UPDATE: GLOBAL METHODOLOGY STANDARDS FOR REAL ESTATE INVESTMENTS

February 2017

CONTENTS

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1 INTRODUCTION

A number of changes will be applied to MSCI's IPD Indexes and market information products from July 12, 2016 onwards. In line with these changes, the Global Methodology Standards for Real Estate Investment will incorporate a number of amendments.

This document highlights the main changes that will be applied to MSCI's IPD Indexes and market information products.

2 WHAT IS CHANGING?

The methodological enhancements impacting the results of MSCI's IPD Indexes will be:

- Discontinuation of discretionary flagging
- Introduction of a new global interpolation method
- Implementation of a global dominance rule
- Amended currency conversion
- New index reweighting
- Standardization of global yields
- New "same store" index type
- Revised assumptions on property management fees
- New global market size reweighting

MSCI's Fund-Level IPD Indexes will not be impacted by these changes.

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3 WHY ARE THESE CHANGES BEING IMPLEMENTED?

The changes incorporated in the revised methodology are the result of over two years of analysis and client consultation by MSCI.

Real estate investment is increasingly recognized as a global asset class by institutional investors. Although the preference for domestic investment remains strong, more and more institutions have adopted a global approach to real estate in order to fully exploit the substantial diversification potential of the asset class.

MSCI is supporting these trends by providing its clients with objective insights to power their multi-asset and multinational portfolio construction and management through sophisticated real estate performance measurement and analytics tools. However, private real estate is a fragmented asset class and to provide meaningful benefits these insights need to allow for integrated measurement and analysis at the fund, asset and tenant level. Also, the methodologies need to be comparable internationally and across asset classes.

In order to promote integrated analysis and comparability, MSCI has begun the ambitious project of enhancing the global consistency of its private real estate indexes and portfolio analytics. This is being done by standardizing the collection of data, the calculation of measures and the classification of markets over the 32 countries it covers.

This global standardization project is being conducted under the governance of MSCI's Real Estate Index Committee and represents a thorough process involving both research by MSCI and consultation with industry experts. This standardization process is not being undertaken from a purely theoretical viewpoint: it is essential that it should create greater benefits for market participants globally, while not losing any of the benefits that lie in locally-generated information.

MSCI believes that these changes to its IPD Indexes and market information products will help to enhance the quality and consistency of the data available in the market.

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4 WHEN WILL THESE CHANGES COME INTO EFFECT?

The new methodology document will be effective from July 12, 2016. Any releases after this date will be subject to the updated methodologies as described in this document.

4.1 INDEX RELEASES

Any IPD Index or market information product released from July 12 2016 onwards will be subject to these methodology changes. Any new release after that will be calculated based on the new methodologies. A full schedule of index releases is available on the MSCI website.

4.2 INDEX FACTSHEETS AND FROZEN INDEXES

New IPD Index factsheets will be updated with each new index release. The exception to this will be for all frozen annual indexes (the UK, France and the Netherlands); a one-off restatement to the IPD UK Monthly Property Index, IPD UK Quarterly Property Index and IPD Netherlands Annual Property Index were made on July 14, August 1, and September 29, 2016, respectively. The IPD France Annual Property Index had undergone a one-off historical restatement on October 24, 2016 and the IPD UK Annual Property Index on March 1, 2017. With each release of restated frozen index results, an updated fact sheet comprising the re-frozen historical restatement is published.

4.3 GLOBAL INTEL AND MULTINATIONAL INTEL

All IPD Indexes and market information currently available through the Analytics Portal on MSCI's Real Estate Reporting Portal are already subject to these methodology changes but are not yet the official results. From July 12, 2016, these data will become the official results after a new release of that particular index.

4.4 DIGESTS

As of July 12 2016, legacy excel-based asset-level digests will no longer contain official results, after a new index release has taken place, and will be decommissioned. Historical products will be avialable for clients via the Report Library on MSCI's Real Estate Reporting Portal.

4.5 KEY CENTERS REPORTS

The Key Centers reports, with detailed geographic segmentations, will continued to be produced using the current methodologies until it is transitions to the online Analytics Portal. From July 12, 2016 onwards though, any excel-based Key Centres reports released

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will be considered unofficial as they won't incorporate the methodology changes described in this document.

4.6 ANALYTICS (PAS) PRODUCTS

At present, most of these methodology changes do not apply to MSCI's private real estate analytics (PAS) products. The exceptions are:

- Revised assumptions on property management fees
- New global market size reweighting

As both of these changes relate to input data assumptions, they will flow through to PAS products as stated in paragraph in 5.8.2 and 5.9.2 respectively.

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5 DETAILED METHODOLOGY CHANGE INFORMATION

5.1 DISCONTINUATION OF DISCRETIONARY FLAGGING

5.1.1 WHY IS THIS CHANGE BEING MADE?

To better reflect the spirit of the IOSCO Principles for Financial Benchmarks, the practice of flagging out assets on a discretionary basis will be removed from the update process for all indexes. The practice of flagging has already stopped in most countries except the UK and Ireland so this change will only impact Indexes in those two countries.

5.2 INTRODUCTION OF A NEW GLOBAL INTERPOLATION METHOD

5.2.1 WHY IS THIS CHANGE BEING MADE?

To reduce inconsistency across national markets, interpolation rules will be standardized. A globally consistent approach to interpolation is to be applied, with the aim of using the best available market evidence of capital growth throughout the year.

5.2.2 NEW METHODOLOGY DETAILS

MSCI calculates estimated capital and rental values for the intervening months for assets that are not valued every month. This interpolation process spreads capital and rental value changes across the period between two genuine data points.

Values will be linearly interpolated for all quarterly indexes. For annual indexes in markets where a quarterly index is published, the quarterly returns will be used to shape the interpolation of the annual index. All other annual indexes will apply linear interpolation. In all cases, capital value interpolation is adjusted for reported intervening capital expenditure.

5.3 IMPLEMENTATION OF A GLOBAL DOMINANCE RULE

5.3.1 WHY IS THIS CHANGE BEING MADE?

To help protect the confidentiality of individual contributors, a new global dominance rule will be implemented to complement the existing ‘5/3 rule’ (any statistical measure must be underpinned by at least five distinct assets, held in three different portfolios).

A dominance threshold of 75% will further ensure the confidentiality of client data and the robustness of the asset-level indexes. This dominance treshold will be the maximum weight of the largest individual contributing portfolio in an index result. It will also allow MSCI to deliver enhanced flexibility through new product ranges, specifically in the form of calculation on demand.

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5.3.2 NEW METHODOLOGY DETAILS

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

MSCI will monitor portfolio dominance in all countries and sectors of the market. When the weight of a contributor in an index exceeds 75% of capital value, results will not be made available

5.4 AMENDED CURRENCY CONVERSION

5.4.1 WHY IS THIS CHANGE BEING MADE?

In the past, historical restatement was needed for local currency return measures in multi-currency indexes like the IPD® Global Annual Property Index. This was because the fixed rate conversion employed was based on a single set of exchange rates, set as at the end of the reporting period and would change with every new release.To prevent restatement in local currency indexes, MSCI is changing its standard methodology for calculating constant exchange rate returns. The new method aims to neutralize currency effects from month to month rather than over longer reporting periods.

In response to client feedback, MSCI is also changing the timing of the currency conversion of capital expenditure, from the current month-end rate to the prior month-end rate, in order to reflect the same treatment about the timing of capital expenditures in the return calculations.

5.4.2 NEW METHODOLOGY DETAILS

Many of our real estate multi-national indexes cover more than one currency area. As the underlying property or fund data are always collected in local currency terms, the calculation of these indexes requires values to be converted to a common currency. Depending on the use of the output, this calculation is either performed on a fixed ('local currency') or variable exchange rate. The change of the amended currency conversion only applies to fixed rate conversion, but the change related to the timing of the capital expenditure also applies to other currency coversions.

Fixed rate conversion

In the past, for fixed-rate reporting, all historical data were converted at a single exchange rate as at the end of the most recent reporting period, with the result that no currency impact was seen in the reported results. This method was used for clients requiring local currency reporting and in national digest products.

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Under the new methodology, a monthly fixed rate method will be applied, eliminating the need for historical restatements. This methodology will now be applied to different performance measures as follows:

- For growth measures, we will convert the relevant input data using a single exchange rate, that of the base month. For example, the data required for December 2014 growth rates will be converted at the November 2014 exchange rate.
- For all spot measures – such as capital value, rent passing, rental value and capital expenditure – with data collected as at month-end, we will convert values using the corresponding month-end exchange rate. For example, December 2014 rent passing will be converted using the December 2014 exchange rate.
- Similarly for spot ratios, such as gross rent passing yield, the appropriate month end exchange rate will be used to convert both the numerator and denominator values in the calculation.
- For measures calculated by summation over time, such as 12-month net investment and net income per square meter (where the numerator is calculated by summation), conversion will be performed every month.

5.5 NEW INDEX REWEIGHTING

5.5.1 WHY IS THIS CHANGE BEING MADE?

To bring the reweighting methodology into line with the total return calculation, MSCI is changing the standard multiplier approach used for rebalancing asset-level indexes/benchmarks to reflect capital employed (defined as the value of an asset/assets held at the beginning of the computation period plus purchase, development and other capital expenditure during the period). Rebalancing multipliers will be applied on a continuous monthly basis, removing the need for historical restatement.

5.5.2 NEW METHODOLOGY DETAILS

For multinational composite indexes, the performance of a set of countries is aggregated, requiring the results from each country to be re-weighted in a consistent way. As MSCI is unable to provide 100% market coverage due to the voluntary basis of data submission, the level of coverage varies from country to country. Results from each country must therefore be re-weighted to reflect underlying market sizes as accurately as possible.

For multinational market reweighted results from 2016 onwards, country weights will be calculated from estimates of the investment capital employed in each market. To adjust capital value weights to estimate weights of capital employed, we assume the same level of

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activity in the market as we have recorded within the universe data. The ratio of capital employed to capital value for each month in the universe data will be applied to the estimated market capital value, to approximate the market capital employed.

5.6 STANDARDIZATION OF GLOBAL YIELDS

5.6.1 WHY IS THIS CHANGE BEING MADE?

To promote cross country comparisons, MSCI is standardizing a number of yield measures as well as increasing the number of yields availble, to provide additional insights. Because gross capital value is not yet available for all markets, yields will be calculated on the basis of net capital value, with the exception of the equivalent yield.

5.6.2 NEW METHODOLOGY DETAILS

New yield measures are to be added, based on net capital value. Full details, including formulae, will be available in the Global Data Standards for Real Estate Investments. The new yields are:

- Net reversionary yield
- Net initial yield
- Net income receivable yield
- Gross rent passing yield
- Gross rent receivable yield
- Gross reversionary yield

5.7 NEW "SAME STORE" INDEX TYPE

5.7.1 NEW METHODOLOGY DETAILS

To provide clients with more flexibility, a new index type is being introduced. The same store sample is a subset of standing investments, with the same asset exclusion rules. Same store filters ensure a consistent sample of assets across a measurement period, comprising only those assets present at both the start and the end of a measurement period, and not in (re)development or subject to any part transactions. The same store sample also results in the same status being given to properties that are submitted on a quarterly and annual basis as standing investments.

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5.8 REVISED ASSUMPTIONS ON PROPERTY MANAGEMENT FEES

5.8.1 WHY IS THIS CHANGE BEING MADE?

To better reflect property management fees for clients unable to supply this data, the standard assumptions have been updated, based on actual data submitted by those clients able to provide it. Default rates have been updated based on recorded costs at the sector level.

5.8.2 NEW METHODOLOGY DETAILS

MSCI base (property) management fees for the UK, Ireland and France are calculated as a percentage of the rent receivable in cases where no property management fees have been submitted. The calculated fees are based on the base management fees of clients that have submitted this data. These standard assumptions are defined at a sector level, and will be reviewed annually by the Real Estate Index Committee. The table below lists the assumptions to be used in the July 2016 IPD® UK Monthly Property Index and in all subsequent reporting for the UK. For the UK annual index, the old rates will be used up to June 30 2016, after which the new rates will come into effect. The same will apply for the France bi-annual index, but for the France annual index the new rates will apply to the whole year, effectively from January 1st 2016 onwards.

	OFFICES	RETAIL	INDUSTRIAL	RESIDENTIAL	OTHER
UK	0.8%	1.2%	1.4%	6.9%	1.8%
Ireland	1.1%	1.5%	0.9%	6.9%	1.8%
France	3.2%	3.2%	2.2%	8.2%	3.8%

5.9 NEW GLOBAL MARKET SIZE REWEIGHTING

5.9.1 WHY IS THIS CHANGE BEING MADE?

To bring greater transparency and predictability to the market size reweighting process, MSCI is adopting a new approach to calculating target market weights. Instead of interpolating between annual market size estimates, target weights will be based on the previous year-end market size estimate and extrapolated forward 12 months using MSCI capital growth rates.

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5.9.2 NEW METHODOLOGY DETAILS

From 2016, the weights will be calculated from estimates of the investment capital employed in each real estate market included. To adjust capital value to estimate capital employed, we will assume the same level of activity in the market as we have recorded within the universe data. The ratio of capital employed to capital value for each month in the universe data will be applied to the estimated market capital value, to approximate the market capital employed.

For deriving the market size estimate the following process is applied:

1. The values of the market size estimates are to be set as the period-start market size. These estimates are denominated in domestic currency. The period-start market size estimates will be announced in May of the index year, based on the MSCI market size estimate (e.g., in May 2017 the index weights for start values used in the reweighting of 2017 year performance will be announced).
2. Intervening month-end market sizes are to be derived by applying domestic currency capital growth (denominated in local currency) to period-start estimates. In order to ensure consistent weights for both quarterly and annual indexes, capital growth is computed from quarterly indexes where such indexes are available.
3. Estimated market capital values are to be converted into estimated capital employed by applying capital employed adjustment ratios, the ratio of capital employed to capital value in MSCI's sample.
4. Currency conversion is to be applied to the intervening month-end capital employed estimates at the month-end currency rate.

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6 VERSIONING TABLE

Version	Publication date	Section	Changes
V1.0	June 2016		Original statement regarding changes to the global methodology standards for real estate investments
V1.1	September 2016	4.2 Index factsheets and frozen indexes	Revised release date of the one-off historical restatement of the frozen IPD UK Annual Property Index: October 24, 2016 instead of the earlier stated September 29, 2016
V1.2	September 2016	4.2 Index factsheets and frozen indexes	Revised release date of the one-off historical restatement of the frozen IPD France Annual Property Index: October 24, 2016 instead of the earlier stated September 29, 2016
V1.3	October 2016	4.2 Index factsheets and frozen indexes	Revised note to communicate completion of one-off historical restatement of the frozen IPD UK Monthly Property Index, IPD UK Quarterly Property Index, IPD Netherlands Annual Property Index and deferment of IPD UK Annual Property Index to a later date instead of the earlier stated October 24, 2016
V1.4	February 2017	4.2 Index factsheets and frozen indexes	Revised release date of the one-off historical restatement of the frozen IPD UK Annual Property Index from a not communicated later date to March 1, 2017.

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