MSCI Barra

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MSCI Barra - Fundamental Data Methodology

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Introduction

MSCI Barra began publishing annual fundamental data for developed market companies in 1969 and for emerging market companies in 1988. MSCI Barra has accumulated a large volume of historical fundamental data during this period.

Fundamental data	Security Level Ratios	Historical Coverage
Earnings per share	Price to Earnings	Since December 1969 for DM Since January 1992 for EM
Cash Earnings per share	Price to Cash Earnings	Since January 1970 for DM Since January 1992 for EM
Sales per share	Price to Sales	Since January 1992 for EM countries Since January 2001 for DM countries
Book Value per share	Price to Book Value	Since December 1974 for DM Since January 1992 for EM
Dividends per share	Dividend Yield	Since December 1969 for DM Since January 1992 for EM
5-years Sales, earnings, cash-earnings, earnings per share		Since December 1969
5 year SPS growth trend , 5 year EPS growth trends		Since June 2003
Balance sheet items		Since March 1971 for DM

MSCI Barra uses these fundamental data items to define:

- Fundamental per share data
- Security ratios
- Index ratios
- Balance Sheet information

In addition, MSCI Barra uses fundamental data to calculate the variables used to assign style to securities under its Value and Growth methodology. The following table summarizes the key variables calculated by MSCI Barra using fundamental data:

Table #1
Fundamental Data Calculation Summary

Fundamental Per Share Data	Security Level Ratios	Index Level Ratios
Sales Per Share	Price to Sales Long-term Historical Sales Per Share Growth Trend	Long-term Historical Sales Per Share Growth Trend
Earnings Per Share	Price to Earnings Long-term Historical Earnings Per Share Growth Trend Return on Equity Current Internal Growth Rate	Price to Earnings Long-term Historical Earnings Per Share Growth Trend Return on Equity Current Internal Growth Rate 12 Months Trailing Index EPS Year on Year Growth Trailing EPS
Cash Earnings Per Share	Price to Cash Earnings	Price to Cash Earnings
Dividends Per Share	Dividend Yield	Dividend Yield
Book Value Per Share	Price to Book Value	Price to Book Value
Forecasted Earnings Per Share	Price to Earnings Forward Long-term Forward Earnings Per Share Growth Rate Short-term Forward Earnings Per Share Growth Rate	Price to Earnings Forward Long-term Forward Earnings Per Share Growth Rate Short-term Forward Earnings Per Share Growth Rate 12 Months Forward Index EPS Year on Year Growth Forward EPS

For certain corporate events MSCI Barra may also adjust and/or restate fundamental data and related ratios in order to maintain comparability between historical and future data. These adjustments are made based on the timing of the event and availability of information at the time of the event.

Depending on the MSCI Equity Index Series or the Global Equity Model, MSCI Barra will provide different fundamental data for each product on a monthly basis. Per share data and security ratios (price to sales, price to earnings, return on equity, price to cash earnings, price to book value, dividend yield) are provided for all MSCI Equity Index Series and Global Equity Models. Fundamental data used for style attribution is distributed for the MSCI Value and Growth Indices and the Global Equity Models. This data includes long-term historical growth trends, current internal growth rate, and forecasted earnings figures.

MSCI Barra strives to maintain clear and transparent rules that best reflect the accounting standards of each country in a consistent manner. The information provided in this methodology book relates to all equity index products distributed by MSCI Barra that use fundamental data. The book demonstrates MSCI Barra's use of fundamental data to calculate financial ratios and indicators at both the security and index level. Additionally, this book demonstrates how MSCI Barra uses fundamental data in connection with corporate events.

1. Fundamental Per Share Data

MSCI Barra provides per share data on an annualized basis and calculates the data on a company level in which all classes (listed and unlisted) of equity are aggregated. The total shares outstanding for the latest period is used for per share data calculations.

MSCI Barra provides two types of fundamental per share data:

- Historical
- Forecasted

Using historical and forecasted data, MSCI Barra calculates security and index ratios. The following section details how MSCI Barra gathers and calculates all fundamental per share data.

1.1. General Rules

1.1.1. Number of shares

To calculate per share figures, MSCI Barra uses the total number of shares at the company level at the date of the results.

All of the company's share classes, listed and unlisted, are aggregated in the total number of shares regardless of whether they are included in an index, as long as they exhibit characteristics of equity securities and are eligible for the MSCI universe. If preferred shares exhibit equity-like characteristics, they are included in the number of shares for per share calculation

MSCI Barra always excludes stock options, warrants and convertible securities from the number of shares outstanding. In other words, diluted number of shares is not used. In general, treasury shares are systematically excluded from index level calculations and from number of shares used for per share calculations.

Total number of shares at the company level at the date of the results is used to calculate per share figures, except United States of America, Canada, the United Kingdom and Ireland where average number of shares is used for per share calculations of earnings, cash earnings, and sales as is the standard practice in these countries.

For companies where MSCI Barra tracks their Depository Receipts (ADR, GDR) or Certificates of Participation (CPO), MSCI Barra reports the fundamental per-share variables on a 'per-ADR / GDR' or 'per-CPO' basis.

1.1.2. Consolidation

MSCI Barra always calculates fundamental data using consolidated information unless consolidated results are unavailable or are not reported on a regular basis. However, in some countries (like Korea, India etc.), owing to the disclosure procedures, there could be use of unconsolidated data for interim financial results whereas the fiscal period financial results could be consolidated.

1.1.3. Currency and Frequency

MSCI Barra reports fundamental data in the currency that the company reports. In general, MSCI Barra follows the frequency of the company reporting. For example, if companies report quarterly results, MSCI Barra also follows quarterly results.

1.1.4. Accounting Standards Used

The primary accounting standard followed by MSCI Barra is the local GAAP. If the company does not report in local GAAP but reports in other GAAPs, such as IAS or US GAAP, then MSCI Barra will follow the latter. For a large number of European countries and some other countries in the Asia-Pacific, MSCI Barra started following IFRS accounting in the year 2006 (please refer to Appendix I for details on MSCI Barra's treatment of some specific issues related to IFRS).

1.1.5. Sources and Updates

MSCI Barra sources company information from third party vendors as well as from publicly available information made available by the companies. In addition, MSCI Barra reflects publicly available information once it is available in the market, provided that the information is complete. We commonly obtain information in the form of vendor files, press releases, interim and annual reports. MSCI Barra uses both audited and unaudited reports.

MSCI Barra endeavors to ensure correctness, quality and timeliness of data loaded into its database, by employing quality control procedures like updating company information only upon availability of complete information, such as official filings with stock exchanges or regulators or upon dual vendor validation. Emphasis is placed on updating the results of bigger companies first, but without undue delay for updating the results for all companies.

1.2. Historical Per Share Data Calculations

The following are the historical per share figures that are reported and/or used by MSCI Barra:

- Sales per share (SPS)
- Earnings per share (EPS)
- Cash earnings per share (CEPS)
- Dividends per share (DPS)
- Book value per share (BVPS)

In general, historical per share figures are calculated using the following formula:

$$Per\ share\ figure = \frac{Trailing\ 12-month\ figure}{Number\ of\ shares\ outstanding\ at\ a\ company\ level}$$

$$Trailing 12-month figure = Last\ reported\ fiscal\ period\ figure + (Current\ interim\ figure - Comparative\ interim\ figure)$$

For instance, if the last period for which results are reported is for an interim period of 3 months ended Mar 31, 2007, the trailing 12-month Earnings will be calculated as:

Trailing 12-month earnings = Fiscal period earnings for the year ended Dec 31, 2006 + (3 month earnings for the current interim period ended Mar 31, 2007 – 3 month earnings for the comparative interim period ended Mar 31, 2006)

The following are exceptions:

- Dividends per share are always used on a per share basis as provided by the company for all calculations.
- Book value per share is calculated using the latest reported book value; a trailing 12-month figure is not calculated.

The following section defines the general rules for historical per share figures and their use.

1.2.1. Sales Per Share (SPS)

MSCI Barra defines sales for all issuers as net operating revenues from all on-going lines of business of the company.

Due to the different definitions of sales in different industries, MSCI Barra does not report sales for certain companies in the financials sector (GICS® Sector 40):

- For *Banks* (GICS® Industry Group 4010) and some *Diversified Financial companies* (GICS® Industry Group 4020), other than securities in *Multi-Sector Holdings* (GICS® Sub-industry Group 40201030), MSCI Barra does not publish sales.
- For *Insurance companies* (GICS® Industry Group 4030), MSCI Barra uses the net premiums earned (or net premiums written, if the former is not available) as a proxy for sales.
- In the case of Trading companies in Japan (Sogoshosha), gross sales (Total Trading Transactions) is considered as per the Japanese GAAP.

MSCI Barra follows cumulative sales reported by the companies, instead of quarterly sales figures. In addition, excise tax is always deducted from sales whenever this information is available.

MSCI Barra uses sales for two purposes:

- *Price/Sales*, which is calculated using the trailing 12-month sales per share figure; and
- *Long-term Historical SPS growth trend*, which is calculated using the last five years fiscal year-end sales per share.

1.2.2. Earnings Per Share (EPS)

MSCI Barra defines earnings as the net income from the continuing operations available to all equity shareholders (i.e., all shareholders holding securities that exhibit equity-like characteristics), excluding extraordinary items or non-recurring items, minority interest and preferred dividends (in cases where preferred shares do not exhibit equity like characteristics).

In cases where MSCI Barra determines that a company has unusual gains or losses that do not reflect the earnings potential of the company going forward, the item will be treated as non-recurring and will be excluded from earnings on an after-tax basis. Profit / loss on sale of discontinued operations, restructuring charges, bankruptcy charges, changes in accounting policy etc. could be some instances where the profits / losses are adjusted by MSCI Barra to reflect normalized earnings.

For all countries, the EPS is calculated using net earnings and number of shares, except in the US, Canada, the UK, and Ireland where MSCI Barra follows basic (undiluted) EPS from continuing operations available to common shareholders as reported by companies.

MSCI Barra uses earnings per share for four purposes:

- *Price/Earnings*, which is calculated using the trailing 12-month earnings per share figure;
- *Long-term Historical EPS growth trend*, which is calculated using the last five years fiscal year-end earnings per share;
- *Return on Equity (ROE)*, which is calculated using the trailing 12-month earnings per share figure and latest book value per share; and
- *Current Internal Growth Rate (g)*, which is calculated using return on equity and the dividend payout ratio.

1.2.3. Cash Earnings Per Share (CEPS)

MSCI Barra defines cash earnings as earnings per share, as stated above, including depreciation and amortization as reported by the company. In cases where amortization is not reported, then only depreciation is added back to earnings in order to calculate cash earnings. In addition, where a company does not report depreciation and / or amortization values in its interim financial statements, the latest fiscal values will be used to compute CEPS.

MSCI Barra uses cash earnings per share to calculate:

Price/Cash Earnings, which is calculated using the trailing 12-month cash earnings per share figure.

1.2.4. Dividends Per Share (DPS)

MSCI Barra defines regular cash dividends as those paid from annual operating profits and/or accumulated earnings.

To estimate the current annualized dividend, MSCI Barra takes the sum of all the dividends announced in the last 12 months. In the US and Canada, however, dividends are annualized by multiplying the latest dividend by the frequency of the dividend payments. This is done to capitalize on the regularity of dividend information in providing a forward-looking approach for the US and Canada.

MSCI Barra uses dividends per share for two purposes:

- *Dividend yield*, which is calculated using the annualized dividend per share figure; and
- *Current Internal Growth Rate ("g")*, which is calculated using the dividend payout ratio and return on equity.

Dividend per share is calculated using the gross dividend of a security (i.e., before any applicable withholding tax). Special cash dividends, unless they are paid for three consecutive years, and capital repayments are excluded from the dividend yield calculation.

Yields are gross, before withholding tax, and take into account special tax credits when applicable.

1.2.5. Book Value Per Share (BVPS)

MSCI Barra defines book value as shareholders' equity available to shareholders at the latest period end date excluding minority interest, treasury shares and preferred shares that do not exhibit equity like characteristics.

MSCI Barra uses the book value per share for three purposes:

- *Price/Book Value*, which is calculated using the latest book value per share;
- *Return on Equity (ROE)*, which is calculated using the latest book value and the trailing 12-month earnings per share figure; and
- *Current Internal Growth Rate ("g")*, which is calculated using return on equity and the dividend payout ratio.

1.3. Forecasted Per Share Data

Forecasted variables are based on consensus earnings estimates taken from financial analysts as provided by Thomson I/B/E/S for all countries except Japan and China A. For Japan domestic index constituents, data from Toyo Keizai is used for securities that are not covered by Thomson I/B/E/S. For China A index constituents, data from Wind is used. MSCI Barra uses forecasted data along with historical data to provide a comprehensive assessment of a company's performance.

MSCI Barra defines two types of earnings per share based on forecasts:

- EPS12F = 12-month forward EPS estimate derived on a rolling basis from the consensus of analysts' earnings estimates for the current fiscal year and the next fiscal year.
- EPS12B = backward 12-month EPS derived in a similar fashion as the EPS12F but using the EPS from the last reported fiscal year and the consensus of analysts' earnings estimates for the current fiscal year.

EPS12F and/or EPS12B are used to calculate:

- *Price to 12-month forward earnings; and*
- *Short-term forward EPS growth rate*

All forecasted data is refreshed monthly.

In order to calculate the short-term forward EPS growth rate, if the EPS of the last reported fiscal year is missing from the data vendor, then MSCI Barra's last reported fiscal year EPS will be used.

2. Security Ratios

Security ratios are derived using fundamental per share data as defined in the preceding section and are used by MSCI Barra to define the investment style of a security.

MSCI Barra calculates two types of security ratios:

- Valuation Ratios
- Other Financial Ratios

This section provides details on the definitions and computations of the variables used to calculate security ratios.

2.1. Valuation Ratios

In general, all valuation ratios are calculated using the following formula:

$$Valuation\ Ratios = \frac{Current\ security\ price}{Trailing\ 12-month\ per\ share\ figure}$$

This formula applies to:

- Price to Sales (P/S)
- Price to Earnings (P/E)
- Price to Cash Earnings (P/CE)
- Price to Book Value (P/BV)
- Price to Earnings Forward (P/E fwd)

while for

- Dividend Yield (YIELD) we use the inverse of the above formula

2.2. Other Financial Ratios

Other financial ratios calculated by MSCI Barra include the following:

- Long-term Historical Growth Trends
- Return on Equity (ROE)
- Current Internal Growth Rate (g)
- Short-term Forward Earnings Per Share Growth Rate (EGRSF)
- Long-term Forward Earnings Per Share Growth Rate (EGRLF)

2.2.1.Long-term Historical Growth Trends

MSCI Barra calculates two historical growth trends, showing the evolution of fundamental data over the last five years.

- Long-term historical EPS growth trend (EGRO)
- Long-term historical SPS growth trend (SGRO)

To calculate the EGRO and SGRO, first MSCI Barra applies a regression using the ordinary least square method to the last five-years' EPS and SPS, respectively.

$$EPS_t = a \times t + b \qquad SPS_t = a \times t + b$$

Where:

- *a,* the slope coefficient,
- *b,* the intercept,
- *t,* the year expressed in number of cumulative months.

Then, we calculate an average absolute EPS or SPS:

$$\tilde{\tilde{\tilde{EPS}}} = \sum_{i=1}^{n} \frac{|EPS_i|}{n} \qquad \tilde{\tilde{\tilde{SPS}}} = \sum_{i=1}^{n} \frac{|SPS_i|}{n}$$

Finally, we calculate the growth trend as follows:

$$EGRO = \frac{a_{EPS}}{\tilde{\tilde{\tilde{EPS}}}} \qquad SGRO = \frac{a_{SPS}}{\tilde{\tilde{\tilde{SPS}}}}$$

Example #1
Calculating the Long-term historical EPS and SPS growth trend

	Fiscal Year End Date	T	EPS	SPS
Fiscal Year End 0	December 31, 2002	0	(1.11)	7.71
Fiscal Year End 1	December 31, 2003	12	(0.51)	8.19
Fiscal Year End 2	December 31, 2004	24	0.29	8.57
Fiscal Year End 3	December 31, 2005	36	0.92	8.87
Fiscal Year End 4	December 31, 2006	48	1.41	11.5
a			0.05	0.07
a, annualised			**0.65**	**0.83**
Average Absolute			**0.85**	**8.97**
Growth trend			**76.30%**	**9.20%**

A minimum of the last four comparable EPS or SPS values is needed to compute the historical growth trends. Growth trends for securities without at least four years of comparable EPS or SPS data are not calculated and/or used to attribute the style of a security. In order to provide meaningful historical growth trends, MSCI Barra restates EPS and SPS to reflect the impact of corporate events that may affect historical financial data.

2.2.2.Return on Equity (ROE)

The following formula is used to calculate return on equity:

$$ROE = \frac{Trailing\ 12-month\ earnings\ per\ share}{Latest\ Book\ value\ per\ share}$$

The ROE, which is expressed in percentage terms, is considered meaningful and calculated only if the following conditions are met:

- the book value is positive;
- the difference between the book value date and earnings date is less than 18 months;
- the book value date is equal to or older than the earnings date and;
- book value and earnings are both consolidated or both non-consolidated.

Otherwise, the ROE value is considered missing and left blank.

2.2.3.Current Internal Growth Rate (g)

The following is the formula for current internal growth rate:

$$g = ROE \times (1 - Dividend\ Payout\ Ratio)$$

Pay out ratio is calculated using the annualized dividend per share divided by the trailing 12-month earnings per share.

ROE is calculated using the trailing 12-month earnings per share divided by the most recently reported book value, as shown is section 2.2.2, entitled “Return on Equity.”

If either the pay out ratio or the return on equity is not available, the current internal growth rate is not calculated.

2.2.4.Short-term Forward Earnings Per Share Growth Rate (EGRSF)

The EGRSF is a measure of the expected growth of a security over the next 12 months from the calculation date.

The EGRSF is computed as follows:

$$EGRSF = \frac{EPS_{12F} - EPS_{12B}}{\left|EPS_{12B}\right|}$$

2.2.5.Long-term Forward Earnings Per Share Growth Rate (EGRLF)

The LT fwd EPS G is the consensus of analysts’ earnings growth rate estimates typically provided for the next 3 to 5 years. In cases where the LT fwd EPS G is considered an outlier (greater than 50% or less than -33%) and the corresponding estimate is based on only one contributor, the variable will not be used by MSCI Barra.

3. Index Ratios

In general, index ratios computed by MSCI Barra result from the aggregation of the constituent using the methodology that best reflects the underlying index.

To reflect the underlying index methodology, index ratios are calculated taking into account each security's inclusion factor, which consists of the free float-adjustment and the style inclusion factor. For MSCI's international index series, the inclusion factor is the foreign inclusion factor (FIF) and for the MSCI's domestic indices, the inclusion factor is the domestic inclusion factor (DIF). For the former, the appropriate FIF is multiplied by the value inclusion factor (VIF) for the value indices and by the growth inclusion factor (GIF) for the growth indices. For the latter series (i.e. domestic indices), FIF is replaced by DIF.

MSCI Barra calculates two types of index ratios:

- Valuation ratios
- Other Financial Ratios

The following section details the calculations of these ratios.

3.1. Index Valuation Ratios

MSCI Barra calculates index valuation ratios by aggregating securities using the following formula:

$$\frac{\sum_{i=1}^{n}(\textit{Current security price} \times \textit{Total current security shares outstanding} \times \frac{1}{\textit{Exchange Rate}} \times \textit{Inclusion Factor})}{\sum_{i=1}^{n}(\textit{Trailing 12-month per share figure} \times \textit{Total current security shares outstanding} \times \frac{1}{\textit{Exchange Rate}} \times \textit{Inclusion Factor})}$$

where n=number of companies included in the calculation

If the trailing 12-month per share figure is not available for a security, that security will be excluded from the calculation for that particular ratio.

This formula applies to:

- Price to Earnings (P/E)
- Price to Earnings Forward (P/E fwd)
- Price to Cash Earnings (P/CE)
- Price to Book Value (P/BV)

while for

- Dividend Yield (YIELD) we use the inverse of the above formula

3.2. Other Index Financial Ratios

Other financial ratios calculated by MSCI Barra include the following :

- Return on Equity (ROE)
- Current Internal Growth Rate (g)
- Short-term Forward EPS Growth Rate (EGRSF)
- Long-term Growth Rates/Trends
- 12-month Index EPS
- Year on Year Growth EPS
- Estimated Daily Dividend Yield

3.2.1. Return on Equity (ROE)

Return on equity at an index level, which attempts to show the average return on equity for an index, is calculated using the recalculated earnings divided by the recalculated book value, as defined by the following formula:

$$Index\ ROE = \frac{Index\ P/BV}{Index\ P/E}$$

3.2.2. Current Internal Growth Rate (g)

The current internal growth rate at an index level is calculated using the return on equity and the payout ratio at an index level, as defined in the following formula:

$$Index\ g = Index\ ROE \times \left(1 - Index\ Dividend\ Yield\ (in\ \%) \times Index\ P/E\right)$$

3.2.3. Short-term Forward EPS Growth Rate (EGRSF)

The short-term forward EPS growth rate is the percentage change between the recalculated earnings backward and the recalculated earnings forward. It is calculated using the following formula:

$$Index\ EGRSF = \left[\frac{Index\ P/E_{12B}}{Index\ P/E_{12F}}\right] - 1$$

- Index P/E12B=Index level Price to Earnings Backward based on EPS12B for all securities included in the index.
- Index P/E12F=Index level Price to Earnings Forward based on EPS12F for all securities included in the index.

EPS12F (12-month forward EPS) and EPS12B (12-month backward EPS) are as defined in section 1.3.

Price to Earnings Backwards is calculated using the index level valuation ratio formula as defined in Section 3.1.

3.2.4.Long-term Growth Rates/Trends

Long-term growth rates and trends at an index level are computed by MSCI Barra from the aggregation of the constituents' security level data using the following formula:

$$\sum_{i=1}^{n}\left[\frac{Current\ share\ price \times Total\ current\ security\ shares\ outstanding \times Inclusion\ \ factor}{\sum_{i=1}^{n}(Current\ share\ price \times Total\ current\ security\ shares\ outstanding \times Inclusion\ \ factor)} \times Growth\ Rate\right]$$

where n=number of companies included in the calculation

This formula applies to:

- Long-term Forward EPS Growth Rate (EGRLF)
- Long -term Historical EPS Growth Trend (EGRO)
- Long-term Historical SPS Growth Trend (SGRO)

3.2.5.12-Month Index EPS

MSCI Barra calculates the 12-month index EPS by combining an index level with its underlying price to earnings ratios, thereby creating a new theoretical per share figure at an index level that reflects the evolution of the EPS for an index. MSCI Barra calculates 12-month index EPS for:

- Historical EPS
- EPS Forward

The following formula is used to calculate these 12-month index ratios:

$$12\ Months\ EPS = \frac{Index\ Level}{P/E\ at\ Index\ Level}$$

3.2.6.Year on Year Growth EPS

Using the 12-month index EPS, as shown above, MSCI Barra calculates an EPS growth rate for an index. Year on year growth EPS relates earnings growth to the index level. Currently, MSCI Barra calculates these figures using:

- 12-Month Index Historical EPS
- 12-Month Index Forward EPS

The year on year growth rate is calculated using the following formula:

$$Year\ on\ Year\ Growth\ EPS = 100 \times \left(\frac{12\ Months\ Index\ EPS\ of\ the\ Current\ Month}{12\ Months\ Index\ EPS\ 12\ Months\ Before} - 1\right)$$

For details on index ratio calculation examples, see Appendix II, entitled "Index Ratio Calculation Examples."

3.2.7.Estimated Daily Dividend Yield

In addition to calculating a monthly dividend yield, MSCI computes, every weekday, an estimated daily dividend yield, that takes into account annualized dividends and prices at previous month end where prices are adjusted by the month-to-date security performance. The estimated daily index yield uses the current security weights.

The estimated daily dividend yield and the monthly yield are calculated for the same indices.

Note that due to different calculation methodologies, the Estimated Daily Dividend Yield at month-end date will not correspond to the Monthly Dividend Yield.

$$EstimatedDailyIndexYield_t = \sum_{s\in 1}^{n} (Closing SecurityWeight_t * EstimatedDailySecurityYield_t)$$

Where

$$EstimatedDailySecurityYield_t = \frac{AnnualisedDividend_{EOPM} / FXrateDividend_{EOPM}}{(PricePerShare_{EOPM} / FXrate_{EOPM}) * \left[1 + \left(\frac{SecurityPriceIndex_t}{SecurityPriceIndex_{EOPM}} - 1\right)\right]}$$

and

$$Closing SecurityWeight_t = \frac{\frac{Closing NumberofShares_t * PricePerShare_t * InclusionFactor_t}{FXrate_t}}{\sum_{s\in 1}^{n} (Closing NumberofShares_t * PricePerShare_t * \frac{1}{FXRate_t} * Inclusion\ Factor_t)}$$

Where:

- *AnnualizedDividend* $_{EOPM}$ is the security annualized dividend as of the end of the previous month.
- *FXrateDividend* $_{EOPM}$ is the FX rate of the annualized dividend currency of security s vs USD at the end of the previous month. It is the value of 1 USD in foreign currency.
- Pr*icePerShare* $_{EOPM}$ is the price per share of the security s at the end of the previous month.
- *FXrate* $_{EOPM}$ is the FX rate of the price currency of security s vs USD at the end of the previous month. It is the value of 1 USD in foreign currency.
- *SecurityPriceIndex* $_t$ is the security price index of security s at time t.
- *SecurityPriceIndex* $_{EOPM}$ is the security price index of security s at the end of the previous month.
- *ClosingNumberOfShares*$_t$ is the number of shares of security s at time t.
- *PricePerShare* $_t$ is the price per share of security s at time t.
- *FXrate* $_t$ is the FX rate of the price currency of security s vs USD at time t. It is the value of 1 USD in foreign currency.
- *InclusionFactor*$_t$ is the inclusion factor (e.g. Foreign Inclusion Factor, Domestic Inclusion Factor, Growth Inclusion Factor, Value Inclusion Factor) of the security s at time t+1.

4. Fundamental Data Treatments for Corporate Events

The following section details the treatment of fundamental data to account for a corporate event. When a corporate event occurs, MSCI Barra may adjust and/or restate fundamental data in order to ensure comparability between the pre and post event data.

For the treatment of fundamental data, MSCI Barra categorizes corporate events as the following:

- Nominal Changes in Capital Structure
- Real Changes in Capital Structure
- Both Nominal and Real Changes in Capital Structure
- Changes in Business Structure

For events such as share buybacks, special cash dividends, and debt-to-equity swaps, no adjustment is made generally.

The policies and guidelines set forth apply in most corporate events. For corporate events not described in this section or combinations of different types of corporate events and other exceptional cases, MSCI Barra will determine the most appropriate implementation method and will announce it prior to the changes becoming effective in the MSCI Equity Index Series.

4.1. Nominal Changes in Capital Structure

Nominal changes in capital structure, events that have no effect on the capitalization of a security, require fundamental data to be adjusted in the same way that the price of the security is adjusted using the price adjustment factor (PAF).

For fundamental per share data, if the corporate event leads to an increase in the number of shares, the adjustment factor will decrease the value of the per share data using the same terms of the corporate event. If the corporate event leads to a decrease in the number of shares, the adjustment factor will increase the value of the per share data using the same terms of the corporate event.

Illustration:

Split 2:1, with a nominal value change from 50 to 25
The shareholder exchanges 1 share of nominal 50 against 2 shares of nominal 25.
The price before split is 100 and the shareholder had 1 share at a price of 100
*Then he has 2 shares which price is : 1*100/ 2 = 50*
The adjustment factor is (ex/cum) 50/100 = 0.50
Fundamental data per share figures are adjusted by this adjustment factor.

In the case of the current dividend rate, if the adjustment factor is between 0.8 and 1.25, no adjustment is made. MSCI Barra assumes that any event that leads to an adjustment factor within this range will typically not lead to a change in a company's dividend policy.

Security and index ratios will remain neutral to corporate events that result in nominal changes in capital structure because fundamental per share data is adjusted in the same proportion as price. Any changes that may be observed are due to price performance or company fundamental data.

4.2. Real Changes in Capital Structure

For all corporate events that involve a real change in capital structure, events that cause a change in security market capitalization, a pro forma book value will be calculated in order to reflect the incoming or outgoing market capitalization. All other fundamental data will not be adjusted for such events including the current dividend rate, except if earnings and/or cash earnings are negative.

Illustration:

Pro forma book value per share is calculated using the following formula:

$$\frac{(Latest\ BVPS \times Latest\ number\ of\ company\ shares\ outstanding) + (Number\ of\ shares\ issued \times Issue\ price)}{Number\ of\ shares\ after\ private\ placement\ or\ public\ offering}$$

The number of shares at BVPS date = 1000.
The book value per share before the public offering is EUR 25.
Event: Public placement of 100 shares @ EUR 50 per share.

*New BVPS = (1000*25)+(100*50)*

(1000 + 100)

New BVPS = 27.27

Adjustment Factor for BVPS = New BVPS/ Old BVPS = ***1.09***

If a company has multiple share classes, book value is adjusted by using the total amount of capital raised in the issue.

Security and index ratios will change by the increase or decrease in the number of shares and change in price. Price to book value, return on equity, and current internal growth rate, at a security and index level, will change based on the new book value per share.

If earnings/cash earnings are negative, an adjustment factor is applied according to the change in number of shares in order to avoid increasing losses artificially in P/E and P/CE calculations at index level.1

4.3. Both Nominal and Real Changes in Capital Structure

All corporate events that involve a nominal and real change in capital structure require fundamental data to be adjusted in the same way that the price of the security is adjusted using the price adjustment factor (PAF) due to the discount the shares are offered at in relation to the market price, except:

In the case of the current dividend rate, if the adjustment factor is between 0.8 and 1.25, no adjustment is made. MSCI Barra assumes that any event that leads to an adjustment factor within this range will typically not lead to a change in a company's dividend policy.

In the case of negative earnings and/or cash earnings. If earnings or cash earnings are negative, an adjustment factor is applied according to the change in number of shares in order to avoid increasing losses artificially in P/E and P/CE calculations at index level.

In the case of book value, a pro forma book value will be calculated in order to reflect the incoming or outgoing market capitalization

[1] When a corporate event results in incoming market capitalization and the company reports losses, MSCI Barra adjusts the trailing 12-month EPS. The loss per share will be recalculated using the number of shares after the corporate event to avoid a decrease in earnings due to an increase in market capitalization.

4.4. Changes in Business Structure

MSCI Barra defines changes in business structure as events that cause a company's on-going business model to substantially change. Events that cause a change in business structure include significant events such as significant mergers and acquisitions and early index inclusions resulting from spin-offs and IPOs. MSCI Barra uses a threshold of an increase of 50% or greater or a decrease of 33% or more, relative to the company's full market capitalization before the event to identify such significant events.

For these significant events, if the post-event entity moves from being a non-constituent to a constituent of the Global Investable Market Index or moves from the Small Cap Index to the Standard Index, the style characteristics of the affected securities are reviewed. If the post-event entity moves from the Standard Index to the Small Cap Index or remains in the same Size-Segment Index (with the Large and Mid Cap Indices being considered as one size index), the style characteristics of the affected securities are not reviewed.

In cases where such a style review is performed, pro forma post-event fundamental data provided by the post-event entity is used. If no pro forma post-event fundamental data is provided, estimations of proforma fundamental data are performed using actual figures provided by the post-event entity.

MSCI Barra will also use estimated proforma fundamental data for the acquiring company in acquisitions of loss-making companies, provided the acquired loss-making companies meet the following conditions:

- The acquired loss-making company was a constituent of the MSCI Standard Size Segment before the acquisition; and
- The 12-month trailing losses of the acquired loss-making company exceeded USD 1bn at the end of the month previous to the ex-date of the acquisition event.

For the acquiring company, MSCI Barra will use estimated proforma fundamental data arrived at by use of pre-event fundamental data of both the acquiring company and the acquired company. Such estimated fundamental data would be used until the time the acquiring company starts reporting post-event fundamental data.

5. Balance Sheet Information

MSCI Barra covers the following Balance Sheet items in its product files.

Assets	
Fixed Assets (FA)	tangible fixed assets, such as property, plant and equipment
Investments (INV)	investments in subsidiaries, joint ventures and associated companies
Other Assets (OA)	includes goodwill and other investments
Current Assets (CA)	sum of cash and cash equivalents, accounts receivable, inventory, marketable securities, prepaid expenses, and other assets that could be converted to cash in less than one year
Total Assets (TA) = FA + INV + OA + CA	

Liabilities	
Shareholders equity / Book Value (BV)	excludes minority interest, treasury shares and preferred shares that do not exhibit characteristics of equity (please note that all the data points, except the book value of the company, are captured only for Fiscal year ends)
Other Liabilities (OL)	all other liabilities including preference capital (PREF). Preference Capital relates to preferred shares that do not exhibit characteristics of equity
Long Term Debt (LD)	liabilities due in a year or more
Current Liabilities (CL)	liabilities due in less than a year
Total Liabilities (TL) = BV + OL + LD + CL	

MSCI Barra also covers the following Balance Sheet ratio for its Global Equity Model

- Market leverage (MLEV)

It is calculated as $$MLEV = \frac{MCAP + PREF + LD}{MCAP},$$

where *MCAP* is the market value of common equity at previous month-end, $PREF$ is the most recent book value of preferred equity, and LD is the most recent book value of long-term debt.

- Book leverage (BLEV)

It is calculated as $$BLEV = \frac{BV + PREF + LD}{BV}$$

where BV is the most recent book value of common equity, *PREF* is the most recent book value of preferred equity, and *LD* is the most recent book value of long-term debt.

- Debt-to-assets (DTOA)

It is calculated as $$DTOA = \frac{LD + CL}{TA}$$

where *LD* is the long-term debt and *CL* are the current liabilities, and *TA* is most recent book value of total assets.

6. Hyperinflationary economies – Adjustment of Fundamental Data

MSCI Barra follows the guidelines provided under FRS (Financial Reporting Standard) 29 to adjust fundamental data of companies belonging to hyperinflationary economies. The standard states that:

Hyperinflation is indicated by characteristics of the economic environment of a country, which include, but are not limited to, the following:

- The general population prefers to keep its wealth in non-monetary assets or in a relatively stable foreign currency. Amounts of local currency held are immediately invested to maintain purchasing power;
- The general population regards monetary amounts not in terms of the local currency but in terms of a relatively stable foreign currency. Prices may be quoted in that currency;
- Sales and purchases on credit take place at prices that compensate for the expected loss of purchasing power during the credit period, even if the period is short;
- Interest rates, wages and prices are linked to a price index; and
- The cumulative inflation rate over three years is approaching, or exceeds, 100%.

Accordingly, MSCI Barra will review the inflation rates of countries on a periodic basis to identify cases that meet the above threshold.

Earlier, MSCI Barra used to adjust fundamental data of companies belonging to hyperinflationary currency economies (viz Argentina, Brazil, Venezuela etc.). The data was adjusted to reflect the fundamental variables excluding the impact of inflation.

Appendix I

MSCI Barra's treatment of some specific aspects of IFRS

Under the regulation adopted by the Council of the European Union, all EU listed companies are required to prepare their consolidated financial statements for financial years beginning on or after January 1, 2005, in accordance with IFRS. In addition, several companies in other regions including Norway, Switzerland, Australia, Singapore, Hong Kong and China also adopted IFRS starting 2005. EU listed companies that report using United States Generally Accepted Accounting Principles ('US GAAP') were permitted to continue doing so until 2007.

A transition from local GAAP to IFRS impacts the computation of historical long-term earnings and sales trends because IFRS earnings and sales numbers may not be comparable with the numbers reported using local GAAP. Historical earnings and historical sales trends over a five-year period are important components of MSCI Barra's index construction methodology.

1) MSCI Barra's approach to the treatment of **amortization of goodwill**:

In order to make five-year earnings comparable, MSCI Barra will adjust historical [non-IFRS] earnings by adding back "amortization of goodwill" for companies where the difference between IFRS earnings and non-IFRS earnings is more than or equal to 10%. For companies with the largest percentage and absolute change in earnings due to the adoption of IFRS, the discontinuation of goodwill amortization explains the bulk of the earnings change in a majority of cases. 'Amortization of goodwill' is also the only item for which historical pre-IFRS earnings data can be consistently adjusted to make it comparable to IFRS data. For further details, please refer to MSCI Barra's consultation document -- 'MSCI Consultation on the Treatment of Financial Results under IFRS'-- released in February 2006.

2) In order to make **sales comparable**, MSCI Barra will make case-by-case adjustments.

3) MSCI Barra's approach to the treatment of **Gain / Loss due to Revaluation of property**:

'Revaluation of property' can have a large impact on earnings of Real Estate companies. Therefore, MSCI Barra adjusts the earnings of real estate companies (i.e., companies falling under the GICS Industry Group 'Real Estate' for 'Gain / Loss due to Revaluation of Investment Property').

To compute the trailing EPS of a real estate company that has opted to revalue its investment property, MSCI Barra adjusts the trailing EPS for the 'Gain / Loss due to Revaluation of Investment Property' for the latest trailing period updated by MSCI Barra.

To compute the Long-term Historical EPS growth trend and to make the five year earnings comparable, MSCI Barra adjusts the EPS of fiscals reported by the company under IFRS (December 2004 onwards) for the 'Gain / Loss due to Revaluation of Investment Property'.

As a reminder, MSCI Barra calculates:

1) Long-term Historical EPS growth trend, by performing a regression analysis of the last five years' fiscal year-end earnings per share;

2) Long-term Historical SPS growth trend, by performing a regression analysis of the last five years' fiscal year-end sales per share.

Appendix II

Index Ratio Calculation Examples

This appendix provides examples on how index ratios are calculated.

The ratios are calculated by dividing the market capitalization of the relevant index by the aggregated relevant fundamental data for all securities included in the relevant index.

MSCI Barra calculates index valuation ratios by aggregating securities using the following formula:

$$\frac{\sum_{i=1}^{n}(Current\ security\ price \times Total\ current\ security\ shares\ outstanding \times \frac{1}{Exchange\ Rate} \times Inclusion\ Factor)}{\sum_{i=1}^{n}(Trailing\ 12-month\ per\ share\ figure \times Total\ current\ security\ shares\ outstanding \times \frac{1}{Exchange\ Rate} \times Inclusion\ Factor)}$$

where n=number of companies included in the calculation

If the trailing 12-month per share figure is not available for a security, that security will be excluded from the calculation for that particular ratio.

This formula applies to:

- Price to Earnings (P/E)
- Price to Earnings Forward (P/E Fwd)
- Price to Cash Earnings (P/CE)
- Price to Book Value (P/BV)

while for

- Dividend Yield (D/P) we use the inverse of the above formula

For Price to Earnings (P/E) and Price to Cash Earnings (P/CE) ratios, the security level per share figure is the Trailing 12-month earnings per share and the Trailing 12-month cash earnings per share respectively.

Each example runs a simulation with three securities in an index.

Example # 1
Calculating price to book value at an index level for the MSCI Standard Index Series

	Security A	Security B	Security C
Price	$45.21	$15.40	$25.49
Book Value Per Share	$10.90	$7.80	$13.20
P/BV	**4.15**	**1.97**	**1.93**
Total Current Security Shares Outstanding (in millions)	50.24	40.87	12.41
Exchange Rate	1.0	1.0	1.0
Foreign Inclusion Factor (FIF)	0.9	0.8	0.95
Inclusion Factor	0.9	0.8	0.95
Adjusted Market Capitalization (in millions of $)	2044.22	503.52	300.51
Book Value (in millions of $)	492.85	255.03	155.62
Total Adjusted Market Capitalization (in millions of $)			**2848.25**
Recalculated Total Book Value (in millions of $)			**903.5**
Index Level Price to Book Value			**3.15**

Example # 2
Calculating price to book value at an index level for the MSCI Standard Index Series

	Security A	Security B	Security C
Price	$45.21	$15.40	$25.49
Book Value Per Share	$10.90	$7.80	$13.20
P/BV	**4.15**	**1.97**	**1.93**
Total Current Security Shares Outstanding (in millions)	50.24	40.87	12.41
Exchange Rate	1.0	1.0	1.0
Foreign Inclusion Factor (FIF)	0.9	0.8	0.95
Value Inclusion Factor (VIF)	1.0	0.5	0.65
Inclusion Factor	0.9	0.4	0.6175
Adjusted Market Capitalization (in millions of $)	2044.22	251.76	195.33
Book Value (in millions of $)	492.85	127.51	101.15
Total Adjusted Market Capitalization (in millions of $)			**2491.31**
Recalculated Total Book Value (in millions of $)			**721.52**
Index Level Price to Book Value			**3.45**

Example # 3
Calculating price to book value at an index level for the MSCI Standard Index Series using companies with different exchange rates

	Security A	Security B	Security C
Price (in local currency)	$45.21	$15.40	€ 25.49
Price exchange rate	1.00	1.00	0.83
Price (in US dollars)	$45.21	$15.40	$30.71
Book Value Per Share (in local currency)	€ 10.90	$7.80	€ 13.20
Fundamental Data Exchange Rate	0.8	1.0	0.8
Book Value Per Share (in US dollars)	$13.13	$7.80	$15.90
P/BV	**3.44**	**1.97**	**1.93**
Total Current Security Shares Outstanding (in millions)	50.24	40.87	12.41
Inclusion Factor	0.9	0.8	0.95
Adjusted Market Capitalization (in millions of $)	2044.22	251.76	195.33
Book Value (in millions of $)	593.70	255.03	187.50
Total Adjusted Market Capitalization (in millions of $)			**2909.80**
Recalculated Total Book Value (in millions of $)			**1036.32**
Index Level Price to Book Value			**2.81**

Example # 4
Calculating price to earnings at an index level

	Security A	Security B	Security C
Price	$45.21	$15.40	$25.49
Earnings Per Share	$0.12	$0.28	$15.21
P/E	**376.75**	**55.00**	**1.68**
Total Current Security Shares Outstanding (in millions)	50.24	40.87	12.41
Exchange Rate	1.0	1.0	1.0
Inclusion Factor	0.9	0.8	0.95
Adjusted Market Capitalization (in millions of $)	2044.22	503.52	300.51
Earnings (in millions of $)	5.43	9.15	179.32
Total Adjusted Market Capitalization (in millions of $)			**2848.25**
Recalculated Total Book Value (in millions of $)			**193.9**
Index Level Price to Book Value			**14.69**

Long-term growth rates and trends at an index level are computed by MSCI Barra from the aggregation of the constituents' security level data using the following formula:

$$\sum_{i=1}^{n}\left[\frac{Current\ share\ price \times Total\ current\ security\ shares\ outstanding \times Inclusion\ factor}{\sum_{i=1}^{n}(Current\ share\ price \times Total\ current\ security\ shares\ outstanding \times Inclusion\ factor)} \times Growth\ Rate\right]$$

where n=number of companies included in the calculation

Example # 5
Calculating long-term forward EPS growth rate at an index level

	Security A	Security B	Security C
Price	$45.21	$15.40	$25.49
EGRLF	11.45%	25.40%	8.47%
Total Current Security Shares Outstanding (in millions)	50.24	40.87	12.41
Exchange Rate	1.0	1.0	1.0
Inclusion Factor	0.9	0.8	0.95
Adjusted Market Capitalization (in millions of $)	2044.22	503.52	300.51
Total Adjusted Market Capitalization (in millions of $)			**2848.25**
Index Level EGRLF			**13.60%**

MSCI Barra calculates the 12-month index EPS by combining an index level with its underlying price to earnings ratios, thereby creating a new theoretical per share figure at an index level that reflects the evolution of the EPS for an index. MSCI Barra calculates 12-month index EPS for:

- Historical EPS
- EPS Forward

The following formula is used to calculate these 12-month index ratios:

$$12\ Months\ EPS = \frac{Index\ Level}{P/E\ at\ Index\ Level}$$

Example # 6
Calculating 12-month index EPS

	Security A	Security B	Security C
Price	$45.21	$15.40	$25.49
Earnings Per Share	$0.12	$0.28	$15.21
P/E	**376.75**	**55.00**	**1.68**
Total Current Security Shares Outstanding (in millions)	50.24	40.87	12.41
Exchange Rate	1.0	1.0	1.0
Inclusion Factor	0.9	0.8	0.95
Adjusted Market Capitalization (in millions of $)	2044.22	503.52	300.51
Earnings (in millions of $)	5.43	9.15	179.32
Index Level Price to Earnings			**14.69**
Index Level			**954.15**
12-month Index EPS			**64.96**

Appendix III

Correction Policy

The rule for **Valuation Ratios correction** is as follows:

The correct valuation ratios (P/E, P/CE, P/Sales, P/BV, Dividend Yield) are calculated at security level and their yields are used to evaluate the error impact.

- If the incorrect yields are within ±0.25% of the correct yields (±0.5% for book value/price), no index revision is done.
- If the incorrect yields are not within ±0.25% of the correct yields (±0.5% for book value/price), new valuation ratios are calculated for the security's standard country and industry group indices and the impact on the yields is evaluated.
- If the incorrect index yields are within ±0.1% of the correct yields (±0.5% for book value /price), no index revision is done.
- If the incorrect index yields are not within ±0.1 of the correct yield (±0.5% for book value/price), new valuation ratios are calculated for all indices in which the security participates and the impact on the yields is evaluated.

MSCI Barra applies a one fiscal year correction period for errors discovered in annual valuation ratios.

The following section has been modified since September 2008 :

Section 4.4 : Changes in Business Structure

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