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MSCI Methodology for Calculating Fundamental Data Ratios at an Index Level

MSCI Standard and Small Cap Index Series, MSCI US Equity Indices, MSCI Global Value and Growth Index Series

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The following table indicates all ratios that are calculated by MSCI 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

The information contained in this document describes MSCI's methodology for calculating the Index Level Ratios set forth in the table above. This document should be read in conjunction with Appendix 1 to the MSCI Global Value and Growth Index Series Methodology Book.

1. Index Level Ratios

In general, index level ratios computed by MSCI aggregate the relevant constituent level fundamental data.

Index level ratios take into account each constituent security's inclusion factor, which consists of the security's free float-adjustment and its style inclusion factor[1]. For example, a company in the Global Value and Growth Index will have an inclusion factor equal to its FIF multiplied by its G-VIF.

MSCI calculates two types of index level ratios:

- Valuation ratios
- Other Financial Ratios

[1] For the MSCI Standard and Small Cap Index Series the inclusion factor is the foreign inclusion factor (FIF) and for MSCI's Domestic Index Series like the MSCI US Equity Market Capitalization Indices and the MSCI China A Index, the inclusion factor is the domestic inclusion factor (DIF). For the Global Value and Growth Index Series and the MSCI US Equity Style Indices, the appropriate FIF or DIF is multiplied by the value inclusion factor (G-VIF / VIF) for the value indices and by the growth inclusion factor (G-GIF / GIF) for the growth indices.

Section 1.1 explains MSCI's methodology for calculating index level valuation ratios. Section 1.2 describes MSCI's methodology for calculating certain other index level financial ratios.

1.1 Index Level Valuation Ratios

These 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.

In general, all index level price ratios aggregate the relevant security level data and are calculated as follows:

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

Where,
n=number of securities included in the calculation.
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.

If any per share figure is not available for a particular security, the security is not included in 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)
- Dividend yield (D/P)[2]

1.2 Other Index Level Financial Ratios

The other financial ratios calculated by MSCI are:

- Return on Equity (ROE)
- Current Internal Growth Rate (g)
- Short-term Forward EPS Growth Rate (ST fwd EPS G)
- Long-term Growth Rates/Trends
- 12-month Index EPS
- Year on Year Growth EPS

[2] Dividend yield is calculated using the inverse of the price ratio formula and is expressed in percentage terms.

1.2.1 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 by dividing the index level price to book value by the index level price to earnings ratio**,** according to the following formula:

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

1.2.2 Current Internal Growth Rate (g)

The current internal growth rate at an index level is calculated by multiplying the index level return on equity and the index level payout ratio, according to the following formula:

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

1.2.3 Short-term Forward EPS Growth Rate (ST fwd EPS G)

The short-term forward EPS growth rate measures the percentage change between the index level price to earnings backward and the index level price to earnings forward. It is calculated using the following formula:

$$Index\ ST\ \ fwd\ \ EPS\ G = \left[\frac{Index\ P/E_{12B}}{Index\ P/E_{12F}}\right] - 1$$

1.2.4 Long-term Growth Rates/Trends

Long-term growth rates and trends at an index level aggregate the constituents' security level data using the following formula:

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

where n=number of securities included in the calculation

This formula applies to:

- Long-term Forward EPS Growth Rate (LT fwd EPS G)
- Long -term Historical EPS Growth Trend (LT his EPS G)
- Long-term Historical SPS Growth Trend (LT his SPS G)

1.2.5 12-Month Index Level EPS

MSCI calculates the 12-month index level EPS by dividing an index level by the price to earnings ratio of the same index, thereby creating a new theoretical per share figure at an index level that reflects the evolution of the EPS for an index. MSCI calculates a 12-month index level EPS for:

- Trailing EPS
- EPS Forward

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

$$12\ Months\ EPS_{(Trailing\ or\ Forward)} = \frac{Index\ Level}{P/E_{(Trailing\ or\ Forward)}\ at\ Index\ Level}$$

1.2.6 Year on Year Growth EPS

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

- 12-Month Index Trailing EPS
- 12-Month Index Forward EPS

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

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

Appendix I - Index Level Ratio Calculation Examples

This appendix provides examples of how MSCI calculates certain index level ratios. Each example uses a hypothetical index comprised of only three constituent securities.

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	1	1
Foreign Inclusion Factor (FIF)	0.9	0.8	0.95
Inclusion Factor	0.9	0.8	0.95
Adjusted Market Capitalization (in millions of $)	2,044.22	503.52	300.51
Book Value (in millions of $)	492.85	255.03	155.62
Total Adjusted Market Capitalization (in millions of $)			**2,848.25**
Recalculated Total Book Value (in millions of $)			**903.50**
Index Level Price to Book Value			**3.15**

Example #2 **Calculating price to book value at an index level for the MSCI Value 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	1	1
Foreign Inclusion Factor (FIF)	0.9	0.8	0.95
Value Inclusion Factor (VIF)	1	0.5	0.65
Inclusion Factor (FIF x VIF)	0.9	0.4	0.6175
Adjusted Market Capitalization (in millions of $)	2,044.22	251.76	195.33
Book Value (in millions of $)	492.85	127.51	101.15
Total Adjusted Market Capitalization (in millions of $)			**2,491.31**
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	0.83	1	0.83
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 $)	2,044.22	503.52	362.07
Book Value (in millions of $)	593.80	255.03	187.50
Total Adjusted Market Capitalization (in millions of $)			**2,909.80**
Recalculated Total Book Value (in millions of $)			**1,036.32**
Index Level Price to Book Value			**2.81**

Example #4

Calculating price to earnings at an index level

Notice that Security C has the biggest impact on the index level price to earnings ratio in this example even though it is the smallest security using free-float adjusted market capitalization.

	$Security_A$	$Security_B$	$Security_C$
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	1	1
Inclusion Factor	0.9	0.8	0.95
Adjusted Market Capitalization (in millions of $)	2,044.22	503.52	300.51
Earnings (in millions of $)	5.43	9.15	179.32
Total Adjusted Market Capitalization (in millions of $)			**2,848.25**
Recalculated Total Earnings (in millions of $)			**193.90**
Index Level Price to Earnings			**14.69**

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
LT fwd EPS G	11.45%	25.40%	8.47%
Total Current Security Shares Outstanding (in millions)	50.24	40.87	12.41
Exchange Rate	1	1	1
Inclusion Factor	0.9	0.8	0.95
Adjusted Market Capitalization (in millions of $)	2,044.22	503.52	300.51
Total Adjusted Market Capitalization (in millions of $)			**2,848.25**
Index Level LT fwd EPS G			**13.60%**

Example #6			
Calculating 12-months 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	1	1
Inclusion Factor	0.9	0.8	0.95
Adjusted Market Capitalization (in millions of $)	2,044.22	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-Months Index EPS			**64.96**

Appendix II - Frequently Asked Questions

Q. How are trailing per share figures calculated at the security level?

A. **In case of all countries except US and GB:**

Historical per share figures are calculated using the following formula:

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

where 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 9 months ended Mar 31, 2005, the trailing 12-month earnings would get calculated as under:

Trailing 12-month earnings = Fiscal period earnings for the year ended Jun 30, 2004 + (9-month earnings for the current interim period ended Mar 31, 2005 – 9-month earnings for the comparative interim period ended Mar 31, 2004)

Trailing Earnings per share would then be computed as under:

$$\textit{Trailing 12-month EPS} = \frac{\textit{Trailing 12-month earnings}}{\textit{Number of shares outstanding at a company level}}$$

However, subsequently, when the company comes out with its Annual results for the year ended Jun-2005, we need not calculate the trailing 12-month figures, since the reported figures are already for a period of 12 months.

In case of US and GB:

As explained above, generally, we compute trailing per share figures by calculating the trailing 12-month figure and then dividing it by the Number of shares outstanding. However, in case of companies in US and GB, trailing per share numbers are computed as under:

Trailing per share figure = Last reported fiscal period per share figure + (Current interim per share figure – comparative interim per share figure)

Accordingly, in case of companies in US and GB, trailing 12-month EPS would be calculated as under:

Trailing 12-month EPS = Fiscal period EPS for the year ended Jun 30, 2004 + (9-month EPS for the current interim period ended Mar 31, 2005 – 9-month EPS for the comparative interim period ended Mar 31, 2004)

Q. What is the difference between earnings and cash earnings?

A. Depreciation on fixed assets and amortization of intangibles are added to earnings to arrive at cash earnings.

Q. Can an index-level P/E or P/CE ratio be negative?

A. Yes. When one or a few dominant companies experience significant losses, this would make the P/E or P/CE at the index-level negative. In these cases, the aggregate P/E or P/CE for that index (country-level or industry–level as the case may be) is published as a negative number.

Owing to the depreciation/amortisation figure, negative index-level P/CE ratios are rare.

Q. Why would an index-level P/E or P/CE ratio change significantly from month to month?

A. In smaller markets and sometimes even in deeper markets, certain securities may dominate the index. If the change in earnings or stock performance of such securities have been substantial, the index-level P/E and P/CE ratios may change substantially.
In addition, a small variation in the index-level earnings and cash earnings from one month to another may result in large swings in index-level ratios when the index-level earnings and cash earnings are small relative to the index market capitalization. This occurs for example when index-level earnings and cash earnings turn from a slightly positive to a slightly negative figure.

Q. Can P/CE be greater than P/E at the index-level?

A. When index-level earnings are negative and index-level cash earnings are positive, the index-level P/CE will be greater than the index-level P/E
P/CE ratio is not computed for banks, insurance companies, and some real estate companies. If any per share figure is not available for a particular security, the security is not included in the calculation for that particular ratio at the index level. Banks, insurance companies and real estate companies – for which we do not compute cash earnings – are thus included for the purpose of computing the index-level P/E ratio but excluded in the computation of index-level P/CE ratio. If such companies report substantial positive earnings, it may result in a non-negative index-level P/E being smaller than a country-level P/CE.