MSCI

Index Methodology

MSCI Custom Pacific ex Japan Low Carbon Optimized Index Methodology

December 2014

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1 Introduction

The MSCI Custom Pacific ex Japan Low Carbon Optimized Index is an optimized index that aims to reduce exposure to companies with high carbon footprint and high fossil fuel reserves while exhibiting risk and return characteristics similar to those of the MSCI Pacific ex Japan Index.

2 Constructing the MSCI Custom Pacific ex Japan Low Carbon Optimized Index

The MSCI Custom Pacific ex Japan Low Carbon Optimized Index ("the Index") is constructed from the MSCI Pacific ex Japan Index ("the Parent Index"). MSCI uses greenhouse gas emissions and fossil fuel reserves data to optimize the Index to have lower carbon exposure than the Parent Index.

2.1 Carbon Exposure Measurement

The Carbon exposure of a security is measured in terms of greenhouse gas emissions intensity and potential carbon emissions intensity from fossil fuel reserves. The emission intensity and potential carbon emissions intensity is calculated by dividing the greenhouse gas emissions and potential carbon emissions by market capitalization of the company.

2.1.1 Carbon Emissions

MSCI ESG Research collects annual company-specific direct (Scope 1) and indirect (Scope 2) greenhouse gas (GHG) emissions data from company public documents and/or the Carbon Disclosure Project. If a company does not report GHG emissions, then MSCI ESG Research estimates Scope 1 and Scope 2 GHG emissions. Further, to normalize for size, MSCI divides the sum of Scope 1 and Scope 2 GHG emissions by the issuer market capitalization to calculate emission intensity.

2.1.2 Potential Carbon Emissions from Fossil Fuels

MSCI ESG Research collects fossil fuel reserves data where relevant, typically in the Oil & Gas, Coal Mining and Electric Utilities industries. Sources for this data include company publications, other public records and third party data providers.[1]

To convert reserves data to potential carbon emissions, MSCI ESG Research applies a formula from the Potsdam Institute for Climate Impact Research.[2] Further, the potential carbon emissions are converted to potential carbon emissions intensity by dividing them by the issuer market capitalization.

2.2 Optimization

The MSCI Custom Pacific ex Japan Low Carbon Optimized Index is constructed using the most recent release of the Barra Open Optimizer in combination with the relevant Barra Equity Model to minimize carbon footprint while maintaining risk and return characteristics similar to the MSCI Pacific ex Japan Index.

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[1] Some of the raw data on which this research is based was supplied by GlobalData Publications Inc. (http://energy.globaldata.com).

[2] Malte Meinshausen, Nicolai Meinshausen, William Hare, Sarah C. B. Raper, Katja Frieler, Reto Knutti, David J. Frame & Myles R. Allen. *Greenhouse-gas emission targets for limiting global warming to 2 °C.* ***Nature*** 458, 1158-1162 (30 April 2009) | doi:10.1038/nature08017; Received 25 September 2008; Accepted 25 March 2009. Supplementary Information, p. 7.

For newly added issuers to pro-forma index with no data, MSCI uses the industry average emission intensity multiplied by the market capitalization of the security in the *pro forma* index, and zero fossil fuel reserves.

The carbon footprint is expressed in terms of z-score which is calculated for each security according to the method below:

- Carbon emission intensity is normalized and converted into a z-score which is factored into the optimization process. Additionally, a penalty based on the carbon reserves intensity is also factored into the optimization (-0.5 for issuers having reserves with reserves intensity below the median carbon reserves intensity of the issuers in the Parent Index which have reserves and -1 for issuers having reserves and having reserves intensity above the median reserves intensity of the issuers in the Parent Index which have reserves). The combined scores, after including the penalty for carbon reserves, are winsorized at +3 and -3.

The following optimization constraints are employed, aiming to reduce the tracking error of the Index with respect to the Parent Index while reducing the carbon footprint of the Index:

- The ex-ante tracking error of the Index is constrained to 0.90%
- The one way semi-annual turnover of the MSCI Custom Pacific ex Japan Low Carbon Optimized Index is constrained to a maximum of 10%
- The sector weights of the Index will not deviate from the sector weights of the Parent Index by more than +/-2%.
- The country weights of the Index will not deviate from the country weights of the Parent Index by more than +/-2%.

2.2.1 Relaxation Mechanism

In case there is no optimal solution that satisfies all the optimization constraints described above, the tracking error constraint is relaxed in steps of 0.1% until a feasible solution is reached.

3 Maintaining the MSCI Custom Pacific ex Japan Low Carbon Optimized Index

3.1 Semi-Annual Index Reviews

The Index is rebalanced semi-annually in May and November to coincide with the regular Index Reviews of the MSCI Global Investable Market Indexes, and the changes are implemented on the effective date of the index reviews. The pro forma indexes are typically announced nine business days before the effective date.

3.2 Ongoing Event Related Change

In general, the MSCI Custom Pacific ex Japan Low Carbon Optimized Index follows the event maintenance of the Parent Index.

3.2.1 IPOs and other Early Inclusions

IPOs and other newly listed securities will only be considered for inclusion at the next Semi-Annual Index Review, even if they qualify for early inclusion in the Parent Indexes.

3.2.2 Additions and Deletions due to Corporate Events

The general treatment of additions and deletions due to corporate events aims at minimizing turnover in the MSCI Custom Pacific ex Japan Low Carbon Optimized Index. A constituent deleted from the Parent Index following a corporate event or during the Quarterly Index Review of the Parent Index will be simultaneously deleted from the Index.

Please refer to the MSCI Corporate Events Methodology book available at:

http://www.msci.com/products/indexes/size/standard/methodology.html

for more details.

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The company's flagship product offerings are: the MSCI indexes with over USD 9 trillion estimated to be benchmarked to them on a worldwide basis1; Barra multi-asset class factor models, portfolio risk and performance analytics; RiskMetrics multi-asset class market and credit risk analytics; IPD real estate information, indexes and analytics; MSCI ESG (environmental, social and governance) Research screening, analysis and ratings; and FEA valuation models and risk management software for the energy and commodities markets. MSCI is headquartered in New York, with research and commercial offices around the world.

[1] *As of March 31, 2014, as reported on June 25, 2014, by eVestment, Lipper and Bloomberg* *July 2014*