



IOS/MBX/PO – BENCHMARK STATEMENT

1. General Disclosures	
Benchmark family name	IOS/MBX/PO Indices
Benchmark administrator	IHS Markit Benchmark Administration Ltd. (IMBA UK)
Date of initial publication of this document	9 July 2018
Date of last update to this document	1 October 2020
ISIN (where available)	There are presently no ISINs available or accessible for the benchmarks covered by this Benchmark Statement.
Determination by contributions of input data	The administrator does not receive contributions of “input data” as defined by BMR.
Qualification of the benchmark family	The IOS/MBX/PO index family is administered as a significant benchmark.
2. Climate-related disclosures	
Type of benchmark family	Other benchmarks
Name of the benchmark	IOS/MBX/PO benchmarks
Does the benchmark pursue ESG objectives?	No
Where the answer to the above question is negative, is any EU Climate Transition Benchmark or EU Paris-Aligned Benchmark	Yes

<p>available in the portfolio of IMBA UK or does IMBA UK have benchmarks that pursue ESG objectives or take into consider ESG factors?</p>	
<p>3. Key information relating to the benchmark or family of benchmarks</p>	
<p>General description of the market or economic reality</p>	<p>Each IOS, MBX and PO Index is composed of the interest, principal and combined components of US residential mortgage loan pools issued by Fannie Mae (The Federal National Mortgage Association) or Ginnie Mae (The Government National Mortgage Association) during the designated period that meet the criteria specified in the index rules.</p>
<p>Geographical boundaries of the market or economic reality</p>	<p>As above, each IOS, MBX and PO Index is composed of the interest, principal and combined components of US residential mortgage loan pools issued by Fannie Mae or Ginnie Mae.</p>
<p>Other relevant information relating to the market or economic reality</p>	<p>Any IOS, MBX or PO Index launched shall meet the following criteria:</p> <ol style="list-style-type: none"> 1. Each related reference pool must be designated by Fannie Mae or Ginnie Mae; 2. Each reference pool must be USD-denominated and bear a fixed rate; 3. Each reference pool must contain fixed rate, conventional, residential mortgage loans with an original stated maturity of 30 years or less; 4. Each reference pool must have been issued within the related designated period; 5. The monthly report (or other similar periodic statement) issued by Fannie Mae or Ginnie Mae related to each reference pool must be reasonably obtainable by the administrator.
<p>4. The potential limitations of the benchmark and the circumstances in which the measurement of the market or economic reality may become unreliable</p>	
<p>Circumstances in which we would lack sufficient input data to determine the benchmark according to the methodology</p>	<p>No benchmark will be calculated in the event an index receives two or less price submissions.</p>
<p>Circumstances in which the degree of liquidity of the underlying market becomes insufficient to ensure the integrity and reliability of the</p>	<p>Liquidity in the indices has declined over time, with trading no longer occurring on a regular basis. As a result, the closing mid-market prices submitted by participants may be estimated values for</p>

benchmark determination according to the methodology	transactions under the applicable Standard Terms Supplement , rather than actual transacted prices.
5. The controls and rules that govern the exercise of judgment or discretion in the calculation of the benchmark or family of benchmarks	
<p>Position of each function or body that may exercise discretion in the calculation of a benchmark and governance thereof</p>	<p>The administrator’s indices are rules based and do not typically permit the use of discretion unless there are exceptional circumstances that are not addressed by either the index rules or an administrator policy. Such scenarios may include (but are not limited to):</p> <ul style="list-style-type: none"> • Failure of data providers; • Significant changes to the underlying market; • Complex corporate events; • Action by governmental or regulatory bodies that causes market disruption; • Events beyond human control. <p>In the event that the administrator needs to take action or make a decision that has not been foreseen by the methodology or associated policy, senior members of the administration team will consult internally with the applicable senior product management committee and externally, when appropriate, with the Index Advisory Committee; this is to arrive at a decision that is consistent with the objective of the index in question and that causes minimal disruption to index stakeholders.</p> <p>Any changes to the index methodology or cessations will be decided upon as per IMBA's Benchmark Methodology Changes and Cessation policy (available here). Where a proposed methodology change is material IMBA will launch a wider consultation which is addressed to all relevant stakeholders. It will also notify the Board of the administrator and the Benchmark Oversight Committee who will oversee the consultation process and can challenge the suggested approach. A methodology change is likely to be material if it has a substantial impact on the index calculation process or formula, the quality of the input data, the index selection rules, the underlying market or reality measured, the panel of contributors to the benchmark, or the benchmark level.</p>
Ex-post evaluation process	As above, the exercise of judgment or discretion in the calculation is guided by precise internal guidelines to ensure that no conflict of interest arises and that the IOS/MBX/PO Indices continue to reflect the underlying economic reality. To the extent there is feedback or comment on the use of

expert judgment or discretion, the administrator will review those comments at the earliest opportunity.

6. Review of the methodology and changes to, or cessation of, the benchmark or family of benchmarks

The methodology

For each index, the administrator will solicit closing mid-market prices (excluding any accrued fixed amount) from all eligible members. For the IOS Indices, dealers submit mid-market prices (excluding any accrued fixed amount) for the interest component of the related reference pools.

For the PO Indices, dealers submit mid-market prices (excluding any accrued fixed amount) for the principal component of the related reference pools.

For the MBX Indices, dealers submit mid-market prices (excluding any accrued fixed amount) for the interest and principal components of the related reference pools.

Such prices will be submitted either by spreadsheet (or any other electronic delivery format designated as acceptable by the administrator) or, later, via the administrator's automated mechanism between 3:00 p.m. and 4:00 p.m. each day other than Saturday, Sunday, and United States Federal Holidays; provided that on any day that Securities Industry and Financial Markets Association ("SIFMA") recommends closing the fixed income markets early, prices will be submitted within thirty (30) minutes after the time set by SIFMA for the closing of the fixed income markets.

The administrator will employ a filtering process which entails taking the received quotes, discarding the top and bottom quartiles and taking the arithmetic mean of what remains. The quoted fixing value will be reported as a price rounded to the nearest 1/64th of a percentage. The number of prices q in each discarded quartile will be given by $q = \text{int}(N_c/4)$ where N_c is the total number of contributors. Examples are shown in the table below.

Table of Discarded Quartile Examples

Number of Submitters	Upper Quartile Discards	Lower Quartile Discards	Number of Submissions used in Composite
1	0	0	No composite calculated
3	0	0	3
4	1	1	2

5	1	1	3
7	1	1	5
8	2	2	4
11	2	2	7
12	3	3	6
15	3	3	9
16	4	4	8
19	4	4	11
20	5	5	10

The administrator strives to provide index information of the highest accuracy to its customers and to conduct its business with integrity. However, the administrator recognizes that in some situations inaccuracies can arise that may warrant a restatement of the MBX, IOS and PO Indices. Such inaccuracies may be caused by a range of events including, but not limited to:

1. Late data delivery or data updates from external parties;
2. Unavailability of up-to-date pricing data at the time of index calculation;
3. Index identification errors, which could occur because of the submitted pricing level being applied to the incorrect index or sub-index.

The administrator has implemented checks to capture and validate exceptions which could indicate an error or data problem. These include checks for instances when not enough submissions are received for publishing a composite price for the indices. Any exception identified through checks is reviewed by the administrator and analyzed for potential problems. In the event that the exception is caused by an error, the index analysts will attempt to correct the error before official publication.

In the instance an inaccuracy is not caught and resolved before index calculation and publication, or if input data received is revised retrospectively, the administrator will review the impact on affected index values. In order to decide whether to restate an index, the administrator takes multiple factors into consideration including:

1. The size of the deviation between published and updated index levels;

	<ol style="list-style-type: none"> 2. Dates of the restatement period, in particular: <ol style="list-style-type: none"> a. Whether the restatement affects month-end index levels, b. How recent the restatement period is; c. The length of the period to be restated; 3. Client impact; 4. Index usage. <p>If the administrator decides to revise the index values, the reason for the revision together with revised material will be published. In addition, the administrator will compile an incident report to summarize the incident, the root cause, and set forth remedial actions to avoid such an error report in the future, where such remedial actions are applicable.</p> <p>Further details of the administrator's Restatement policy is available on the administrator's website here.</p> <p>Eligible members reserve the right to stop submitting prices on any index with less than 10 (ten) trades outstanding in the DTCC Trade Information Warehouse Section 1 Open Positions report.</p> <p>In order to calculate the official composite value for a particular index, the administrator must receive closing mid-market prices from three (3) eligible members. If, on any date, the administrator receives fewer than three (3) closing mid-market prices for an index, the administrator will not publish a composite value for such index on such date. The methodology for calculating an official composite value for an index will be subject to change upon an affirmative vote of at least seventy-five percent (75%) of eligible members.</p> <p>The methodology is subject to at least annual review by the administrator. Such review is approved by the Board and presented to the Benchmark Oversight Committee.</p>
<p>Possible impacts of changes to, or the cessation of the benchmarks upon the financial contracts, financial instruments that reference the benchmark or the measurement of the performance of investment funds</p>	<p>It is possible that factors, including external factors beyond the control of the administrator, may necessitate changes to, or the cessation of, the IOS, MBX and PO Indices.</p> <p>It is possible that changes to, or the cessation of, the IOS, MBX and PO Indices may have an impact upon the financial instruments that reference the indices.</p> <p>In the event the administrator is unable to calculate a composite price, counterparties will have to agree to a substitute for the index or appoint an independent third party to value the index and calculate ongoing settlements. If neither of these two options are fulfilled, the trade will terminate based on the last known composite price the administrator calculated.</p>

	Further details of the administrator's Change and Cessation policy is available on the administrator's website here .
7. Key Terms	
Board	means the Board of Directors of IMBA UK
Benchmark Oversight Committee	means the independent function overseeing the IMBA UK Board with regard to the administration of the IOS/MBX/PO Indices
ESG	means Environmental, Social, and Governance, recognised as the three central pillars measuring sustainability and societal impact of institutions, sovereigns, or other entities
IHS Markit Benchmark Administration Ltd. (IMBA UK)	means the administrator, which is the UK entity authorised by the FCA responsible for the daily provision of the IOS/MBX/PO Indices
Index Administration Committee	means the committee with responsibility for overseeing day to day administration of the IOS/MBX/PO Indices
IOS	means the synthetic total return swap indices referencing the interest component of fixed rate mortgage pools of a specific Agency, coupon, and cohort(s).
MBX	means the synthetic total return swap indices referencing the cash flows (interest and principal components) of fixed rate mortgage pools of a specific Agency, coupon, and cohort(s).
PO	means the synthetic total return swap indices referencing the principal component of fixed rate mortgage pools of a specific Agency, coupon, and cohort(s).
Standard Terms Supplement	means the 12 September 2010 document incorporating by reference the definitions and provisions contained in the 2006 ISDA Definitions, as published by the International Swaps and Derivatives Association, Inc. which govern all trades on the IOS, MBX and PO indices.
8. Additional information	

Additional information	For more information, including methodology documents please visit https://ihsmarkit.com/products/indices.html or contact us at indices@ihsmarkit.com .
9. Document governance	
Document name	IOS/MBX/PO Benchmark Statement
Document owner	Regulatory Compliance
Applies to	IOS/MBX/PO benchmark family
Approved by	Board of IHS Markit Benchmark Administration Ltd. and Benchmark Oversight Committee
Date of Last review	1 October 2020

IMPORTANT:

This Benchmark Statement will be updated whenever the information it provides is no longer correct or sufficiently precise and at least where:

(a) there is a change in the type of the benchmark;

(b) there is a material change in the methodology for determining the benchmark or, where the Benchmark Statement refers to a family of benchmarks, in the methodology for determining any benchmark within the family of benchmarks.

This Benchmark Statement will be updated at least every two years.

ABOUT US

IHS Markit (NYSE: INFO) is a world leader in critical information, analytics and expertise to forge solutions for the major industries and markets that drive economies worldwide. The company delivers next-generation information, analytics and solutions to customers in business, finance and government, improving their operational efficiency and providing deep insights that lead to well-informed, confident decisions. IHS Markit has more than 50,000 key business and government customers, including 85 percent of the Fortune Global 500 and the world's leading financial institutions. Headquartered in London, IHS Markit is committed to sustainable, profitable growth.

CONTACT US

For more information, including methodology documents please visit <https://ihsmarkit.com/products/indices.html> or contact us at indices@ihsmarkit.com.

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