

MSCI ECONOMIC EXPOSURE DATA METHODOLOGY

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OUTLINE OF THE METHODOLOGY BOOK

This methodology book details the methodology to create and maintain the MSCI Economic Exposure Security Data Modules and the MSCI Small Cap Economic Exposure Security Data Modules (herein ‘Security Data Modules’).

Section 1 provides a brief introduction to the Security Data Modules.

Section 2 provides details of the methodology used to compute the economic exposure of companies to different regions and countries. This includes the methodology for computing other metrics / fields such as estimation scores derived from reported geographic segment level revenue data and computation of the economic exposure of select MSCI Indices to specific countries.

Section 3 describes the procedures to maintain economic exposure data on an ongoing basis to reflect timely updates and changes arising from corporate events, company level revenue updates, updates to GDP data and any corrections to economic exposure data.

Section 4 has appendices that provide details of the list of countries and regions for which economic exposures are computed.

This methodology book was last updated in November 2013.

SECTION 1: INTRODUCTION

With continued trends in globalization, many companies increasingly operate across several countries and regions. Consequently, their revenues may be exposed to economic activity in many regions other than their home country. Significant disparities in the reporting of segment level financial data across companies and practical issues of availability of reliable data have prompted MSCI to develop a simple and transparent methodology to estimate the economic exposure of companies in a consistent manner using the geographic distribution of a firm’s revenues and the nominal GDP of the countries where revenues are generated.

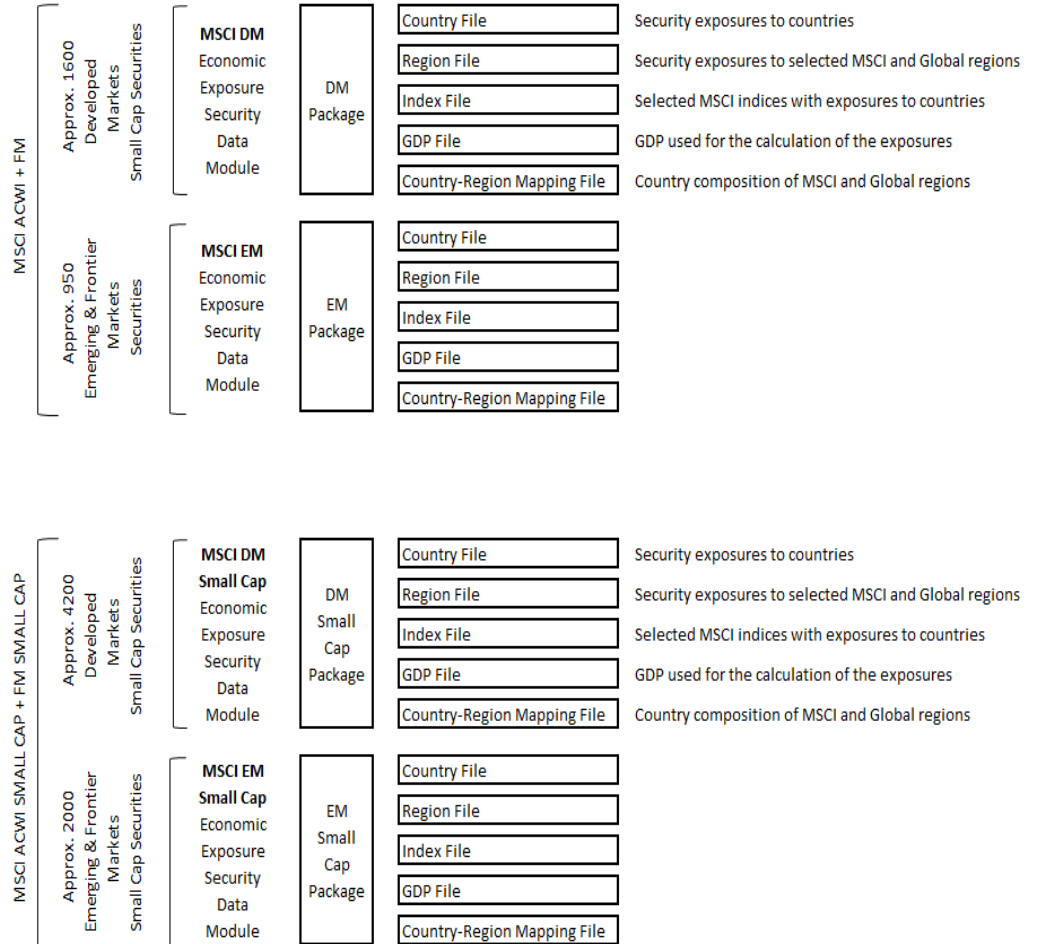
The Security Data Modules cover developed, emerging and frontier markets. These modules provide geographic revenue breakdowns by country and by region for each large, mid and small cap stock included in the MSCI ACWI + Frontier Markets (ACWI FM) IMI Index¹, and are designed to enhance and support portfolio management, portfolio construction and risk management investment decisions and processes.

The modules represent innovative tools for clients to:

- Compare portfolio economic exposures with a benchmark
- Tilt a portfolio’s economic exposure towards a target country or region
- Calculate and report portfolio economic exposures to specific regions or countries

The Security Data Modules apply a consistent and transparent methodology to calculate the economic exposure of a broad and investable universe of securities, using each company’s reported revenues by geographic segment and the nominal GDP of the constituent countries in each regional segment. The Security Data Modules provide five files in a pipe-delimited format and XML format.

¹ MSCI ACWI + Frontier Markets (ACWI FM) Investable Market Index (IMI), a global equity index consisting of large, mid and small cap stocks from developed, emerging and frontier market countries.



SECTION 2: ESTIMATING ECONOMIC EXPOSURE OF COMPANIES

The economic exposure of a company to a target region or country is the proportion of its revenues coming from that region. As a general principle, MSCI estimates economic exposure from the geographic segment distribution of revenues by final markets/destination as reported by a company and the GDP weight of the countries and regions within a specific geographic segment.

Example:

In the case of determining EM exposure, all countries and regions (including frontier markets) except developed markets are included for the calculation of the EM exposure of a company. The EM exposure of a security is derived as the weighted average of the percentage segment revenue and the GDP weight of the emerging market countries within each of the geographic segments (16.3% in this example)

Exhibit 1: Example Calculation of EM Exposure for ABC Ltd.

Geographic Segment	Revenue (€ mil)	Revenue (%) (1)	EM GDP as a proportion of Total GDP of the geographic segment(%) (2)	EM Exposure contribution (%) (3) = (1) * (2)
France	2,000	12.1	0	0.0
Rest of Europe	3,000	18.2	20	3.6
United States	5,000	30.3	0	0.0
Japan	4,000	24.2	0	0.0
Rest of Asia	1,500	9.1	95	8.6
Rest of the World	1,000	6.1	67	4.1
Total	16,500	100.0		16.3

The generic calculation of the economic exposures of companies in the Security Data Module involves the following steps:

- Select the applicable universe of companies
- Obtain the geographic segment revenue information for each company
- Disaggregate the reported geographic segments into the constituent countries
- Process the geographic segments starting from the smallest (individual countries / smaller regions) to largest (larger regions, 'Rest of the World') based on the number of countries in a geographic segment
- Aggregate the country level exposure to arrive at the regional exposures using the region to country mapping definitions
- Compute estimation scores for the different economic exposures of a company

Each of these steps is explained in more detail below.

2.1 APPLICABLE UNIVERSE

The applicable universe comprises all the companies that are constituents of the MSCI ACWI + Frontier Markets (ACWI FM) IMI Index. This universe covers nearly 8700 large, mid and small cap companies from developed, emerging and frontier markets that reflect the international opportunity set of global equities.

2.2 OBTAINING THE GEOGRAPHIC SEGMENT INFORMATION OF THE COMPANY

To obtain the geographic segment information of the company

- Identify the reported geographic segment information of the company
- Standardize the reported geographic segment information

Identifying the geographic segment information of the companies

Source of information

The geographic segment information of the company may be sourced from vendor databases and the latest annual reports of the company. If the information is not available from either of these two sources, other public information provided by the company such as financial reports, investor presentations, company websites and other related reports may be used to arrive at the geographic segment information.

Revenues by final markets/destination

As a general principle, when a company reports revenue distributions by subsidiary locations and by final markets/destination, the revenue distribution by final markets/destination is used.

For re-insurance firms, the geographic segment data may be reported by subsidiary locations or by ceding company locations. The subsidiary location is the location of the reinsurance company subsidiary that is generating the revenue, while the ceding company is the insurance company that passes a part or all of its risks from its insurance portfolio to the reinsurance firm. The geographic segment distribution of revenues by ceding company locations is used wherever possible for estimating economic exposure.

In the case of companies that report revenues only by source of production or operations (e.g., mining locations or assets) and there is no reported information on revenues by end markets or customer segments, the geographic segment revenues reported by source of production or operations may be used to estimate the company's economic exposure. In cases where companies report geographic segment revenues by production source and based on sales from end markets (by volume), the distribution of sales by volume is used to

estimate economic exposure. If the revenue type of a company cannot be ascertained with reasonable accuracy, it is set as destination by default in the Security Data Modules.

Geographic segment revenues reported as either “Predominantly” or “more than x%”

- If the geographic segments are reported as “predominantly/substantially from Japan”, all of the firm’s revenues are assigned to Japan.
- If the geographic segments are reported as “more than x% coming from Japan” then
 - If $x \geq 90\%$, all of the firm’s revenues are assigned to Japan
 - If $x < 90\%$, Japan is assigned x% of the firm’s revenues and Rest of the World is assigned (100-x)%

Revenues for Banks and Insurance companies

The revenues for Financial companies are determined as the sum of Net Interest Income (NII) + Commissions and Fees + Realized Gains on Sales of Investments – Impairment Losses Recognized for Earnings + Insurance Premiums + Other Revenues.

Insurance companies’ total income is defined as the sum of net premiums + fees + investment income + commissions + other income.

If such data is not available, then the geographic segment revenue distribution as reported by the company is considered for estimating economic exposure.

Companies with non-geographic segments

The sum of the geographic segment revenues of the company may differ from the total revenues of the company. For example, according to the International Financial Reporting Standards (IFRS), the companies that follow the IFRS must report the segment information covering at least 75% of the company revenues². Also, the presence of non-geographic segments such as eliminations, corporate center activities and inter-segment sales may result in the total segment revenues being more or less than the total revenues of the company. For the purpose of computing economic exposure, only the geographic segments of the company are considered for calculation, and any non-geographic segments are ignored. The sum of the company level exposures to all the countries (including ‘other countries’) would always add up to 100%, even if the sum of revenues coming from the geographic segments of the company is different from the total revenues of the company.

² International Financial Reporting Standard 8 relating to Operating segments

Geographic segments reported across multiple business lines

A company may report its geographic segments for each of its business lines. For example, a company may present the following geographic segment revenue information:

Segment	Revenue	Revenue (%)
General Insurance		
Asia	90	90%
Rest of the World	10	10%
Total	100	100%
Life Insurance		
Asia	80	40%
Europe	60	30%
Rest of the World	60	30%
Total	200	100%
Total consolidated	300	

In such cases, the geographic segments should not be aggregated across business lines but must be captured as such. In this example, the geographic segment ‘Rest of the World’ corresponds to World (excluding Asia) for General Insurance business but corresponds to World (excluding both Asia and Europe) for Life Insurance business, and hence cannot be aggregated meaningfully.

Other relevant metrics where the geographic distribution of revenues is not reported

For companies that do not report geographic distribution of revenues or if any of the geographic segment revenues are negative (in case of Financials), other metrics such as the geographic distribution of dividends from investment portfolios (for holding companies), credit exposures (for banks), assets and other relevant metrics (number of restaurants or sales by volume) as reported by the company may be used to estimate economic exposure. If no information on geographic segment revenues or other metrics is available from any of the aforementioned sources, then all the revenues may be attributed to the country of primary operations as inferred from the annual report.

Standardizing the reported geographic segments of companies

The reported geographic segments are standardized for consistent interpretation and presentation. For example, the geographic segment USA may be reported as ‘USA’, ‘United States of America’, ‘US’ or any other combination by various companies. These segments are mapped to standardized geographic segments to ensure consistency in reporting in the Security Data Modules.

2.3 DISAGGREGATING THE GEOGRAPHIC SEGMENTS INTO THE CONSTITUENT COUNTRIES

The next step is to decompose the standardized geographic segments into the constituent countries. While this process is straightforward when the geographic segments are individual countries or a set of countries, the geographic segments may also fall into various categories outlined below.

- Global regions: The regions such as Asia, Europe, Americas etc. are defined systematically and consistently applied. The list of 244 countries in the world, and the region to country mapping for the global regions is defined by MSCI based on official sources such as the United Nations, IMF and the World Bank³. The region to country mapping for the different global regions is made available as part of the Security Data Modules.
- Geographic segments such as *'Mature markets'*, *'Growth markets'*, *'Emerging Markets'*: These geographic segments are mapped to the emerging or developed markets as defined by MSCI for the purpose of computing economic exposure. The developed markets include the countries in the MSCI World Index and a few other developed market countries such as Liechtenstein, Luxembourg and Monaco not covered by the MSCI country classification. In turn, the emerging markets countries are defined as all countries and regions in the world (including frontier markets) excluding developed markets.
- Ambiguous geographic segments such as *'Asia and others'*: For these segments, the company's reported financials are reviewed for any additional information. In the absence of more granular country level information, the geographic segment is mapped to the granular country / region. For example, the geographic segment *'Asia and others'* would be mapped to Asia absent any additional relevant information.
- Geographic segments such as *'Home'*, *'Domestic'* and *'Foreign'*: In instances where the geographic segment is defined as *'Home'* or *'Domestic'*, it is mapped to the company's country corresponding to the MSCI country classification of securities. The geographic segment *'Foreign'* is mapped to *'Rest of the World'*.

Therefore, the domestic exposure of any company in the MSCI ACWI + Frontier Markets (ACWI FM) IMI Index is equal to the country exposure corresponding to the company's MSCI country classification⁴. The international exposure is equal to one minus its domestic exposure.

³ Refer to the IMF WEO database, [UN Standard Country and Area Code classifications](#), World Bank for more details

⁴ Refer to Appendix III: Country Classification of Securities of the MSCI Global Investable Market Indices Methodology for more details

2.4 PROCESSING THE INDIVIDUAL GEOGRAPHIC SEGMENTS

The individual geographic segments are processed in a sequential order starting with the individual countries and then spanning through the different regions in the increasing order of their size (based on number of countries within each region).

Example

Geo-Segment	Revenue (€ mil)	Revenue (%)
France	2,000	12%
Rest of Europe	4,000	24%
United States	5,000	30%
Japan	1,000	6%
Rest of Asia	3,000	18%
Rest of the World	1,500	9%
Total	16,500	100%

- In the example mentioned above, the individual countries viz. France, USA and Japan are processed first, and the exposures of 12%, 30% and 6% are assigned respectively to the three countries.
- Next, the region ‘Rest of Europe’ is processed as ‘Europe excluding France’. The European countries excluding France are collectively assigned a revenue contribution of 24%, with the individual country exposures in Europe ex France being proportionate to their relative GDP contribution. For example, if a country contributes 10% to the GDP of ‘Europe ex France’, then it is assigned a revenue contribution of 2.4%. The GDP data used is the most recent nominal GDP data of countries as reported by the IMF and World Bank. Please refer to Section 0 *GDP updates* for more details.
- Similarly, Rest of Asia is processed as ‘Asia excluding Japan’ and the Asian countries except Japan are collectively assigned a revenue exposure of 18% and individual country exposures are proportionate to their GDP contribution within ‘Asia excluding Japan’.
- Finally, Rest of the World is processed as ‘World excluding Asia, Europe and USA’, and all the countries in this region are collectively assigned a revenue exposure of 9%.
- The country level exposures at the company level are computed by aggregating the country exposure at the individual geographic segment level.

This process ensures that the country exposure of a company is derived from only one geographic segment in most instances (please refer to Appendix II for exceptions).

Therefore, it is possible to attribute the country exposure of the company to the standardized geographic segment from which it is derived. This information is provided as a part of the Security Data Modules under the field ‘Derived from geographic segment’.

In case of companies reporting the geographic segments under multiple business lines, the process is repeated for each of the business lines, and the country exposures of the individual business lines are aggregated at the company level using the business segment revenue weights.

The economic exposures are computed for all the countries that are part of the MSCI ACWI Index, MSCI Frontier Markets and MSCI stand-alone country indices. For the countries not covered by the MSCI country classification, the country exposures are aggregated and reflected under the category ‘other countries’.

2.5 AGGREGATING THE COUNTRY EXPOSURES TO CALCULATE REGION EXPOSURES

The final step is to compute the regional exposures of a company from its country exposures. The regional exposures for the MSCI regions are computed using the MSCI region country definitions⁵. The regional exposures for the global regions are computed using the definitions described in Section 2.3.

In addition to company level revenue based exposures, index level exposures are also provided for select MSCI Indices. The index level revenue exposure for an MSCI Index is computed by first aggregating the country exposure revenues (in USD) for the companies in the index, and deriving the proportion of revenue attributable to the individual countries. During aggregation, any duplication that may arise from multiple securities of a company of the MSCI Index (e.g., Atlas Copco A and Atlas Copco B, dual listed entities such as Unilever NV and Unilever Plc) is addressed. The conversion of the reported country revenues in local currency for the individual companies to USD is done using the exchange rates at the end of the month.

The list of regions for which country level exposures are computed is provided in Appendix I.

⁵ Please refer to the [MSCI Region Country Membership](#) for the latest definitions

2.6 COMPUTING ESTIMATION SCORES

The estimation score of a company with respect to a target country or region is the proportion of the company revenues on which GDP estimation is required to compute the exposure to that country or region. An example to demonstrate the concept is provided below.

Example:

Company A geographic segment information

Geo-Segment	Revenue (€ mil)	Revenue (%)	Estimation required	
			EM Exposure	Europe Exposure
France	3,000	13%	N	N
Europe ex France	5,000	22%	Y	N
US	5,000	22%	N	N
Japan	2,000	9%	N	N
Asia ex Japan	6,000	26%	Y	N
Rest of World	2,000	9%	Y	N
Total	23,000	100%		

Estimation score of Company A with respect to EM exposure = 22% + 26% + 9% = 57%

Estimation score of Company A with respect to Europe exposure = 0

Company B geographic segment information

Geo-Segment	Revenue (\$ mil)	Revenue (%)	Estimation required	
			EM Exposure	UK Exposure
Americas	3,000	75%	Y	N
EMEA	1,000	25%	Y	Y
Total	4,000	100%		

Estimation score of Company A with respect to EM exposure = 100%

Estimation score of Company A with respect to UK exposure = 25%

In the first example, for company A, the geographic segments France, US and Japan are individual countries, while the geographic segments Europe ex France, Asia ex Japan and Rest of the World comprise both emerging and developed markets. To calculate the emerging market exposure of company A, the GDP based estimation is applied to the highlighted geographic segments, which make up approximately 57% of the company A revenues. Hence the estimation score of company A with respect to emerging markets exposure is 57%. However, GDP estimation is not required for estimating Europe exposure (since this figure is directly calculated from France and Europe ex France geographic segments). Hence Company A's Europe exposure has an estimation score of 0.

For company B, the emerging markets exposure needs to be estimated using GDP for both the Americas and EMEA geographic segments. Hence the estimation score of company B's emerging markets exposure is 100%. However, in order to estimate the UK exposure, the GDP estimation needs to be applied only on the EMEA segment, which makes up 25% of the company B revenues. Hence the company B's UK exposure has an estimation score of 25%.

The estimation score is computed in a similar way for all companies and with respect to the target countries and regions. It should be noted that the estimation scores of a company to complimentary regions (like developed markets and emerging markets, Japan and World ex Japan, domestic and foreign) of the World are always equal. The estimation score is not reported for the countries grouped under ‘other countries’ category.

SECTION 3: MAINTAINING THE SECURITY DATA MODULES

MSCI Security Data Modules are maintained and updated on a monthly basis to reflect any changes arising from updates to company financials, corporate events and the GDP data. In particular, the maintenance involves:

- Monthly updates to the Security Data Modules in order to reflect the company level updates and corporate events
- Treatment of corporate events
- GDP updates
- Corrections

3.1 MONTHLY REVIEW

The companies are reviewed every month for changes arising from updates to their published financial information and corporate events.

3.2 HANDLING CORPORATE EVENTS

Ongoing corporate events such as mergers, acquisitions, spin-offs and bankruptcies are reflected in the Security Data Modules at the end of the month. The details of the various corporate events and their impact on economic exposures are detailed below.

IPOs and other early inclusions

In the case of newly listed companies, the geographic segment information found in the company prospectus or regulatory filings are used for computing the economic exposures. For other early inclusions to the universe, the information from the sources as detailed in section 0 Source of information may be used for computing exposures.

Bankruptcy and early deletions from the Universe

If the company is deleted from the applicable universe during a month, it would be deleted from the Security Data Modules as well.

Mergers and Acquisitions

In the case of a merger or an acquisition between two companies that are part of the applicable universe, the geographic segment information of the combined entity may be significantly different from the individual entities. The event is reviewed on a case by case basis using sources such as the interim filings in order to ascertain the impact of the event on the geographic segment revenues of the combined entity. If such information cannot be ascertained with reasonable accuracy, the combined entity is treated as one company with two business lines, with the business lines being the individual companies prior to the merger / acquisition, and the exposures are computed as described in sections 0 (Geographic segments reported across multiple business lines) and Section 0 (Aggregating the country exposures to calculate region exposures) for treatment of companies with multiple business lines.

In the case of a merger or an acquisition between a constituent of the applicable universe and a company not a constituent of the applicable universe, the existing exposure of the constituent company would be retained until the combined entity's published financial information is made publicly available.

The exposures are tagged with relevant event flags in the Security Data Modules to reflect the pre-event or the post-event status of the exposures.

Spin offs

If a company is added to the applicable universe as a result of a spin off, the event is reviewed using sources such as the interim filings in order to ascertain the impact of the event on the geographic segment revenues of the spun off entity and the parent company. In the event such information cannot be ascertained with reasonable accuracy, the exposures of the parent company are applied to the spun off company until such time as updated information is available to recalculate exposures of the spun off company.

Conversion, Country reclassification and Stock exchange reclassification

The security conversion, country reclassification and stock exchange reclassification do not result in any change in the country and regional exposures of the company. However, the country reclassification of the security by MSCI would result in a change in the domestic exposure and international exposure, as the domestic exposure would now refer to the country exposure of the reclassified country.

Assigning Event flags in the Security Data Modules

The companies which have undergone event related changes in the exposures would be assigned an event flag to reflect the pre-event or post event status of exposures. An event flag of 1 indicates that the exposures are pre-event, which means the company's geographic

segment information before the event occurred was used for estimating the exposures. An event flag of 2 indicates the exposures are post-event, which means the geographic information is based on prospectus, regulatory filings or other public information that were made available by the company post the corporate event. An event flag of 3 refers to the exposures of a recently listed company (IPO).

3.3 GDP UPDATES

The nominal GDP (in USD) data of countries obtained from IMF and World Bank is reviewed twice a year, (usually at the end of April and October), coinciding with the release of IMF World Economic Outlook report and is generally used to update the Security Data Modules in April and October. Since all the countries of the world may not report their GDP at the same time, a lagged GDP estimate up to 3 years is considered acceptable for computing the GDP weights and economic exposures for a given month.

The exposures of a company are calculated using the latest available geographic segment information and the latest GDP weights. Therefore, the exposures of companies may be updated following updates to the GDP weights.

3.4 CORRECTIONS POLICY

Any corrections applied by MSCI to the existing geographic segments of a company would result in a recalculation of the economic exposures for the company. Following a correction, the company's revised economic exposures to major regions such as Americas, Asia, Africa, Europe, Oceania, emerging markets and domestic markets are compared with their original values. If the absolute change in exposures is greater than 5% and the percentage change in exposures is greater than 10% with respect to any of the aforementioned regions, an announcement is made by MSCI with the revised country and region exposures for the company, along with the revised index level revenue exposures.

APPENDIX I: LIST OF REGIONS FOR WHICH ECONOMIC EXPOSURES ARE COMPUTED IN THE SECURITY DATA MODULES

Sno	Regions	Global / MSCI Region definitions
1	MSCI North America	MSCI
2	MSCI EM Latin America	MSCI
3	MSCI AC Americas	MSCI
4	MSCI EM EMEA	MSCI
5	MSCI Europe	MSCI
6	MSCI AC Europe	MSCI
7	MSCI EM Europe	MSCI
8	MSCI EMU	MSCI
9	MSCI FM Africa	MSCI
10	MSCI AC Asia Pacific	MSCI
11	MSCI AC Asia Pacific ex Japan	MSCI
12	MSCI EM Asia	MSCI
13	MSCI AC Pacific ex Japan	MSCI
14	MSCI Pacific	MSCI
15	MSCI Far East	MSCI
16	MSCI World	MSCI
17	MSCI Emerging Markets	MSCI
18	MSCI Frontier Markets	MSCI
19	MSCI EAFE	MSCI
20	MSCI World ex Japan	MSCI
21	MSCI BRIC	MSCI
22	MSCI GCC Countries	MSCI
23	MSCI AC Far East ex JP	MSCI
24	Americas	Global
25	Latin America and the Caribbean	Global
26	EMEA	Global
27	Europe	Global
28	Western Europe	Global
29	Eastern Europe	Global
30	Southern Europe	Global
31	Northern Europe	Global
32	Middle East	Global
33	Africa	Global
34	Asia	Global
35	Developed markets	Global
36	Emerging markets	Global

APPENDIX II: EXCEPTIONS WHERE THE 'DERIVED FROM GEOGRAPHIC SEGMENT' FIELD IS BLANKED

The Derived from geographic segment field is populated for all rows in the country file of the Security Data Modules except in cases where:

- Companies report their geographic segments within business lines
- Companies are 'Holding companies', where the exposures may be derived from the exposures of the subsidiaries
- Country exposures for countries grouped under 'other countries' or 'international exposure' category

CONTACT US

clientservice@msci.com

AMERICAS

Americas	1 888 588 4567 *
Atlanta	+ 1 404 551 3212
Boston	+ 1 617 532 0920
Chicago	+ 1 312 675 0545
Monterrey	+ 52 81 1253 4020
New York	+ 1 212 804 3901
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EUROPE, MIDDLE EAST & AFRICA

Cape Town	+ 27 21 673 0100
Frankfurt	+ 49 69 133 859 00
Geneva	+ 41 22 817 9777
London	+ 44 20 7618 2222
Milan	+ 39 02 5849 0415
Paris	0800 91 59 17 *

ASIA PACIFIC

China North	10800 852 1032 *
China South	10800 152 1032 *
Hong Kong	+ 852 2844 9333
Mumbai	+ 91 22 6784 9160
Seoul	00798 8521 3392 *
Singapore	800 852 3749 *
Sydney	+ 61 2 9033 9333
Taipei	008 0112 7513 *
Thailand	0018 0015 6207 7181 *
Tokyo	+ 81 3 5290 1555

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