Construction and methodology

Russell Developed Large Cap EM GeoExposure Index
v2.6
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Section 1

Introduction

1.0 Introduction

1.1 Russell Developed Large Cap EM GeoExposure Index

1.1.1 The Russell Developed Large Cap EM GeoExposure Index seeks to track the performance of companies with targeted revenue exposure to Emerging Markets (EM).

1.1.2 FTSE Russell identifies companies with significant economic and market exposure to EM and selects each company in the index based upon its exposure composite score. The exposure composite score reflects the significance of the company’s geographic exposure to the EM relative to its peer companies. The resulting tradable, modified market capitalization-weighted index provides clients with insight into companies’ geographical exposure to EM while still maintaining traditional index diversification benefits.

1.2 Available currencies

1.2.1 The base currency of the benchmark is US Dollars. Index values may also be published in other currencies.

1.3 FTSE Russell

1.3.1 FTSE Russell is a trading name of FTSE International Limited, Frank Russell Company, FTSE Global Debt Capital Markets Limited (and its subsidiaries FTSE Global Debt Capital Markets Inc. and MTSNext Limited), Mergent, Inc., FTSEFixed Income LLC, The Yield Book Inc and Beyond Ratings.

1.3.2 FTSE Russell hereby notifies users of the index series that it is possible that circumstances, including external events beyond the control of FTSE Russell, may necessitate changes to, or the cessation of, the index series and therefore, any financial contracts or other financial instruments that reference the index series or investment funds which use the index series to measure their performance should be able to withstand, or otherwise address the possibility of changes to, or cessation of, the index.

1.3.3 Index users who choose to follow this index series or to buy products that claim to follow this index series should assess the merits of the index’s rules-based methodology and take independent investment advice before investing their own or client funds. No liability whether as a result of negligence or otherwise is accepted by FTSE Russell for any losses, damages, claims and expenses suffered by any person as a result of:
• any reliance on this Construction and Methodology, and/or
• any errors or inaccuracies in this Construction and Methodology, and/or
• any non-application or misapplication of the policies or procedures described in this Construction and Methodology, and/or
• any errors or inaccuracies in the compilation of the index or any constituent data.
Section 2

Management Responsibilities

2.0 Management Responsibilities

2.1 FTSE International Limited

2.1.1 FTSE is the benchmark administrator of the indexes\(^1\).

2.1.2 FTSE Russell is responsible for the daily calculation, production and operation of the index series and will:

- maintain records of the index weightings of all constituents;
- make changes to the constituents and their weightings in accordance with the Ground Rules;
- carry out the periodic index reviews of the index series and apply the changes resulting from the reviews as required by the Ground Rules;
- publish changes to the constituent weightings resulting from their ongoing maintenance and the periodic reviews;
- disseminate the indexes.

2.2 Amendments to These Ground Rules

2.2.1 These Ground Rules shall be subject to regular review by FTSE Russell to ensure that they continue to best reflect the aims of the index series. Any proposals for significant amendments to these Ground Rules will be subject to consultation with FTSE Russell advisory committees and other stakeholders if appropriate. The feedback from these consultations will be considered by the FTSE Russell Product Governance Board before approval is granted.

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\(^1\) The term administrator is used in this document in the same sense as it is defined in Regulation (EU) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds (the European Benchmark Regulation).
Section 3

FTSE Russell Index Policies

3.0 FTSE Russell Index Policies

These Ground Rules should be read in conjunction with the following policy documents which can be accessed using the links below:

3.1 Queries and Complaints
3.1.1 FTSE Russell’s complaints procedure can be accessed using the following link:

[Benchmark_Determination_Complaints_Handling_Policy.pdf]

3.2 Index Policy for Trading Halts and Market Closures
3.2.1 Guidance for the treatment of index changes in the event of trading halts or market closures can be found using the following link:

[Index_Policy_for_Trading_Halts_and_Market_Closures.pdf]

3.3 Index Policy in the Event Clients are Unable to Trade a Market
3.3.1 Details of FTSE Russell’s treatment can be accessed using the following link:

[Index_Policy_in_the_Event_Clients_are_Unable_to_Trade_a_Market.pdf]

3.4 Recalculation Policy and Guidelines
3.4.1 The Russell Developed Large Cap EM GeoExposure Index is recalculated whenever errors or distortions occur that are deemed to be significant. Users of the Index are notified through appropriate media.

3.4.2 For further information refer to the FTSE Russell Recalculation Policy and Guidelines document which is available from the FTSE Russell website using the link below or by contacting info@ftse.com.

[Recalculation_Policy_and_Guidelines_Equity_Indexes.pdf]

3.5 Policy for Benchmark Methodology Changes
3.5.1 Details of FTSE Russell’s policy for making benchmark methodology changes can be accessed using the following link:

[Policy_for_Benchmark_Methodology_Changes.pdf]
Section 4

Construction and Methodology

4.0 Construction and Methodology

4.1 Defining the eligible universe

The Russell Developed Large Cap EM GeoExposure Index is derived from the FTSE Developed Index.

4.2 Screening stocks for geographic exposure and determining index membership

4.2.1 The Russell Developed Large Cap EM GeoExposure Index selects companies with significant geographic exposure to EM. For details of the geographic exposure estimation methodology, please see Appendix A.

4.2.2 To construct the Russell Developed Large Cap EM GeoExposure Index

1. For each company in the FTSE Developed universe, companies’ economic and market exposures to the Emerging Market (EM) segment are determined using the geographic exposure estimations from companies’ most recent annual reports:

   - Economic Exposure – Company’s total revenue derived from the EM segment in USD.
   - Market Exposure – Percentage (%) of the company’s revenue derived from the EM segment – i.e. Company’s Economic Exposure / Total Revenue in USD.

2. Using the economic and market exposures determined above, an exposure composite score for each company is calculated. The exposure composite score for each company is based on a weighted average of the company’s rankings on the following:

   - Market Exposure (50%)
   - Economic Exposure (25%)
   - Free Float Adjusted Market Capitalization (25%)

   - Free float adjusted market capitalization is based on closing prices & FX rates at the close of the last business day in August, free float and shares at the open of the Monday after the third Friday in September.

   - For each of the above attributes, the companies are sorted and ranked in descending order. The composite score for each company is then calculated by taking the weighted average of each of the
three rankings. A company’s market exposure rank or percentage of total company revenue derived from the target region rank is given a weight of 50%. A company’s economic exposure rank or the total revenue amount derived from the target region rank and a company’s market capitalization rank are each given weights of 25%.

3. After the exposure composite scores are calculated for each company, the companies are then sorted in descending order of their exposure composite score and given a final geographic exposure rank. Companies are selected for index membership based on their final geographic exposure rank until the targeted number of companies for the index is reached. The target number of companies for the Russell Developed Large Cap EM Exposure Index is 400.

4.3 Determining index weighting

4.3.1 The Russell Developed Large Cap EM GeoExposure Index employs a modified weighting scheme. The constituents are weighted according to their final geographic exposure ranks.

4.3.2 At the annual review, the companies of Russell Developed Large Cap EM GeoExposure Index are capped at 5 per cent using closing prices, free float and shares in issue at the close of the last business day in August. The capping is implemented after the close of business on the third Friday in September.

4.4 Index reconstitution

4.4.1 The Russell Developed Large Cap EM GeoExposure Index is reviewed annually in September using data at the close of the last business day in August. The review will be implemented after the close of business on the third Friday in September.

4.5 Banding rules

4.5.1 To mitigate unnecessary index turnover, at each rebalance, FTSE Russell implements a 20% banding around the target number of companies for the Russell Developed Large Cap GeoExposure Index.

4.6 Index maintenance / corporate action-driven changes

4.6.1 Full details of changes to constituent companies due to corporate actions and events can be accessed in the Corporate Actions and Events Guide for Non Market Capitalization Weighted Indexes using the following link:

Corporate_Actions_and_Events_Guide_for_Non_Market_Cap_Weighted_Indices.pdf
Appendix A: Gravity Model Revenue Estimation Methodology

Reported data of the geographic breakdown of publicly traded company revenues is often inconsistent. Documents that companies are required to file, such as 10-Ks in the US, give companies wide latitude in how they report the geographic sources of their revenues. If a company wishes to provide transparency, it might list all countries in which it operates along with the revenues from each of those countries. On the other hand, a company might report country and regional revenues. For the latter cases, a methodology is needed to obtain estimates of geographic revenue.

One way to estimate geographic revenue is to use GDP or imports/exports to GDP ratios. These techniques may over or under estimating the sale derived from the market under consideration. For example, the distribution of sales from large (by market capitalisation) typically differ from those of small companies and additionally GDP and sale ratios incorporate data from all companies and economic activities rather than from just those which are publically listed.

Gravity Trade Model

The simplest Gravity Trade Model starts with the premise that the flow of trade between two countries $i$ and $j$ is proportional the economic size (GDP) of the two countries and inversely proportional to their distance apart, $d_{ij}$.

E.g.

$$ Trade\ Flow_{ij} = \beta_0 \frac{GDP_i^{\beta_1} GDP_j^{\beta_2}}{d_{ij}^{\beta_3}} $$

where the $\beta$s are usually determined via a regression model such as:

$$ \log(Trade\ Flow_{ij}) = \beta_0' + \beta_1 \log(GDP_i) + \beta_2 \log(GDP_j) - \beta_3 \log(d_{ij}) + \varepsilon $$

If the behavior of the logged residuals is of a concern (i.e. $E[\log(\varepsilon)] \neq \log(E[\varepsilon])$) the model can be refactored as:

$$ Trade\ Flow_{ij} = e^{(\beta_0' + \beta_1 \log(GDP_i) + \beta_2 \log(GDP_j) - \beta_3 \log(d_{ij}))} $$

In general GDP is not a useful measure of economic wealth and GDP per capita provides a better proxy to the purchasing power of a country along with its population.

Additionally, the gravity model described above fails to consider the impact of land borders (adjacency), import tariffs, common languages, customs unions and/or trade agreements, historical, cultural and political ties. Each of these represents an additional regressor in the model.
The various relationships mentioned in the previous paragraph can be difficult to quantify and (with the exception of tariffs) are usually included as a dummy variables taking a value of 1 (the relationship exists) or 0 (there is no relationship). Whilst there can be some merit in including unknowns in this way, it is still incumbent on the modeler to determine if the relationship exists or not. In complex and dynamic models this may well be an impossible task.

For this reason our Gravity model incorporates all the unknown, but possible relationships in a single number that is obtained as part of the regression, thereby alleviating the need to determine any relationships and ensuring that the relationships that do exist evolve in a dynamic way.

The Gravity Trade Model is determined separately for each country in the underlying index by using the aggregate sales from each country \( i \) represented in the index (e.g. company domicile) that go to a unique destination country \( j \) (these are \( Sales_{ij} \) represent the trade flow) and distance between the two countries, the GDP per capita of each country, the population of each country and average applied import tariffs (which account for trade blocs such as EU and NAFTA).

The model is:

\[
\log(Sales_{ij}) = \beta_1 \log(GDP\ Per\ Capita_i) + \beta_2 \log(GDP\ Per\ Capita_j) - \beta_3 \log(d_{ij}) + \beta_4 \log(Population_i) + \beta_5 \log(Population_j) - \beta_6 \log(Tariffs_{ij}) + \beta_7 \beta_{relationships} + \epsilon
\]

To determine the model parameters (\( \beta_1 \) to \( \beta_7 \) and \( \beta_{relationships} \)) a non-linear optimization is used with the following objective function and constraints:

\[
\min_{\text{for country } i} \sum_{j} (\beta D + \beta_7 \beta_{relationships} - \log(Sales))^2
\]

such that \( 0 \leq \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_{relationships} \leq 10 \),

where \( D \) is the design matrix of known regressors.

With the model established it is a simple matter to generate estimates of sales to countries that are not covered by the known sales data using the known values of GDP per capita, distance, population and tariffs. With these missing data established the regional breakdowns can be determined as a matter of course.

The transparency of the reported sales can vary from year-to-year and it is assumed that sales from country \( i \) to \( j \) are in general not transitory. The relationship between country \( i \) and \( j \) determined in the previous two years are combined with relationship determined in the current year via an exponentially weighted moving average:

\[
\beta'_{relationship,ij, t} = 0.834 \beta_{relationship,ij, t} + 0.135 \beta_{relationship,ij, t-1} + 0.031 \beta_{relationship,ij, t-2}
\]

The average estimate (\( \beta'_{relationship,ij, t} \)) is subsequently used in the estimation of sales from country \( i \) to \( j \) in year \( t \).
Appendix B: Further Information

A Glossary of Terms used in FTSE Russell’s Ground Rule documents can be found using the following link:

Glossary.pdf

For further information on the Russell Developed Large Cap EM GeoExposure Index visit www.ftserussell.com or e-mail info@ftserussell.com. Contact details can also be found on this website.

For more information about our indexes, please visit ftserussell.com.


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