# MSCI METHODOLOGY FOR PROPERTY FUND INDEXES

Index Construction Objectives, Guiding Principles and Methodology for the MSCI Real Estate Property Fund Indexes

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# 1 INTRODUCTION

The objective of MSCI Property Fund Indexes is to measure the performance of unlisted pooled structures, including the effects of cash holdings, leverage and fund operating costs, as well as the returns to the underlying real estate assets.

To achieve this objective, indexes are constructed top-down from the financial records of real estate investment funds. This contrasts with, and complements, the MSCI Property Indexes, which are constructed bottom-up from records of individual property assets.

The fund-level data used in constructing the MSCI Property Fund Indexes are generally provided by the managers of funds included in each of the index universes. When available and appropriate, MSCI may supplement this data with information from public sources for particular index reporting purposes.

MSCI employs one of two different calculation methodologies for each of its Property Fund Indexes: either a Unitized or a Modified Dietz computation framework. Both are described in this methodology document. The key differences between these two methodologies relate to their primary focus – that of the end-investor interest in the fund (Unitized) or its aggregated bottom line return delivery (Modified Dietz). Regardless of the specifics of each calculation methodology, the overall fund performance measurement objectives of the indexes remain the same.

# 2 INDEX COMPOSTION

## 2.1 UNIVERSE

All MSCI's Property Fund Indexes are restricted to unlisted pooled structures. Participation, as with all MSCI private real estate indexes, is voluntary and the data requirements are demanding, as the indexes reflect not only the underlying direct property assets, but also the overlay effects of cash holdings, leverage, fees and fund operating costs. Therefore, exhaustive Universe coverage is rarely if ever achieved.

However, the widely shared interest of end investors in a rigorously defined and transparent framework for the comparison of pooled funds' performance track records, often coupled with the active support and collaboration of relevant trade associations, can result in the achievement of high Universe coverage ratios.

## 2.2 INDEX INCLUSION REQUIREMENTS

The inclusion rules for each of MSCI's property fund indexes are detailed in the relevant Property Fund Index methodology document. The index inclusion criteria for Property Fund Indexes will typically include, but are not limited to:

- the investor participation structure of the fund (e.g., open vs. closed-ended)
- the types of investors targeted/eligible (e.g., retail vs. professional)
- any asset-level mandate limitations or underlying real estate allocation (e.g., balanced vs. specialist, domestic vs. international)
- the targeted risk appetite of investors (e.g., core vs. non-core)

Additional criteria will also commonly be introduced for the production of any required sub-indexes drawn from the broader Standard Index universes. A Standard Index is defined by its country or regional (for multinational indexes) scope, its reporting frequency and its basic index methodology, and has the broadest coverage for that market. The Standard Index is also used for determining the thresholds for Index Composition Change and Correction policies.

However, for a vehicle to be eligible for inclusion in any fund index universe, its historical data must first be provided to and then verified by MSCI. This applies across the full range of fund indexes.

## 2.3 CHANGES IN COMPOSITION OF INDEXES

The addition of new funds and the withdrawal/termination of existing funds are normal events in the administration of the MSCI Property Fund Indexes. In accordance with the Index Composition Change Policy, where the resulting index composition change is deemed material, MSCI will publish an index announcement on the MSCI website detailing the change that has been made (for more information on these index composition rules, see the MSCI Real Estate Index Design Guidelines and Policies).

Indexes may be discontinued based on the Index Termination Policy, either if fewer than the required minimum number of funds are eligible and available for inclusion when applying a given methodology to a market, or due to fund dominance.

The index fact sheets on the MSCI website contain a statement of transparency setting out the profile for each index, detailing the number and total value of constituent funds in each market sector.

## 2.4 SUB-INDEXES

For most Standard Property Fund Indexes, sub-indexes are also published. These sub-indexes represent the performance of one or more underlying segments of the Standard Index. The criteria for any breakdown by segment may differ from market to market, but often reflect the categories referenced in the list of inclusion criteria for indexes as detailed above.

While asset-level data are matched with fund-level financial data wherever possible, fund indexes cannot usually be partitioned based on conventional real estate sub-market definitions that separate property uses, geographies and management activities (for example). This is because, however richly detailed the underlying asset data, the fund-level financial overlays – cash balances, fees, debt levels etc., – are not normally assigned to individual assets and thus cannot be incorporated in asset related typologies. Fund grouping rules based upon underlying portfolio asset profiles (e.g., balanced vs. specialist, domestic vs. international) may however be designed and used for sub-index definitions, as long as asset-level data are complete.

Sub-index inclusion rules, together with those for Standard Indexes, are detailed in the relevant property fund index methodology document.

# 3 DATA COLLECTION AND VALIDATION

## 3.1 REAL ESTATE FUND DATA REQUIREMENTS

MSCI calculates direct portfolio level investment performance bottom-up, from records of the individual property assets included. In contrast, fund investment performance is calculated top-down, from the overall financial records of real estate investment funds.

For the MSCI Property Fund Indexes, data are required for each fund as shown in the table below. The data used for calculating the indexes include fund-level Net Asset Values (NAVs), prices and distributions and a range of intermediate fund level financial information including costs, fees, taxes, cash and debt. Details of differences between the data field specifications, dependent upon the standard return computation method (Unitized/Modified Dietz) adopted in each national market, are noted.

A mandatory core set of data, to be used for the calculation of total investment returns, is however required in all markets, in order to render the MSCI Property Fund Indexes comparable across markets. The mandatory data items are also identified below.

In addition, non-mandatory data, often specific to individual national markets, can be provided if available to allow for more detailed analyses and the production of customized sub-indexes. These non-mandatory data fields are currently under review and where possible being standardized by MSCI across markets.

The data provision requirements are highlighted in the MSCI Real Estate Data Provider Code of Conduct. Non-compliance with the Code of Conduct may result in the exclusion of funds from MSCI Property Fund Indexes. More information on data definitions can be found in the MSCI Global Data Standards for Real Estate Investments. Definitions of the data required from providers are also included in the collection template for the relevant Property Fund Index. The collection templates vary by geographic market and are sent to all data providers.

| Data category | Data used for calculating index returns |
|---|---|
| Data for Property Fund Indexes based on Unitized methodology | |
| **NAV** | Total NAV and/or NAV per unit |
| **Units** | Number of units issued |
| **Dividend** | Dividend details / distributions, fees* |
| **Vehicle Capital flows** | Capital invested, capital returned |
| **Currency** | Exchange rates** |
| Data for Property Fund Indexes based on Modified Dietz methodology | |
| **NAV** | Total NAV |
| **Weighted average equity** | Weighted average equity |
| **Dividend** | Dividend details / distributions |
| **Investment income** | Net and gross of fees investment income |
| **Vehicle Capital flows** | Capital invested, capital returned, fees |
| **Currency** | Exchange rates** |

**Fees are not mandatory for all indexes, but are required for calculating gross and net of fees returns.*

***Sourced from WM Reuters*

In addition to the data required to calculate their performance, MSCI uses fund-reported allocations and classification data to assign funds to sub-indexes or to provide aggregated index characteristics. Examples of this category of data are described below.

| Data category | Examples of data used for classification of funds |
|---|---|
| **Property type** | Sector allocation |
| **Geography** | Country allocation |
| **Vehicle structure** | Open/closed, style (i.e., core/non-core) |

### 3.1.1 NET ASSET VALUE REQUIREMENTS

For most financial asset classes, including unlisted pooled funds, investment performance measurement is normally based upon transaction prices. By contrast, unlisted real estate fund investments hold assets which are large, normally indivisible, heterogeneous and illiquid. These characteristics make the formation of purely price-based indexes problematic.

As a result, MSCI Property Fund Indexes are based on Net Asset Values (NAVs), the bulk of the inputs to which are sourced from independent professional valuers. Besides the more generic requirements for the determination of NAV as defined in the MSCI Global Data Standards for real estate investment, there may also be market specific requirements. The detailed NAV requirements are highlighted in the methodology documents specific to the individual property fund index.

# 4 INDEX CALCULATION METHODOLOGY

It should be noted that the bulk of the calculations described below are applicable in the same way to individual funds and to the whole market covered by an index.

## 4.1 DATA PREPARATION FOR INDEX CALCULATION

### 4.1.1 INTERPOLATION OF DATA FOR UNITIZED INDEXES

By excluding capital flows and distributions from the monthly capital employed term (denominator), the MSCI fund (NAV) total return formula effectively times all cash flows to the end of the month. Although in most cases fund managers may execute capital flows at any point during the month, this methodology aims to simplify data provision and allow for fund comparisons on a like-for-like basis, as it excludes the impact of the timing of investor-driven cash flows into the fund.

For those quarterly indexes where no data is received on a monthly basis, for those months between quarter-ends the NAV of the previous period is held down. For biannual and annual indexes, the NAV is interpolated. The distribution for quarterly indexes is also shifted to the latest month if not timed to the month, in order to calculate a correct per unit figure for use in return calculations. For biannual and annual indexes, the distributions are apportioned equally over the months concerned.

### 4.1.2 CROSS HOLDINGS

When one fund in a Property Fund Index has an interest in another included in the same index, the second fund's performance will be over-weighted unless an adjustment is made. The performance of the fund which is cross-held will contribute directly at a weight of 100% of its total NAV as well as indirectly by the ownership percentage of the total NAV of the fund that holds that interest. As a result, the performance of the cross-held fund would be weighed at over 100% of its total NAV in the overall index.

MSCI adjusts for cross holdings in its U.K. and Australia Property Fund Indexes by deducting the amount of the investment from the NAV of the fund in which the investment has been made. In all other markets no correction is made for cross holdings.

For the MSCI/AREF UK Quarterly Property Fund Index, MSCI/Mercer Australia Core Wholesale Monthly Property Fund Index and The Property Council of Australia/MSCI Australia Unlisted Retail Quarterly Property Fund Index, data is collected for the investments in other funds that are parts of that same index, and the above described adjustment is made.

This same adjustment is made for all the sub-indexes within the MSCI/AREF UK Quarterly Property Fund Index, whether or not the cross holding occurs within the same sub-index. No adjustment is made to the sub-indexes of the MSCI/Mercer Australia Core Wholesale Monthly Property Fund Index and The Property Council of Australia/MSCI Australia Unlisted Retail Quarterly Property Fund Index, which therefore deviate from the U.K. practice.

## 4.2 TOTAL RETURN – MODIFIED DIETZ

Modified Dietz methodology defines total return (gross of fees) as:

$$Gross\ Fund\ Return_t = \left(\frac{Appreciation_t + NIY_t}{AvWtdEq_t}\right) * 100$$

**Where:**

$$AvWtdEq_t = NAV_{t-1} + \sum_{i=1}^{n} \left[Days_{i,t} * NCI_{i,t}\right]$$

**And:**

NIYt is the net investment income in month t;
AvWtdEq is average weighted equity*
Daysi,t is the number of days;
NCIi,t is the net capital invested.

The capital component of the numerator ($Appreciation_t$) is defined as the net appreciation of all assets and interests (including real estate, mark-to-market debt adjustment/debt and any other investment or liability), both realized and unrealized, not caused by capital expenditure. The realized and unrealized capital components are adjusted to offset the inclusion of distributed income in net investment income. Net Investment Income is the income net of interest expenses that is reported by the investment during the period. Net Investment Income is gross of advisory fees and incentive fees, and includes both distributed and retained income.

In calculating capital employed a standard Modified Dietz methodology is applied: contributions and capital distributions are added to the start period NAV. Both are weighted to reflect the number of days they have been in the fund.

Net of fees fund level return is defined as:

$$Net\ Fund\ Return_t = \left(\frac{Appreciation_t + NIY_t - Fees_t}{AvWtdEq_t}\right) * 100$$

**Where:**

fees are restricted exclusively to those applied at fund-level (management fees including any incentive fee) but exclude property management costs

The market fund-level return, calculated gross and net of fund-level fees, is defined as:

$$Index\ Return_t = \sum_{i=1}^{n} \left(\frac{WtdAvFdEq_{i,t}}{WtdAvIndEq_t} * FdR_{i,t}\right)$$

**Where:**

$WtdAvFdEq_{i,t}$ is the weighted average equity of fund i in month t;
$WtdAvIndEq_t$ is the weighted average index equity in month t;
$FdR_{i,t}$ is the weighted average return of fund i in month t;

## 4.3 TOTAL INVESTMENT RETURN - UNITIZED

Total return on NAV of Unitized Indexes is calculated as the movement in month-end NAV net of new capital invested, plus any distributions accrued/declared for the current month ("ex-dividend" distributions), expressed as a percentage of the capital employed on a per unit basis, as shown below. If no ex-dividend distribution information is provided or estimated, the distributions included will be those actually made ("as paid").

Capital employed is defined as the previous month-end NAV multiplied by the number of units in issue.

Multi-period measures of performance and index values are time weighted and calculated by the chain-linked compounding of single monthly-period percentage measures.

Funds included in the index are weighted according to their NAV at the beginning of the month in all cases except Australia, where they are weighted according to their NAV at the end of the month.

### 4.3.1 MONTHLY MARKET TOTAL RETURN - UNITIZED

The following formula describes the general fund (NAV) total return calculation for monthly fund performance. It measures the change in NAV per unit from month to month accounting for additional returns from distributions accrued and the effects of capital flows in or out of the fund:

$$Fund\ Return_t = \left(\frac{UtNAV_t - UtNAV_{t-1} - UtNCI_t + UtDist_t}{UtNAV_{t-1}}\right) * 100$$

**Where:**

$UtNAV_t$ is the net asset value per unit in month t;
$UtNCI_t$ is the net capital invested per unit in month t;
$UtDist_t$ is the distribution per unit in month t.

Before being incorporated into an aggregate market measure, each fund's per unit numerator and denominator is multiplied by the number of units in existence at the start of the month. This process ensures that the weight of each fund, in terms of NAV, is reflected in the overall market total return.

$$Market\ Return_t = \left[\frac{\sum_{i=1}^{n}\left(UtR_{i,t} * Units_{i,t-1}\right)}{\sum_{i-1}^{n}\left(UtCapEmp_{i,t-1} * Units_{i,t-1}\right)}\right] * 100$$

**Where:**

n is the number of funds in the market sample;
UtRi,t is the return per unit in month t of fund i;
UtCapEmpi,t-1 is the capital employed per unit in month t-1 of fund i; in Australia the capital employed per unit in month t is used;
Units are the current number of units in issue by each fund in the universe, less cross-holdings (U.K. and Australia only).

All fund total return calculations are undertaken using the NAV, distribution and net capital invested per unit. Applying the components of the total return on a per unit basis ensures that the performance of open-ended and closed-ended funds can be incorporated together in a uniform and consistent structure, making comparisons fairer and allowing for the more accurate incorporation of any corporate actions (rights issues, open offers, etc.) that might otherwise dilute actual fund total returns.

In practice, applying total return components on a per unit basis means that open-ended and closed-ended structures have slightly different return formulas within the MSCI Property Fund Indexes.

### 4.3.2 OPEN-ENDED FUND TOTAL RETURN FORMULA - UNITIZED

For open-ended funds, the change in the number of units from month to month reflects capital flows into and out of the fund. In the fund (NAV) total return calculation, there may be a risk of double counting capital cash flows should a change of units and net capital investment (NCI) be combined in the same calculation. Therefore, net capital expenditure is

not included in the total return calculation for open-ended funds. However, NCI data is required by MSCI as it could be used as part of the validation process.

$$TR_{openfund} = \frac{NAV_{perunit,t} - NAV_{perunit,t-1} + Dist'n_{perunit,t}}{NAV_{perunit,t-1}} \times 100$$

#### 4.3.3 CLOSED-ENDED FUND TOTAL RETURN FORMULA - UNITIZED

Closed-ended funds are not structured to allow for continuous changes in the size of their ownership base and are assumed to have a fixed number of units issued. In cases where closed ended funds do not have a unitized structure, MSCI assumes that the fund comprises a default 1000 units. For closed-ended funds, NCI is included in the total return calculation as the number of units in circulation is not expected to change from month to month, with any return on investment adjusted for capital flows. Although closed-ended funds do not generally take in new money, it is normal for them to periodically draw down committed capital during the investment phase of the fund's life and gradually return capital as it nears the termination date. Including NCI accounts for this process.

$$TR_{closedfund} = \frac{NAV_{perunit,t} - NAV_{perunit,t-1} - NCI_{perunit,t} + Dist'n_{perunit,t}}{NAV_{perunit,t-1}} \times 100$$

### 4.4 LONGER TERM RETURNS

#### 4.4.1 INDEX VALUES

Starting from a base value of 100, each successive index value is calculated by multiplying the preceding index value by (1+monthly return):

$$Index_{t=0} = 100$$
$$Index_t = Index_{t-1} \text{ x } \left[\frac{1 + TR_t}{100}\right]$$

**Where:**

$TR_t$ is the total return for the period t-1 to t, expressed as a ratio

### 4.4.2 MULTI-PERIOD TIME-WEIGHTED TOTAL RETURN

The basis for calculating all annual and quarterly performance measures is time-weighted. Annual measures are calculated by compounding twelve monthly figures and annual figures are shown only when twelve months' figures are available. These measures gives an equal weight to each month. To calculate quarterly and annual returns it is necessary first to construct an index from monthly values.

The 12-month return, for example, is calculated as the percentage change in the index (Xt) over the relevant 12 months.

$$12 \text{ Month Total Return} = \left[\frac{\text{Index}_t}{\text{Index}_{t-12}} - 1\right] \text{x } 100$$

### 4.4.3 ANNUALIZED RATE

The annualized rate is the geometric mean of the individual annual rates of change for a series of years. It is calculated as the $n^{th}$ root of the final indexed score converted back into a percentage:

$$\text{Annualized Rate} = \left[\left(\frac{\text{Index}_t}{\text{Index}_{t=0}}\right)^{1/n} - 1\right] \text{x } 100$$

**Where:**

n is the number of years
$\text{Index}_t$ is the final indexed score.
$\text{Index}_{t=0}$ is the initial indexed score.

## 4.5 DATA RULES FOR PERFORMANCE REPORTING

### 4.5.1 FUND CONFIDENTIALITY RULES

In order to protect the confidentiality of the fund level data provided by each contributor, MSCI applies strict confidentiality rules, which set the minimum number of constituents necessary to permit the reporting of a sample dataset. In any aggregate, the minimum acceptable number of funds is three. However, if all data providers to an index have agreed to disclose individual fund results, some confidentiality rules may cease to apply.

### 4.5.2 FUND DOMINANCE RULES

In order to avoid the possibility of the overwhelming weight of one portfolio compromising the representativeness of an index or benchmark, MSCI employs investor dominance rules and guidelines when determining the composition of an index.

MSCI monitors portfolio dominance in all indexes. When calculating an index, a maximum weight for any single contributing fund is calculated based on NAV. When the weight of a contributor in any index series exceeds 75% of index NAV, the results will not be made available. However, if all data providers to an index have agreed to disclose individual fund results, some confidentiality rules may cease to apply.

## 4.6 RANKING/DISTRIBUTIONS OF RETURNS

A percentile measure indicates the value below which a given percentage of a group of observations fall. For example, the 20$^{th}$ percentile is the value (or score) below which 20 percent of the observations may be found. The term percentile and the related percentile rank are often used to report scores describing performance levels, and are therefore very popular in summarizing a fund's return position within a peer group. For example, if a score is on the 86$^{th}$ percentile, it is higher than 86% of the other scores. In MSCI property fund return reporting, the minimum sample required for showing percentile distributions is at least 10 funds.

The 25$^{th}$ percentile is also known as the first quartile (Q1), the 50$^{th}$ percentile as the median or second quartile (Q2) and the 75$^{th}$ percentile as the third quartile (Q3). In general, percentiles and quartiles are specific types of quantiles.

In computing the weighted average of a compounded measure over longer than one month, a different sample of funds may be included as the period lengthens. When calculating percentiles, only those funds that have contributed in every period are included. Therefore, the ranked sample may be smaller than the weighted aggregate results sample.

## 4.7 POLICY AND PROCEDURE FOR CHANGES IN METHODOLOGY

Major changes to the MSCI Property Fund Indexes methodology are infrequent. In many cases the need for such changes stems from changes to the real estate investment regulatory environment or a shift in industry practices. The former may necessitate a rapid change in methodology while the latter may be a reaction to a more gradual shift in the industry consensus. MSCI takes a considered approach to such methodology changes,

involving both internal and external consultation, a formal internal sign off procedure and the public communication of final decisions concerning the implementation of changes. More information about the methodology change and consultation policy and procedures can be found in the MSCI Real Estate Index Design Guidelines and Policies.

## 4.8 FROZEN HISTORY REPORTING

In most cases, the MSCI Property Fund Indexes are subject to historical restatement when new data become available or corrections are made, in order to maximize the robustness and accuracy of the reported historical results. However, when the sample size for a market is large and the impact of including additional data contributors is therefore relatively small, value may be gained from freezing historical results. A key advantage of fixed histories is that they provide a much more robust base for manager remuneration. The decision to freeze an index dataset is however made only after discussion with local market participants.

Frozen indexes currently include:

- The MSCI/AREF UK Quarterly Property Fund Index.
  The index was originally frozen in June 2005. From this date, funds can only contribute from their first submission that meets MSCI eligibility requirements. In December 2012, due to exceptional circumstances, the index was restated to Q3 2012. At this point, historic fund contributions were refreshed to allow for the correction of data errors. The time periods for which each fund contributes remain unchanged. In January 2019 the index will be restated to Q3 2018, due to minor corrections including certain inputs to cross holdings and to back-calculating the index on a new technology platform.
- The MSCI/Mercer Australia Core Wholesale Monthly Property Fund Index.
  The index was last restated in June 2011, when it was restated to May 2011.

A decision to freeze an index history is based on the likelihood of future revisions to historical data. This in turn will depend upon:

- Market coverage level: The higher the ratio of MSCI data coverage to the estimated total real estate investment market, the greater is the likelihood that historical market results will remain unchanged through the addition of new funds to the dataset.
- Review of historical restatement impacts: Comparing the difference between published results and results including any newly submitted data gives an indication of the consistency of historical results.

- Trends in numbers of portfolios joining the dataset and their perceived likelihood of supplying historical data.

If a decision is taken to freeze an index, that decision will be made by year-end, announced to the public and implemented in the following annual index update cycle.

## 4.9 INDEX COMPOSITES: MARKET SIZE REBALANCING

MSCI's multinational composite Property Fund Indexes aggregate the performance of a set of countries. In contrast to MSCI asset level property indexes, no re-weighting is applied to Property Fund Indexes in producing multinational Property Fund Indexes. Therefore, multinational Property Fund Indexes reflect the weight of the underlying samples as measured by MSCI.

## 4.10 OTHER MARKET INFORMATION REPORTING

### 4.10.1 GEARING

Gearing, or leverage, measures the level of debt in a fund and can be expressed in the following ways:

- Net debt as a percentage of NAV

$$Net\ Debt\ over\ NAV_t = \left(\frac{Gross\ Debt_t - Cash_t}{NAV_t}\right) * 100$$

- Gross debt as a percentage of NAV

$$Gross\ Debt\ over\ NAV_t = \left(\frac{Gross\ Debt_t}{NAV_t}\right) * 100$$

- Gross debt as a percentage of GAV

$$Gross\ Debt\ over\ GAV_t = \left(\frac{Gross\ Debt_t}{GAV_t}\right) * 100$$

### 4.10.2 12-MONTH DISTRIBUTION YIELD OR GROSS YIELD

Gross yield is the historic distribution yield. Except where there is an indication to the contrary, a fund's gross yield is the sum of its distributions per unit over 12 months as a percentage of its net asset value per unit at the end of that period. The distributions included in the calculation are those earned/accrued, rather than paid, during the 12 months, are gross of tax and include capital distributed/returned to investors.

$$Gross\ Yield_t = \left(\frac{\sum_{t=1}^{12} Distributions\ per\ unit_t}{NAV\ per\ unit_t}\right) * 100$$

#### 4.10.3 BID/OFFER SPREAD

Bid/offer spread is calculated as the difference between the latest bid and offer prices of a fund, expressed as a percentage of the latest offer price.

$$Bid/Offer\ Spread_t = \left(\frac{Offer\ Price_t - Bid\ Price_t}{Offer\ Price_t}\right) * 100$$

### 4.11 ANALYTICS – FUND-LEVEL REAL ESTATE EXPLORATORY TECHNIQUES

#### 4.11.1 RECONCILING ASSET-LEVEL AND FUND-LEVEL RETURNS

As well as calculating overall fund-level performance, MSCI measures the impact of each financial layer within the fund upon that overall return.

Starting from the asset level, each financial overlay (debt, cash, etc.) is successively added to the return on the underlying assets to widen the scope of the calculation of fund-level performance. The arithmetic difference between any two successive return levels (before and after a new layer has been added) shows the impact of that given layer.

# 5 APPENDIX: GLOSSARY OF TERMS

| | |
|---|---|
| **Accruals accounting principle** | The assumption that payment is timed to the due date rather than to the date of monetary transfer. |
| **Arithmetic mean** | The sum of numbers in a series divided by the count. |
| **Balanced fund** | Fund that has an exposure or investment strategy to allocate their portfolio into more than one property sector and / or geography. The criteria for the classification of funds may differ between indexes. |
| **Benchmark** | The average against which the performance of a portfolio or group of properties is measured. For MSCI, benchmarks cover all assets and investment holdings including purchases, sales, developments, indirect holdings and where appropriate, other financial assets and liabilities. |
| **Bid/offer spread** | Difference between the bid and offer prices. |
| **Capital employed** | The denominator of the total return, capital growth and income return measures, which is calculated as the sum of the start-period capital value of all assets covered and the capital expenditure over the period. |
| **Drawdowns** | Capital returned to investors (redemptions) by the fund. |
| **Cross holding** | For real estate funds, the holding of a financial interest in another fund. |
| **Development** | Property under construction or land where construction is planned. |
| **Direct investment/holding** | For real estate, properties held within an investment portfolio or fund, either individually or as a group, as distinct from any financial structures that may support them. |
| **Distribution yield** | The sum of a fund's distributions per unit over a period expressed as a percentage of its net asset value per unit at the end of the period. |

| | |
|---|---|
| **Diversified** | See balanced. |
| **Fixed rate currency conversion** | For multinational real estate reporting, a monthly fixed rate method is applied in which monthly fixed rates are used. |
| **Frozen index history** | The case where all historical results are fixed, so that the addition of new data into the relevant dataset will not affect the results stated for earlier periods. |
| **Fund** | A financial structure, usually in the form of a co-ownership vehicle, by which investors come together to hold real estate. The performance of a fund as obtained by its unit-holders derives not only from the properties it contains, but also from the effects of debt (gearing/ leverage), cash holdings and fees. |
| **Gearing** | A measure of the extent to which a fund is indebted or ”leveraged”, usually shown as the ratio of gross or net debt to net asset value (NAV), expressed as a percentage. |
| **Geometric mean** | The nth root of the product of a series of numbers (where n is the count of the numbers). Geometric means are generally used for calculating average rates of growth. |
| **Gross debt** | The total outstanding amount of unpaid debt in a fund, in money terms. |
| **Gross yield** | See distribution yield (used in fund reporting). |
| **Index** | In real estate reporting, a statement of the performance of a real estate market. |
| **Indirect investment/holding** | In real estate, investment in a fund or other financial structure which holds property assets. |
| **Mid-rate** | For currency conversion, the mid-point of bid and offer rates. |
| **Modified Dietz methodology** | A time-weighted method of calculating gross fund level returns, by which the capital employed is modified by the addition of contributions and capital distributions to start-period NAV. This calculation method is used by |

| | |
|---|---|
| | MSCI for fund returns in the U.S. |
| **Multinational** | In MSCI reporting, covering two or more national markets. |
| **Net asset value (NAV)** | The total value of all the assets held in a fund, less the capitalized value of any outstanding liabilities. |
| **Net debt** | The total outstanding amount of unpaid debt in a fund, in money terms, less any cash holdings. |
| **Number of units in issue** | The number of units issued to investors in a fund since its inception that are as yet unredeemed. |
| **Portfolio** | A group of properties or other assets managed as an entity on behalf of an investor or investors. |
| **Professional investor** | A professional investor is either a per se professional client or an elective professional client. Often referred to as an institutional investor or wholesale investor in Australia. |
| **Real Estate Index Committee (REIC)** | The Real Estate Index Committee (REIC) is responsible for overseeing the development and interpretation of methodologies and data collection for real estate index and benchmarking analyses. |
| **Relative return** | The ratio of the return on a portfolio, segment or individual asset, to that of a benchmark, expressed as a percentage. |
| **Retail investor** | An investor who is not a professional investor or an eligible counterparty. Often referred to as non-institutional. |
| **Sector specialist** | Fund that has an exposure or investment strategy to allocate a large proportion of their portfolio into one property sector. The criteria for the classification of funds may differ between indexes. |
| **Sharpe Ratio** | The ratio of the risk premium, defined as the average return less the risk free rate of return, to the total risk of the portfolio, measured by the standard deviation. |
| **Standard Index** | A Standard Index is defined by its country or regional |

| | |
|---|---|
| | (for multinational indexes) scope, its reporting frequency and its basic index methodology, and has the broadest coverage for that market. |
| **Time-weighted** | For performance measures, those in which returns generated for different time periods are weighted equally in producing returns for longer periods, irrespective of the amount of capital employed in each period. |
| **Total return** | The most important measure of overall investment performance used to compare different assets across time periods. It incorporates both capital and income elements, and is calculated as the percentage value change plus net income accrual, relative to the capital employed. |
| **Universe** | A dataset covering a whole investment market for the purposes of an index or for benchmarking. For real estate this is normally defined as a national market area. |
| **Valuation** | The process by which an estimation of market capital value is made for an investment property. The valuation process also generates a large amount of supporting data which is used by MSCI in its analysis of portfolios and markets. |
| **Variable rate currency conversion** | For multinational real estate reporting, converting all currencies throughout the performance history at the exchange rates in effect at the end of each month. |
| **Volatility** | Portfolio or asset risk, defined as the standard deviation of the series of returns around the arithmetic mean. |

# 6 APPENDIX: VERSIONING TABLE

| VERSION | PUBLICATION DATE | KEY CHANGES |
|---|---|---|
| V1.0 | January 2019 | First release of separate document, which was previously included in the MSCI Global Methodology Standards for Real Estate Investments. |

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