METHODOLOGY CHANGES FOR MSCI REAL ESTATE ANALYTICS PRODUCTS

January 2019

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1 INTRODUCTION

A number of enhancements will be applied to MSCI's real estate analytics products. In line with these changes, the Global Methodology Standards for Real Estate Investment have incorporated a number of enhancements. These enhancements are a reflection of the increasing need from investors and managers to have a single globally standardized methodology for real estate indexes, benchmarks, portfolio analysis and integration into multi-asset class analysis and risk management.

This document highlights the main changes that will be applied to MSCI's real estate analytics products based on MSCI Global Methodology Standards for Real Estate Investment.

2 WHAT IS CHANGING?

All the enhancements have been already implemented in MSCI's market information products and will be reflected in MSCI's real estate analytics products based on the Global Methodology Standards for Real Estate Investment. The changes have been highlighted below:

- Discontinuation of discretionary flagging*
- Introduction of a new global interpolation method*
- Implementation of a global dominance rule*
- Amended currency conversion*
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- New "same store" index type*
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* Announced in the Summary of changes – Global Methodology Standards for Real Estate Investments (February 2017).
** Announced in Clarification on change in Index Methodology for IPD Korea Annual Property Index in March 2017

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 started 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 private real estate indexes, market information and analytics products will help to enhance the quality and consistency of the data available in the market.

4 WHEN WILL THESE CHANGES COME INTO EFFECT?

4.1 MARKET INFORMATION PRODUCTS

The new methodology became effective from July 12, 2016 in all market information products (i.e. Index Fact sheets and Global Intel). Any releases after this date were subject to the updated methodologies as described in this document.

4.2 ANALYTICS PRODUCTS

This methodology will be implemented in MSCI's private real estate analytics products (MSCI Real Estate Enterprise Analytics) which are based on MSCI's Global Methodology Standards for real estate investments which might be delivered alongside the legacy products on the MSCI reporting portal.

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 threshold 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.

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 multicurrency 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 conversions.

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.

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 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 available, 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.

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
U.K.	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.

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

5.10 CHANGE IN TREATMENT OF TENANT DEPOSITS IN KOREA

5.10.1 WHY IS THIS CHANGE BEING MADE?

This change improves the global comparability of MSCI's real estate indexes. The original practice was to deduct Chonsei (a refundable tenant deposit specific to Korea) from the denominator of the total return, income return and capital growth. Tenant deposits however shouldn't have an impact at the direct property level performance. The direct property assets results exclude the impact of indirectly held real estate investment, debt (incl. other liabilities), fund management fees, corporate taxation and cash

5.10.2 NEW METHODOLOGY DETAILS

The change is to discontinue the practice of considering Chonsei (a refundable tenant deposit specific to Korea) in the calculation of performance measures at the asset level in IPD Korea Annual Property Index.

5.11 UNALLOCATED EXPENDITURE AND RECEIPT RECORDS

5.11.1 WHY IS THIS CHANGE BEING MADE?

To align the sample of the analytics products with the Direct Properties Index dataset sample, it was decided to exclude the Unallocated Expenditure and Receipt records from the products. In the legacy methodology, these were already excluded from the Index dataset sample, but not in the analytics products.

While the unallocated items are excluded from Direct Property Indexes, those will still be included in the Fund Level results, which includes other assets and other layers of revenue of costs beyond the Direct Property level.

5.11.2 NEW METHODOLOGY DETAILS

As per new methodology the unallocated expenditure and receipt records for both revenue and capital account will be excluded from analytics products. These unallocated records were only contributing to the dataset level performance in the legacy products and did not contribute to the sector/segment level results.

5.12 OWNER OCCUPIED ASSETS

5.12.1 WHY IS THIS CHANGE BEING MADE?

To align the asset inclusion rules to make them consistent across MSCI's analytics products and Market information products, the owner occupied assets are to be included in results from both datasets. This enables inclusion of owner occupied assets as a sub-category of Direct property within the Indexes. By including owner occupied assets all Direct Property assets are being included in the all assets filter. The requirement for the inclusion of the owner occupied assets is that they are valued on the basis of the valuation requirements for all other assets.

5.12.2 NEW METHODOLOGY DETAILS

As a standard criteria the owner occupied assets were earlier excluded from the Market information products as well as analytics products. These were included in analytics products, only based on client specification. Based on the changed inclusion rules owner occupied assets will be included in analytics products as well as Index dataset sample at the all assets level.

Owner occupied assets are not included under Standing investments and instead considered as Non-operating assets.

5.13 PERFORMANCE STATUS – STANDING INVESTMENTS DEFINITION

5.13.1 WHY IS THIS CHANGE BEING MADE?

In an endeavour to align the standard asset exclusion rules for analytics products with the Direct Properties Index dataset, it was decided that the Standing investment definition be revised for analytics products. A global definition has been implemented to reflect as much as possible the market of completed and lettable assets without any transaction activity. Also assets that don't have normal performance characteristics of completed and lettable assets are excluded like short leasehold assets with high income return or ground lease assets which have a very low income return.

5.13.2 NEW METHODOLOGY DETAILS

The change to the classification of Standing investment are the following:

1. Land asset - As per new methodology, a land asset (refers to Land for commercial development, not farmland or forestry) is considered as a 'Development' asset regardless of any development activity taking place (or lack of it) during the measurement period.

As per the legacy methodology a Land asset with no transaction or development activity was considered as a 'Standing investment'.

Also – the Standing investment definition excludes the following:

2. Short leasehold assets
3. Ground rent assets

As per legacy criteria, Short leasehold and Ground rent assets were included within Standing Investments sample for analytics products while being excluded from the Market information products.

The owner occupied assets were however excluded from the Index dataset as well as analytics products in legacy, as a standard criteria. If the client specifications required owner occupied assets to be included within analytics products, then those were treated as 'Standing investments' if there was no activity in the asset during the measurement period.

5.14 HELD DOWN VALUATIONS

5.14.1 WHY IS THIS CHANGE BEING MADE?

In some markets there are asynchronous valuation regimes which means that only a portion of the entire stock is valued at every index calculation date. In such markets, most recent available valuations are held down for current index measurement period for the non-valued assets. Such assets with held-down valuations were included under 'Standing investment' sample on the legacy analytics products.

For such asynchronous valuation regimes, excluding held-down assets altogether from the Index sample would have reduced the Index sample for every measurement period and resulted in historical restatements due to assets entering the history based on latest valuations. However after client consultations, MSCI decided not to exclude held-down assets altogether from the Index sample and instead of classifying them as 'Standing investments' these are now included under 'Non-operating' assets sample and included in the "all asset" filter.

5.14.2 NEW METHODOLOGY DETAILS

Indexes for markets with asynchronous valuation frequency include assets within the dataset which have not been valued for the latest reporting period. The capital values for such assets are held-down for the latest period due to lack of valuations.

For the period in which the values are held-down, such assets are excluded from the 'Standing investment' sample as per new methodology. In legacy these used to be included under 'Standing investments' if there was no transaction or development activity within the asset. If a genuine valuation will become available the capital value of the assets in the periods the value was held down will be updated based on the interpolation between the previous and current valuation.

5.15 CAPITAL VALUE AND FLOOR SPACE BASED SEGMENTATION

5.15.1 WHY IS THIS CHANGE BEING MADE?

For a segmentation defined by the capital value, floorspace of an asset as well as to other periodic classifications, the classification for full history of an asset was based on a single floorspace or capital value range and was using the most recent floorspace or capital value of the asset (at latest capital value point or floorspace during sale).

Thus, in order to enable a dynamic classification for history based on floorspace or capital value changes through the life of an asset, the floorspace or capital value is continuously reviewed as per new methodology and classified appropriately in history.

5.15.2 NEW METHODOLOGY DETAILS

For a segmentation defined using asset capital value, floorspace of an asset as well as to other periodic classifications, an asset is assessed as at the start of each measurement period, as per new method, and accordingly classified in the corresponding capital value or floorspace range within segmentation.

As per old methodology the assessment and classification used to be based on the final floorspace and capital value of the asset (most recent or during sale).

5.16 PROPERTY TYPE SECTOR CHANGES

5.16.1 WHY IS THIS CHANGE BEING MADE?

In order to aid a better analysis going forward, MSCI decided to change structure of a few sectors by re-aligning the constituent property types on a global basis. This allows multinational investors a better and consistent comparison of sector results across markets.

5.16.2 NEW METHODOLOGY DETAILS

As per the revised property type classification for sector composition, the following changes have been made:

1. Laboratories are now included within Industrial sector as per revised classification. As per legacy, laboratories were not part of any of the primary defined sectors (i.e. Retail, Office, Industrial, Residential, Hotel) and were reported as part of the sector “other”.
2. Nursing homes and Care homes are now considered as Healthcare as per revised classification. Because Healthcare is not part of any of the primary defined sectors (i.e. Retail, Office, Industrial, Residential, Hotel) it will be reported as part of the sector “other”. As per legacy, Nursing homes and Care homes were included under ‘Residential’ sector.
3. Outlet centres are now considered as Shopping Centres as per revised classification at the Property Type level, but will remain as part of the sector “retail”.

To allow for local deviations under the sector composition in the national level specific segmentation the classification could differ from the Global Property Type classification.

5.17 ATTRIBUTION MEASURES

5.17.1 WHY IS THIS CHANGE BEING MADE?

The sum of allocation and selection results would ideally equal the relative return of the portfolio against the benchmark. However in case of large changes in capital employed or significant expenditure in the analysis period a reconciliation term (residual) would be generated in the legacy analytics analysis. To resolve for this, the Selection (property score) formula has been amended to adjust for the residual. The new methodology is aligned to the industry best practice to include the residual in the Selection.

The Allocation (structure score) formula is unchanged except for the USA. In legacy for the USA, the residual of relative return and the attribution analysis is removed by apportioning it across the 'Allocation' results. However in order to align the analysis more closely with other asset classes, the residual is now apportioned across the segment 'Selection' results.

Attribution measures are only a part of analytics products. Market data products are not affected by this change.

5.17.2 NEW METHODOLOGY DETAILS

Similar to legacy, the un-apportioned selection results are calculated monthly and then compounded for the analysis period. In the legacy products there was a residual. The residual between Relative return and Attribution measures has been removed by apportioning it across the segments selection results for the measurement period, so that the allocation and selection score always sums up to the relative return. The residual is apportioned by segment average capital employed weight.

5.18 WEIGHTED CONTRIBUTION

5.18.1 WHY IS THIS CHANGE BEING MADE?

Ideally the sum of the individual asset or segment weighted contributions would equal the absolute/ relative return. However in case of a large change in capital employed or significant expenditure during the analysis period, a reconciliation term (residual) would be generated in the legacy analytics products. To resolve for this, the weighted contribution formulae have been amended to remove the residual as well as the weighted contribution calculation has changed by calculating this on a monthly basis while in the legacy products it was calculated based on the periods average capital employed.

NEW METHODOLOGY DETAILS

The residual generated between Relative return and the Sum of Weighted contribution of relative return is now apportioned across all assets in the portfolio, such that the allocation and selection score always sums up to the relative return. The apportioning is based on average capital employed weights during the analysis period.

Weighted contribution measures are only a part of analytics products. Market information products are not affected by this change. This change to the apportioning is only applicable to markets other than USA. Calculation methodology for USA remains unchanged.

5.19 VACANCY RATE - FINANCIAL

5.19.1 WHY IS THIS CHANGE BEING MADE?

There are multiple calculation methods to derive financial vacancy rate in legacy based on individual markets. In an endeavour to standardize across markets, a single calculation has been applied across all markets to reflect the vacancy within standing investment assets at asset level. In the past certain types of rental units were excluded from the calculation of the total market rental value as well as non-standing investment units within a bigger property were excluded.

5.19.2 NEW METHODOLOGY DETAILS

Financial vacancy rate is calculated as follows :-

Vacancy rate (Financial) % = (Vacant Market Rental value / Total Market rental value)

6 VERSIONING TABLE

Version	Publication date	Section	Changes
V1.0	November 2018		Original statement regarding methodology changes in MSCI's analytics products to be aligned to the global methodology standards for real estate investments

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ABOUT MSCI

For more than 40 years, MSCI's research-based indexes and analytics have helped the world's leading investors build and manage better portfolios. Clients rely on our offerings for deeper insights into the drivers of performance and risk in their portfolios, broad asset class coverage and innovative research.

Our line of products and services includes indexes, analytical models, data, real estate benchmarks and ESG research.

MSCI serves 99 of the top 100 largest money managers, according to the most recent P&I ranking.

For more information, visit us at www.msci.com.