-21.2%	-4.4%	Daily	2/28/2019
Markit iBoxx EUR Infrastructure Bond Index	8.5%	5.5%	9.6%	-1.1%	4.1%	1.7%	0.9%	Daily	2/28/2019
Markit iBoxx GBP Infrastructure Bond Index	8.5%	3.9%	15.3%	-2.2%	15.7%	0.6%	2.4%	Daily	2/28/2019
Markit iBoxx USD Infrastructure Bond Index	7.0%	0.5%	9.0%	-5.1%	10.8%	2.6%	2.1%	Daily	2/28/2019
Markit iBoxx USD Liquid High Yield Infra. Bond Index	9.9%	6.0%	6.9%	-7.2%	22.2%	5.3%	6.5%	Daily	2/28/2019
Bloomberg Commodity Index	-7.7%	-1.8%	-22.8%	-26.5%	16.0%	1.6%	-5.7%	Daily	2/28/2019

Source: Alerian, ARES, Bloomberg, FTSE, Giliberto-Levy, IHS Markit, MSCI, NCREIF, Wilshire, and DWS. As of February 2019 or latest available.
*ARES Japan Property Index and ARES Japan Fund Index returns data are for the rolling 12 month period from November 2018 (latest available)

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_ Adverse changes in law and regulation including environmental laws and regulations, zoning laws and other governmental rules and fiscal policies;
_ Environmental claims arising in respect of real estate acquired with undisclosed or unknown environmental problems or as to which inadequate reserves have been established;
_ Changes in the relative popularity of property types and locations;

The opinions and forecasts contained herein sets forth our views as of this date of this report. The underlying assumptions and these views are subject to change without notice. Past performance may not be indicative of future results.

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