MSCI FUNDAMENTAL DATA METHODOLOGY

MSCI Methodology for Fundamental Data

April 2019

CONTENTS

INTRODUCTION

MSCI began publishing annual fundamental data for developed market companies in 1969 and for emerging market companies in 1988. MSCI 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
	Return on Equity	Since March 1997 for DM Since December 1993 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 uses these fundamental data items to define:

- Fundamental per share data

- Security ratios

- Index ratios

- Balance Sheet information

In addition, MSCI 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 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	Price to Earnings
	Long-term Historical Earnings Per Share Growth Trend	Long-term Historical Earnings Per Share Growth Trend
	Return on Equity	Return on Equity
	Current Internal Growth Rate	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
	Payout Ratio	Payout Ratio
Book Value Per Share	Price to Book Value	Price to Book Value
Forecasted Earnings Per Share		Price to Earnings Forward
		Price to Earnings Backward
		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 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 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 Indexes and the Global Equity Models. This data includes long-term historical growth trends, current internal growth rate, and forecasted earnings figures.

MSCI 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 that use fundamental data. The book demonstrates MSCI's use of fundamental data to calculate financial ratios and indicators at both the security and index level. Additionally, this book demonstrates how MSCI uses fundamental data in connection with corporate events.

1 FUNDAMENTAL PER SHARE DATA

MSCI 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 provides two types of fundamental per share data:

- Historical

- Forecasted

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

1.1 GENERAL RULES

1.1.1 NUMBER OF SHARES

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

1.1.2 CONSOLIDATION

MSCI always calculates fundamental data using consolidated information unless consolidated results are unavailable or are not reported on a regular basis. However, in countries like India, 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 reports fundamental data in the currency of a company's country of classification based on GIMI Methodology. In general, MSCI follows the frequency of the company reporting. For example, if companies report quarterly results, MSCI also follows quarterly results.

1.1.4 ACCOUNTING STANDARDS USED

The primary accounting standard followed by MSCI 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 will follow the latter. For a large number of European countries and some other countries in the Asia-Pacific, MSCI started following IFRS accounting in the year 2006 (please refer to Appendix I for details on MSCI's treatment of some specific issues related to IFRS).

1.1.5 SOURCES AND UPDATES

MSCI sources company information from third party vendors as well as from publicly available information made available by the companies. In addition, MSCI 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 uses both audited and unaudited reports.

MSCI 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[1]

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

- 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, 2011, the trailing 12-month Earnings will be calculated as:

Trailing 12-month earnings = Fiscal period earnings for the year ended Dec 31, 2010 + (3 month earnings for the current interim period ended Mar 31, 2011 – 3 month earnings for the comparative interim period ended Mar 31, 2010)

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.

[1]MSCI will update Fundamental per share data for China A "Stock Connect" listings based on the offshore RMB exchange rate (CNH). In addition, for securities listed outside China and reporting their financials in RMB, MSCI will publish fundamental per share data based on CNH effective March 2018 month-end.

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

1.2.1 SALES PER SHARE (SPS)

MSCI 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 applies certain exceptional treatment in sales reported for some companies:

- For *Banks* (GICS® Industry Group 4010), MSCI does not publish sales.

- For *Insurance companies* (GICS® Industry Group 4030), MSCI uses the net premiums earned (or net premiums written, if the former is not available) as a proxy for sales.

- For certain companies that report higher revenues on account of notional contracts or sales, MSCI may report revenues net of operating cost.

MSCI 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 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 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 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 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 follows basic (undiluted) EPS from continuing operations available to common shareholders as reported by companies.

MSCI 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 (RO*E), 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 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.

Due to the nature of business of Banks (GICS® Industry Group 4010) and Insurance companies (GICS® Industry Group 4030), MSCI does not publish cash earnings.

MSCI 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 defines regular cash dividends as those paid from annual operating profits and/or accumulated earnings, while capital repayments or returns of capital are defined as cash distributions from the company's share capital or additional paid-in capital (capital contribution reserve). Regular capital repayments are considered as regular cash dividends.

To estimate the current annualized dividend, MSCI takes the sum of all the declared regular cash distributions (dividends or capital repayments), including the ones not yet ex or paid, over the latest 12-month period.

However, if the regular cash distribution frequency is changed, the latest 12 months of distribution may not be available. An example may be when the distribution frequency is changed from annual to semi-annual which yields either latest 6 months of distributions or latest 18 months of distributions. In this case, MSCI estimates the current annualized dividend by using the latest 6 months of distribution if resulting in a higher amount than the previous annualized dividend. If the latest 6 months of distribution is lower than the previous annualized dividend, MSCI keeps the previous annualized dividend without taking the latest 6 months of distribution into consideration.

In the US and Canada, however, regular cash distributions are annualized by multiplying the latest cash distributions by the frequency of the regular cash distributions' payments. This is done to capitalize on the regularity of the regular cash distributions' information in providing a forward-looking approach for the US and Canada.

MSCI.COM | PAGE 13 OF 70

MSCI 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). Capital repayments are usually not subject to withholding tax. Special cash dividends, unless they are paid for three consecutive years, and extraordinary 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 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 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. For Japan, data from Toyo Keizai is used for securities that are not covered by Thomson I/B/E/S. MSCI uses forecasted data along with historical data to provide a comprehensive assessment of a company's performance.

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

- **EPS$_{12F}$** = 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.

$$EPS_{12F} = \frac{M \times EPS_1 + (12 - M) \times EPS_2}{12}$$

Where

- EPS_1 is the consensus of analysts' earnings estimates for current fiscal year.

- EPS_2 is the consensus of analysts' earnings estimates for the next fiscal year.

- M is the number of months remaining before the current fiscal year end

- The current fiscal year corresponds to the fiscal year following the last fiscal year for which the company has made its results publicly available

For cases where EPS_2 is not available and M is greater than or equal to 8, EPS_1 is used as an approximation of EPS_{12F}.

Example:
Calculating the 12-month forward earnings as of January 10, 2010:

	Security A	Security B	Security C
Latest reported Fiscal Year	Dec 31, 2009	Mar 31, 2009	Dec 31, 2008
M	11	2	11
EPS_1	0.64	1.04	1.04
EPS_1 date	Dec 31, 2010	Mar 31, 2010	Dec 31, 2009
EPS_2	0.74	1.52	1.52
EPS_2 date	Dec 31, 2011	Mar 31, 2011	Dec 31, 2010
EPS_3			1.72
EPS_3 date			Dec 31, 2011
EPS12F	**0.65**	**1.44**	**1.54**

For Security C, the results for the fiscal year ending December 31, 2009 are not yet available. As a result, the EPS_1 estimates still pertain to the fiscal year ending December 31, 2009. Therefore, in order to have meaningful 12-month forward earnings, the EPS_2 and the EPS_3 are used instead of the EPS_1 and EPS_2.

- **EPS_{12B}** = backward 12-month EPS derived in a similar fashion as the EPS_{12F} but using the EPS from the last reported fiscal year and the consensus of analysts' earnings estimates for the current fiscal year.

$$EPS_{12B} = \frac{M \times EPS_0 + (12 - M) \times EPS_1}{12}$$

Where

- EPS0 is last fiscal year end reported earnings per share

- EPS1 is the consensus of analysts' earnings estimates for current fiscal year.

EPS12F and/or EPS12B are used to calculate:

- Price to 12-month forward earnings; and

- Short-term forward EPS growth rate

Example:			
Calculating the Short-term forward EPS growth rate as of the January 10, 2010:			
	Security A	**Security B**	**Security C**
Fiscal Year End	Dec 31, 2009	Nov 30, 2009	Mar 31, 2009
M	11	10	2
EPS_0	0.50	-0.30	0.89
EPS_1	0.64	-0.15	1.04
EPS_2	0.74	0.25	1.52
$EPS12_F$	0.65	-0.08	1.44
$EPS12_B$	0.51	-0.28	1.02
ST fwd EPS G	**26.7%**	**69.7%**	**41.9%**

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'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 to define the investment style of a security.

MSCI 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 include the following:

- Long-term Historical Growth Trends

- Return on Equity (ROE)

- Payout Ratio

- 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 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 applies a regression using the ordinary least square method to the last five-years' EPS and SPS, respectively.

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

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:

$$\tilde{E}\tilde{P}\tilde{S} = \sum_{i=1}^{n} \frac{|EPS_i|}{n} \qquad\qquad \tilde{S}\tilde{P}\tilde{S} = \sum_{i=1}^{n} \frac{|SPS_i|}{n}$$

Finally, we calculate the growth trend as follows:

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

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 may restate EPS and SPS to reflect the impact of corporate events that may affect historical financial data on an on-going basis. Please note that the previously published financial data will not be revised.

For certain corporate events where there is a Large impact on sales and earnings, MSCI will determine comparability over a five year period using sales variation which is deemed to be more stable as compared to earnings.

- Whenever post event annual sales increase by more than 50% or decrease by less than 33% and;
- The variation is determined not to be due to normal continuous business operations (i.e. corporate event, change in accounting standards, or business restructuring):

MSCI will mark the post event fiscal year reporting as non-comparable in sales and earnings against previous fiscals and drop the 5 year growth rate calculation.
If only the post event interim sales is published by the company, MSCI will wait for the post event annual sales to determine comparability and will continue to publish the pre-event fundamental 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 PAYOUT RATIO

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

$$Payout = 100 * \left(\frac{Dividend\ per\ share}{Earnings\ per\ share}\right)$$

2.2.4 CURRENT INTERNAL GROWTH RATE (G)

The following is the formula for current internal growth rate:

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

Payout 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 payout ratio or the return on equity is not available, the current internal growth rate is not calculated.

2.2.5 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:

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

2.2.6 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.

MSCI.COM | PAGE 20 OF 70

2.2.7 EARNINGS VARIABILITY (EVAR)

MSCI calculates Earnings Variability as the standard deviation of year-on-year Earnings per Share (EPS) growth in the last five fiscal years.

$$EVAR = \sqrt{\frac{\sum_1^n (EPSg_i - EPSg_m)^2}{n-1}}$$

- Where $EPSg_i = (EPS_i - EPS_{i-1})/EPS_{i-1}$

- $EPSg_m$ = mean $(EPSg_i)$

- n denotes number EPS growth data points i.e. 4 in case of earnings variability

Calculating the Earnings Variability			
	Fiscal Year End Date	EPS	EPS (*gi*)
Fiscal Year End 0	30-Sep-12	4.04	
Fiscal Year End 1	30-Sep-13	5.48	35.64%
Fiscal Year End 2	30-Sep-14	6.39	16.60%
Fiscal Year End 3	30-Sep-15	15.41	141.15%
Fiscal Year End 4	30-Sep-16	28.05	82.02%

$$EVAR = Standard\ Deviation\ (82.02, 141.15, 16.60, 35.64) = 55.48\%$$

EVAR is calculated using the last 5 fiscal EPS figures, where

- Y-O-Y EPS growth(year(n)) = (EPS(year(n)) − EPS(year(n-1)))/(EPS(year(n-1)) If EPS(year(n-1)) > 0

- Y-O-Y EPS growth(year(n)) = - (EPS(year(n)) − EPS(year(n-1)))/(EPS(year(n-1)) If EPS(year(n-1)) < 0

- If EPS for year n-1 is 0, EPS growth would be Null for the period n

- A minimum of the last five comparable EPS values are needed to compute the earnings variability

In order to provide meaningful historical data, MSCI restates EPS to reflect the impact of corporate events that may affect historical financial data.

2.2.8 ENTERPRISE VALUE TO CASH VALUE (EV/CFO)

The following formula is used to calculate the EV/CFO

$$EV/CFO = \frac{Enterprise\ value}{Net\ cash\ flow\ from\ operations}$$

The ratio is calculated using:

- Enterprise value and net cash flow from operations figures as of the Fiscal year end.

- The ratio is calculated currently using, only fiscal year end data.

Example for security A, the data as of fiscal year end September 2016:

Data point	Value (USD Million)
Enterprise value (EV)	6,20,842
Net cash flow from operations (CFO)	65,824

$$EV/CFO = \frac{6,20,824}{65,824} = 9.43$$

The EV/CFO ratio is not calculated if the following conditions are met:

- Both the enterprise value and cash flow from operations figures are negative (<0)

Data point	Details
Enterprise value (EV)	Market capitalization at fiscal year-end date + preferred stock + minority interest + total debt - cash and cash equivalents
Net cash flow from operations (CFO)	Net cash receipts and disbursements resulting from the operations of the company

2.2.9   DEBT REDUCTION YIELD (DRY/LDRY)

Debt reduction yield is calculated using reduction in total debt over the last fiscal year and the latest fiscal year enterprise value

$$Debt\ Reduction\ Yield\ (DRY) = \frac{Total\ Debt_{t-1} - Total\ Debt_t}{Enterprise\ Value_t}$$

Long term debt reduction yield is calculated using reduction in long-term debt over the last fiscal year and the latest fiscal year enterprise value

$$Debt\ Reduction\ Yield\ (LDRY) = \frac{Long\ Term\ Debt_{t-1} - Long\ Term\ Debt_t}{Enterprise\ Value_t}$$

Where t denotes the latest fiscal year end.

The ratio is calculated using:

- Enterprise value, total debt and long-term debt figures only as of the fiscal year end

- The ratio is calculated currently using, only fiscal year end data.

Example for security A (in USD million):

Data point	Sep 30 2016 (t)	Sep 30 2015 (t-1)
Total debt	64,462	87,032
Enterprise Value	620,842	

$$DRY = \frac{(87,032 - 64,462)}{620,842} = 3.63\%$$

Data point	Details
Total debt (TD)	Total Debt represents all interest bearing, capitalized lease and operating lease obligations.
Long term debt (LTD)	Long-term debt represents all interest bearing financial obligations, excluding amounts due within one year.
Enterprise value (EV)	Market capitalization at fiscal year-end date + preferred stock + minority interest + total debt - cash and cash equivalents

The DRY ratio is not calculated if the following conditions are met:

- If the Enterprise value as of fiscal year end is negative (<0)

2.2.10 DEBT TO EQUITY (D/E)

Debt to equity is calculated using the total debt and book value of the shareholders' equity

$$D/E = \frac{Total\ Debt}{Shareholder's\ Equity}$$

The ratio is calculated using:

- Shareholder's equity and total debt figures of the latest fiscal year end
- The ratio is calculated currently using, only fiscal year end data.

Example for security A, the data as of fiscal year end:

Data point	Value (USD million)
Total debt	64,462
Shareholder's equity	128,249

$$D/E = \frac{64,462}{128,249} = 0.5026$$

Data point	Details
Total debt (TD)	Total Debt represents all interest bearing, capitalized lease and operating lease obligations.
Shareholder's equity	Refer section 1.2.5 for details on the shareholder's equity

MSCI.COM | PAGE 24 OF 70

2.2.11   5 YEAR DPS GROWTH RATE (5Y DPS G)

For the calculation of the 5Y DPS growth, first a regression (ordinary least squares method) is applied to the last 5 yearly DPS.

$$DPS_t = a \times t + b$$

Where:

- a, the slope coefficient,

- b, the intercept,

- t, the year expressed in number of cumulative months

Then, we calculate an average absolute DPS

$$D\widetilde{P}\widetilde{S} = \sum_{i=1}^{n} \frac{|DPS_i|}{n}$$

Finally, we calculate the growth trend as follows:

$$5YDPSG = \frac{a_{DPS}}{D\widetilde{P}\widetilde{S}}$$

	Fiscal Year End Date	T	DPS
Fiscal Year End 0	September 30, 2016	0	2.18
Fiscal Year End 1	September 30, 2015	12	1.98
Fiscal Year End 2	September 30, 2014	24	1.81
Fiscal Year End 3	September 30, 2013	36	1.62
Fiscal Year End 4	September 30, 2012	48	0.38
A			-0.033
a, annualized			-0.396
Average Absolute			1.594
Growth trend			-24.84%

The ratio is calculated using:

- A minimum of the last five comparable DPS values is needed to compute the 5Y DPS G .If 5 years of comparable data is not available , the growth rate is not calculated

- In order to provide meaningful historical growth trends, MSCI restates DPS to reflect the impact of corporate events that may affect historical financial data.

Data point	Details
Annualized DPS	Refer section 1.2.4 for details.

2.2.12 1 YEAR DPS GROWTH RATE (1Y DPS G)

The 1Y DPS growth rate is the difference between the current and previous annualized DPS.

$$1Y\ DPS\ G = \frac{DPS_t - DPS_{t-1}}{DPS_{t-1}}$$

Where t denote the latest fiscal year end

	Fiscal Year End Date	T	DPS
Fiscal Year End 0	September 30, 2016	t	2.18
Fiscal Year End 1	September 30, 2015	t-1	1.98

$$1Y\ DPS\ G = \frac{2.18 - 1.98}{1.98} = 10.10\%$$

Data point	Details
Annualized DPS	Refer section 1.2.4 for details.

2.2.13 CASH ROA (CROA)

Cash ROA is calculated using the net cash flow from operations and total assets of a company.

$$Cash\ ROA = \frac{Cash\ flow\ from\ operations}{Total\ Assets.}$$

The ratio is calculated using:

- Net cash flow from operations and Total assets of the latest fiscal year end

- The ratio is calculated currently using, only fiscal year end data.

Example for security A, the data as of fiscal year end:

Data point	Value (USD million)
Net cash flow from operations	64,462
Total Assets	321,686

$$Cash\ ROA = \frac{64,462}{321,686} = 0.2004$$

Data point	Details
Net cash flow from operations	Net cash receipts and disbursements resulting from the operations of the company.
Total assets	Total assets represent the sum of total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.

2.2.14   3 YEAR AVERAGE EARNINGS

$$3\ year\ average\ Earnings = \frac{Earnings_{\ t} + Earnings_{t-1} + Earnings_{\ t-2}}{3}$$

For example:

	Fiscal Year End Date	Earnings (USD million)
Fiscal Year End t	September 30, 2016	45,687
Fiscal Year End t-1	September 30, 2015	53,394
Fiscal Year End t-2	September 30 , 2014	39,510

$$3Y \text{ AVG ERN} = \frac{45{,}687 + 53{,}394 + 39{,}510}{3} = 46{,}197$$

- The average is calculated only using Fiscal year-end earnings.

- To compute the average, an equally weighted average of the three earnings values is calculated. Only available earnings are used and missing earnings are excluded from the calculation.

For instance If Earnings t-2 is missing:

$$3 \text{ year average Earnings} = \frac{Earnings_t + Earnings_{t-1}}{2}$$

Data point	Details
Earnings	Refer section 1.22 for details

2.2.15 3 YEAR AVERAGE CASH EARNINGS

$$3 \text{ year average Earnings} = \frac{Cash\ Earnings_t + Cash\ Earnings_{t-1} + Cash\ Earnings_{t-2}}{3}$$

For example:

	Fiscal Year End Date	Cash Earnings (USD million)
Fiscal Year End t	September 30, 2016	65,687
Fiscal Year End t-1	September 30, 2015	73,394
Fiscal Year End t-2	September 30 , 2014	49,510

$$3Y \text{ AVG Cash Earnings} = \frac{65{,}687 + 73{,}394 + 49510}{3} = 62{,}863$$

- The average is calculated only using fiscal year-end cash earnings.

- To compute the average, an equally weighted average of the three cash earnings values is calculated. Only available cash earnings are used and missing cash earnings are excluded from the calculation.

For instance, If cash earnings t-2 is missing:

$$3 \ year \ average \ Cash \ Earnings = \frac{Cash \ Earnings_{\,t} + Cash \ Earnings_{t-1}}{2}$$

Data point	Details
Cash earnings	Refer section 1.2.3 for details

2.2.16   3 YEAR AVERAGE SALES

$$3 \ Year \ Average \ Sales = \frac{Sales_t + Sales_{\,t-1} + Sales_{\,t-2}}{3}$$

For example:

	Fiscal Year End Date	Sales (USD million)
Fiscal Year End t	September 30, 2016	215,639
Fiscal Year End t-1	September 30, 2015	233,715
Fiscal Year End t-2	September 30 , 2014	182,795

$$3 \ Year \ Average \ Sales = \frac{215,639 + 233,715 + 182,795}{3} = 210,716$$

- The average is calculated only using fiscal year-end sales.

- To compute the average, an equally weighted average of the three sales values is calculated. Only available sales are used and missing sales are excluded from the calculation.

For instance if sales$_{t-2}$ is missing:

$$3\,Year\,Average\,\text{Sales} = \frac{\text{Sales}_t + Sales_{t-1}}{2}$$

Data point	Details
Sales	Refer section 1.2.1 for details.

2.2.17 CASH FLOW DIVIDEND COVERAGE RATIO

- The ratio is calculated using the net operating cash flow per share as of the fiscal year end and the annualized DPS

For example:

Data point	Period end	Values (USD million)
Net operating cash flow per share	September 2016	12.52
Dividend per share		2.28

$$Cashflow\,Dividend\,Coverage\,Ratio = \frac{12.52}{2.28} = 5.49$$

Fundamental variable	Details
Dividend per share	Refer section 1.2.4 for details.
Cash flow from operations	Net cash receipts and disbursements resulting from the operations of the company

2.2.18 DIVIDEND COVERAGE RATIO

$$Dividend\,Coverage\,Ratio = (Trailing\,12\,months\,EPS\,)\,/\,(Dividend\,per\,share)$$

For example:

Data point	Value (USD million)
EPS	8.43
Annualized DPS	2.28

$$Dividend\,coverage = \frac{8.43}{2.28} = 3.70$$

Data point	Details
Dividend per share	Refer section 1.2.4
EPS	Refer section 1.2.2

2.2.19 CASH FLOW BY TOTAL CAPITAL

$$Cash\ Flow\ by\ Total\ Capital = Net\ Cash\ Flow\ from\ Operations/Total\ Capital$$

$$Total\ Capital = Total\ Debt + Shareholder's\ Equity$$

The ratio is calculated only using fiscal year-end data for net cash flow from operations, total debt and shareholder's equity.

Example for security A, the data as of fiscal year end:

Data point	Values (USD million)
Net cash flow from operations (CFO)	16,868
Total Debt	40,819
Shareholder's equity (book value)	11,870

$$Cash\ Flow\ by\ Total\ Capital = \frac{16,868}{52,689} = 0.32$$

The ratio is not calculated if:

- If total capital (total debt + shareholder's equity) <0

Fundamental variable	Details
Total debt	Total Debt represents all interest bearing, capitalized lease and operating lease obligations.
Shareholder's equity	Represents common shareholders' investment in a company.
Net operating cash flow	Net cash receipts and disbursements resulting from the operations of the company

2.2.20 RETURN ON ASSETS (ROA)

$$ROA = Earnings/Total\ Assets$$

The ratio is calculated only using earnings and total assets figures as of the latest fiscal year end period.

Example for security A, the data as of fiscal year end:

Data point	Values (USD million)
Earnings	16,868
Total assets	112,724

$$Return\ on\ Assets = \frac{16,868}{112,724} = 0.1496$$

Fundamental variable	Details
Total assets	Total assets represent the sum of total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.
Earnings	Net cash receipts and disbursements resulting from the operations of the company

2.2.21 CAPITAL EXPENDITURE TO SALES (CAPEX/SALES)

$$Capital\ Expenditure/Sales = \frac{Capital\ expendiure}{Sales}$$

The ratio is calculated using:

- Capital expenditure and the sales figures of the latest fiscal year end.

The ratio is not calculated or published as "0"if the following conditions are met:

- The difference between the Sales period end date and capital expenditure period end date is greater than 18 months.

- If the company reports negative Sales.

- For all GICS sectors ex financials where the data is not reported, the ratio is reported as "0".

Example for security A, the data as of December 2014:

Data point	Values (USD million)
Capital expenditure	3,740
Sales	92,793

$$Capital\ Expenditure/Sales = \frac{3,740}{92,793} = 4.03\ \%$$

Data point	Details
Capital expenditure	Capital expenditure as investment by a company to acquire or upgrade fixed, physical, non-consumable assets, such as buildings and equipment.
Sales	Refer section 1.2.1

2.2.22   BUYBACK YIELD

The Buyback Yield is calculated at the issuer level using trailing 12 month (TTM) number of common shares (NOS) outstanding adjusted for the corporate events and the current NOS outstanding.

Issuer level buyback yield is calculated as market capitalization weighted average of buyback yield values of all the common share class securities belonging to an issuer.

Preferred stocks and other share types such as units, warrants etc. are excluded from the buyback yield calculation.

$$Net\ buyback\ Yield\ for\ an\ Issuer\ = \sum^{n}\ Wi * Yi$$

Where

- W_i is the market capitalization weight of a common share class security in an issuer with n securities

- Y_i is the buyback yield of a common share class security calculated as change in TTM NOS / Current Number of shares.

2.2.23   TOTAL YIELD

The Total yield is calculated using the Buyback yield and Dividend yield for a company.

$$Total\ yield\ =\ Buyback\ yield + Dividend\ yield$$

Data variable	Details
Buyback Yield	Refer section 2.2.22
Dividend Yield	Refer section 1.2.4 and 2.1

2.2.24   REINVESTMENT RATE

Reinvestment rate is calculated using return on equity (ROE), dividend yield, and price to book value ratio (P/BV).

$$Reinvestment\ Rate\ =\ (ROE - Dividend\ Yield * P/BV)$$

For example:

Data point	Value (USD million)
ROE	10.07
Dividend Yield	5.67
P/BV	0.52

$$Reinvestment\ Rate\ =\ (0.1007 - 0.0567 * 0.52) = 7.12\%$$

The reinvestment rate is not calculated if one of the ratios is not available.

Data point	Details
ROE	Refer section 2.2.2
Dividend yield	Refer section 2.1
Price to book value (P/BV)	Refer section 2.1

2.2.25 ACCRUALS CASH FLOW

Accruals Cash Flow (ACF) is calculated as the negative change in accounts receivable, inventories, accounts payable, accrued taxes, and other current assets/liabilities, less depreciation, standardized by total assets.

$$Accuals\ Cash\ Flow = \ [-(\Delta AR + \ \Delta Inv + \ \Delta AP + \ \Delta AT + \ \Delta OC) - Dep]/TA$$

Where, AR is accounts receivable, Inv is inventories, AP accounts payable, AT is accrued taxes, OC is other current assets/liabilities, Dep is depreciation and TA is total assets.

The ratio is calculated using:

- All fiscal year end data points from the same fiscal year.

- The values for accounts receivable, accounts payable, depreciation and total assets are all available for the same fiscal year.

2.2.26 ACCRUALS BALANCE SHEET

Accruals Balance Sheet (ABS) is calculated as the change in current assets net of cash, less current liabilities net of short term debt, and less depreciation standardized by total assets.

$$Accruals\ Balance\ Sheet = [(\Delta CA - \ \Delta Cash) - (\Delta CL - \ \Delta STD) - Dep]/TA$$

Where CA is current assets, CL is current liabilities, STD is short term debt, Dep is depreciation and TA is total assets.

2.2.27 NET INCOME TO ISSUER MARKET CAPITALIZATION

Net income / Issuer MCap is calculated using the Net income and issuer market capitalization for the company.

$$Net\ income\ /Issuer\ MCap = \frac{Net\ Income}{Issuer\ MCap}$$

Example for security A, the data as of fiscal year end:

Data point	Value (USD Million)
Net income trailing 12 month value	62,842
Issuer Market Cap – month end date	650,824

$$Net\ Income\ Trailing\ 12\ month\ /Issuer\ Mcap = \frac{62,824}{650,824} = 0.097$$

Data point	Details
Net Income	Trailing 12-month net income of the company
Issuer market capitalization	Issuer level market capitalization of the company as of the calculation date

2.2.28 CASH EARNINGS TO ISSUER MARKET CAPITALIZATION

Cash Earnings / Issuer MCap is calculated using the Cash earnings and issuer market capitalization for the company.

$$Cash\ Earnings\ /Issuer\ MCap = \frac{Cash\ Earnings}{Issuer\ MCap}$$

Example for security A, the data as of fiscal year end:

Data point	Value (USD Million)
Cash Earnings trailing 12 month value	80,250
Issuer MCap – month end date	650,824

$$Cash\ Earnings\ /Issuer\ Mcap = \frac{80{,}250}{650{,}824} = 0.123$$

Data point	Details
Cash earnings	MSCI does not publish cash earnings for GICS® Industry Group 4010 and GICS® Industry Group 4030. Refer to Section 1.2.3 for more details.
Issuer market capitalization	Issuer level market capitalization of the company as of the calculation date

2.2.29   BOOK VALUE TO ISSUER MARKET CAPITALIZATION

Book Value / Issuer MCap is calculated using the shareholder's equity (book value) and issuer market capitalization for the company.

$$Book\ Value\ /Issuer\ MCap = \frac{Book\ Value}{Issuer\ MCap}$$

Example for security A, the data as of fiscal year end September 2016:

Data point	Value (USD Million)
Book value	59,252
Issuer market cap – month end date	650,824

$$Book\ Value\ /Issuer\ Mcap = \frac{59{,}252}{650{,}824} = 0.091$$

Data point	Details
Shareholder's equity (Book Value)	Represents common shareholders' investment in a company.
Issuer market capitalization	Issuer level market capitalization of the company as of the calculation date

2.2.30 RESEARCH AND DEVELOPMENT TO SALES (R&D/SALES)

R&D/Sales is calculated using the Research and Development Expense and Sales for the company.

$$R\&D/Sales = \frac{R\&D\ Expense}{Sales}$$

Example for security A, the data as of fiscal year end:

Data point	Value (Million)
R&D Expense	3,740
Sales	92,793

$$R\&D\ /Sales = \frac{3,740}{92,793} = 4.03\%$$

Data point	Details
R&D Expense	Latest fiscal year research and development expense
Sales	Refer section 1.2.1

2.2.31 ASSET TURNOVER (ATO)

Asset Turnover is calculated using Sales and Total Assets for the company as of fiscal year end.

$$ATO = \frac{Sales}{Total\ Assets}$$

Example for security A, the data as of fiscal year end:

Data point	Value (Million)
Sales	64,462
Total Assets	128,249

$$ATO = \frac{64,462}{128,249} = 0.5026$$

Data point	Details
Total assets	Total assets represent the sum of total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.
Sales	Refer section 1.2.1

2.2.32 GROSS PROFITABILITY (GP)

Gross Profitability is calculated using the sales, cost of goods sold, and total assets for the company as of fiscal year end.

$$GP = \frac{Sales - Cost\ of\ Goods\ Sold}{Total\ Assets}$$

Example for security A, the data as of fiscal year end:

Data point	Value (Million)
Sales	87,032
Cost of Goods Sold	64,462
Total Assets	620,842

$$GP = \frac{87,032 - 64,462}{620,842} = 3.64\%$$

Data point	Details
Sales	Refer section 1.2.1 for details.
Cost of goods sold	Cost of goods sold represents specific or direct cost of labor and material attributed to finished goods or services of a company.
Total assets	Total assets represent the sum of total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.

2.2.33 GROSS MARGIN (GM)

Gross Margin is calculated using sales and cost of goods sold for the company as of fiscal year end.

$$GM = \frac{Sales - Cost\ of\ Goods\ Sold}{Sales}$$

Example for security A, the data as of fiscal year end:

Data point	Value (Million)
Sales	87,032
Cost of Goods Sold	64,462

$$GM = \frac{87,032 - 64,462}{87,032} = 25.93\%$$

Data point	Details
Sales	Refer section 1.2.1 for details.
Cost of goods sold	Cost of goods sold represents specific or direct cost of labor and material attributed to finished goods or services of a company.

2.2.34 CASH EARNINGS TO EARNINGS (CETOE)

Cash earnings to earnings is calculated using earnings and cash Earnings for the company as of fiscal year end.

$$CETOE = \frac{Cash\ Earnings}{Earnings}$$

Example for security A, the data as of fiscal year end:

Data point	Value (Million)
Earnings	62,423
Cash earnings	87,542

$$CETOE = \frac{87,542}{62,423} = 1.402$$

Data point	Details
Cash Earnings	MSCI does not publish cash earnings for GICS® Industry Group 4010 and GICS® Industry Group 4030. Refer to Section 1.2.3 for more details.
Earnings	Refer section 1.2.2 for details.

2.2.35 FREE CASH FLOW TO SALES (FCF/SALES)

Free cash flow to sales is calculated using net cash flow from operations, capital expenditure and sales for the company as of fiscal year.

$$FCF\ to\ Sales\ = \frac{Net\ Cash\ Flow\ from\ Operations - Capital\ Expenditure}{Sales}$$

Example for security A, the data as of fiscal year end:

Data point	Value (Million)
Net cash flow from operations	852,640
Capital expenditure	501,250
Sales	500,000

$$FCF\ to\ Sales = \frac{852,640 - 501,250}{500,000} = 0.703$$

Data point	Details
Capital expenditure	Capital expenditure as investment by a company to acquire or upgrade fixed, physical, non-consumable assets, such as buildings and equipment.
Net cash flow from operations (CFO)	Net cash receipts and disbursements resulting from the operations of the company
Sales	Refer section 1.2.1 for details.

2.2.36 FREE CASH FLOW TO NET INCOME (FCF/NET INCOME)

Free cash flow to net income is calculated using net cash flow from operations, capital expenditure and net Income for the company as of fiscal year.

$$FCF\ to\ Net\ Income = \frac{Net\ Cash\ Flow\ from\ Operations - Capital\ Expenditure}{Net\ Income}$$

Example for security A, the data as of fiscal year end:

Data point	Value (Million)
Net Cash Flow from Operations	852,640
Capital Expenditure	501,250
Net Income	500,000

$$FCF\ to\ Net\ Income = \frac{852,640 - 501,250}{500,000} = 0.70$$

Data point	Details
Capital expenditure	Capital expenditure as investment by a company to acquire or upgrade fixed, physical, non-consumable assets, such as buildings and equipment.
Net cash flow from operations (CFO)	Net cash receipts and disbursements resulting from the operations of the company.
Net Income	Net earnings of the company as of fiscal year end.

2.2.37 EARNINGS BEFORE INTEREST AND TAXES TO ENTERPRISE VALUE (EBIT/EV)

Earnings before interest and taxes to enterprise value is calculated using earnings before interest and taxes and enterprise value for the company as of fiscal year end.

$$EBIT/EV = \frac{Earnings\ Before\ Interest\ and\ Taxes}{Enterprise\ Value}$$

Example for security A, the data as of fiscal year end:

Data point	Value (Million)
Earnings before interest and taxes	352,640
Enterprise value	1,500,010

$$EBIT/EV = \frac{352{,}640}{1{,}500{,}010} = 0.235$$

Data point	Details
Earnings before interest and taxes (EBIT)	Earnings of the company before interest expense and taxes.
Enterprise value (EV)	Market capitalization at fiscal year-end date + preferred stock + minority interest + total debt - cash and cash equivalents

2.2.38 EARNINGS BEFORE INTEREST AND TAXES TO TOTAL ASSETS (EBIT/TOTAL ASSETS)

Earnings before interest and taxes to total assets is calculated using earnings before interest and taxes and total assets for the company as of fiscal year end.

$$EBIT/Total\ Assets = \frac{Earnings\ Before\ Interest\ and\ Taxes}{Total\ Assets}$$

Example for security A, the data as of fiscal year end:

Data point	Value (Million)
Earnings before interest and taxes	64,462
Total Assets	321,686

$$EBIT/Total\ Assets = \frac{64{,}462}{321{,}686} = 0.2$$

Data point	Details
Earnings before Interest and taxes (EBIT)	Earnings of the company before interest expense and taxes.
Total assets	Total Assets represent the sum of total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.

2.2.39 ABSOLUTE GROWTH RATES

MSCI calculates growth trends using absolute values, showing the evolution of fundamental data over the last five years.

- Total Asset Growth (AGRO)

- Capital Expenditure Growth (CXGRO)

- Issuance Growth (IGRO)

- Total Sales Growth

- Total Earnings Growth

To calculate the absolute growth rates, MSCI applies a regression using the ordinary least square method to the last years and calculate the average absolute of the respective fundamental data. A minimum of the last four comparable absolute value fundamental data is needed to compute the historical growth trends.

Refer to Section 2.2.1 for detailed example.

2.2.40 WORKING CAPITAL TO TOTAL ASSETS

Working Capital to Total Assets is calculated using Current Asset, Current Liabilities and Total Assets for the company as of fiscal year end.

$$Working\ Capital\ to\ Total\ Assets = \frac{Current\ Assets - Current\ Liabilities}{Total\ Assets}$$

Example for security A, the data as of fiscal year end:

Data point	Value (Million)
Current Assets	16,868
Current Liabilities	3,740
Total Assets	215,639

$$Working\ Capital\ to\ Total\ Assets = \frac{16,868 - 3,740}{215,639} = 0.06$$

Data point	Details
Current Assets	Refer to Section 5 for details.
Current Liabilities	Refer to Section 5 for details.
Total Assets	Total Assets represent the sum of total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.

2.2.41 ISSUER MARKET CAPITALITALIZATION TO TOTAL LIABILITIES

Issuer market capitalization to total liabilities is calculated using the issuer market capital as of calculation month end and total liabilities of the latest fiscal period end.

$$Issuer\ Market\ Cap/Total\ Liabilities = \frac{Issuer\ Market\ Cap\ as\ of\ Calculation\ month\ end}{Total\ Liabilities}$$

Example for security A, the data as of fiscal year end:

Data point	Value (Million)
Issuer Market Cap – month end	2,689,300
Total Liabilities	215,639

$$Issuer\ Market\ Cap\ to\ Total\ Liabilities = \frac{2,689,300}{215,639} = 12.47$$

Data point	Details
Total Liabilities	All short and long term debt obligations of the company.
Issuer market Capitalization	Issuer level market capitalization of the company as of the calculation month end date

2.2.42   RETAINED EARNINGS TO TOTAL ASSETS

Retained earnings to total assets is calculated using retained earnings and total assets for the company as of fiscal year end.

$$Retained\ Earnings/Total\ Assets = \frac{Retained\ Earnings}{Total\ Assets}$$

Example for security A, the data as of fiscal year end:

Data point	Value (Million)
Retained earnings	5,868
Total assets	321,686

$$Retained\ Earnings/Total\ Assets = \frac{5,868}{321,686} = 0.018$$

Data point	Details
Retained earnings	Accumulated after tax earnings of a company which have not been distributed to shareholders.
Total assets	Total Assets represent the sum of total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.

3   INDEX RATIO

In general, index ratios computed by MSCI 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 Indexes, 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 Indexes and by the growth inclusion factor (GIF) for the growth Indexes. For the latter series (i.e. domestic Indexes), FIF is replaced by DIF.

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

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

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 Earnings Backward (P/E Bwd)

- 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 include the following:

- Return on Equity (ROE)

- Payout Ratio

- 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   PAYOUT RATIO

Payout ratio at an index level is calculated using price to earnings and the dividend yield at an index level, as defined in the following formula:

$$Payout = Index\ level\ price\ to\ earnings \times Index\ dividend\ yield$$

3.2.3   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:

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

3.2.4 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.

3.2.5 LONG-TERM GROWTH RATES/TRENDS

Long-term growth rates and trends at an index level are computed by MSCI 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)

3.2.6 12-MONTH INDEX EPS

MSCI 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 calculates:

- 12 months trailing Index EPS

- 12 months forward Index EPS

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

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

3.2.7 YEAR ON YEAR GROWTH EPS

Using the 12-month index 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 Historical EPS

- 12-Month Index Forward EPS

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

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

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

3.2.8 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 regular capital repayments (if applicable), 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 Indexes.

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

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

Where

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

and

$$ClosingSecurityWeight_t = \frac{\frac{ClosingNumberofShares_t * PricePerShare_t * InclusionFactor_t}{FXrate_t}}{\sum_{s \in 1}^{n}(ClosingNumberofShares_t * PricePerShare_t * \frac{1}{FXRate_t} * InclusionFactor_t)}$$

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.

- *PricePerShare$_{EOPM}$* 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.

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 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 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 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 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 (Pre-event number of shares/ Post-event 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 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.

If earnings or cash earnings are negative, an adjustment factor is applied according to the change in number of shares (Pre-event number of shares/ Post-event number of shares) in order to avoid increasing losses artificially in P/E and P/CE calculations at index level.[1]

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

4.4   CHANGES IN BUSINESS STRUCTURE

MSCI 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 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.

---

[1] When a corporate event results in incoming market capitalization and the company reports losses, MSCI 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.

For certain corporate events, MSCI will use post event shares to calculate the fundamental data per share in cases of events such as equity swaps, conversion of debt to equity, dilutive rights, spin off etcetera provided either of following conditions are met:

- An increase of 50% or greater or a decrease of 33% or more, relative to the company's full market capitalization before the event or;
- An increase of 50% or greater or a decrease of 33% or more, relative to the company's outstanding shares before the event

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 Indexes 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 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 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 covers the following Balance Sheet items in its product files.

Assets	
Fixed Assets (FA)	Net fixed assets after accumulated depreciation; may be blanked.
Investments (INV)	Equity participation in loans to subsidiaries, affiliates and associated companies. Investments of pure portfolio nature are excluded from this item whenever possible; may be blanked
Other Assets (OA)	Assets that by their nature are not readily classifiable as Fixed Assets, Investments or Current Assets (such as intangible assets or non-current debtors). May aggregate other balance sheet items if detailed breakdown is not reported by the company; may be blanked
Current Assets (CA)	Include inventories, receivables, securities, bank balances, cash and equivalent. May aggregate other balance sheet items if detailed breakdown is not reported by the company; may be blanked. For GICS® Sector 40 (Financials) and Sector 60 (Real Estate), MSCI does not publish Current Assets.
Total Assets (TA) = FA + INV + OA + CA	

Liabilities	
Shareholders equity / Book Value (BV)	Capital and all reserves of an equity nature; may be blanked
Other Liabilities (OL)	Liabilities that by their nature are not readily classifiable as Book Value, Long-term Debt or Current Liabilities, for example minority interests, special provisions, pension funds, deferred taxation, etc. May aggregate other balance sheet items if detailed breakdown is not reported by the company; may be blanked
Long Term Debt (LD)	Debt maturing in over one year; may be blanked
Current Liabilities (CL)	Includes all liabilities of short-term nature, i.e. payable within one year. May aggregate other balance sheet items if detailed breakdown is not reported by the company; may be blanked. GICS® Sector 40 (Financials) and Sector 60 (Real Estate), MSCI does not publish Current Liabilities.
Total Liabilities (TL) = BV + OL + LD + CL	

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

Earlier, MSCI 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'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's index construction methodology.

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

In order to make five-year earnings comparable, MSCI 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'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 will make case-by-case adjustments.

3) MSCI'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 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 adjusts the trailing EPS for the 'Gain / Loss due to Revaluation of Investment Property' for the latest trailing period updated by MSCI.

To compute the Long-term Historical EPS growth trend and to make the five year earnings comparable, MSCI 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 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 calculates index valuation ratios by aggregating securities using the following formula:

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

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 Earnings Backward (P/E Bwd)

- 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 for MSCI Index			
	Security A	Security B	Security C
Price	USD 45.21	USD 15.40	USD 25.49
Book Value Per Share	USD 10.90	USD 7.80	USD 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 USD)	2044.22	503.52	300.51
Book Value (in millions of USD)	492.85	255.03	155.62
Total Adjusted Market Capitalization (in millions of USD)			**2848.25**
Recalculated Total Book Value (in millions of USD)			**903.5**
Index Level Price to Book Value			**3.15**

Example # 2 Calculating price to book value for MSCI Index			
	Security A	**Security B**	**Security C**
Price	USD 45.21	USD 15.40	USD 25.49
Book Value Per Share	USD 10.90	USD 7.80	USD 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	0.62
Adjusted Market Capitalization (in millions of USD)	2044.22	251.76	195.33
Book Value (in millions of USD)	492.85	127.51	101.15
Total Adjusted Market Capitalization (in millions of USD)			**2491.31**
Recalculated Total Book Value (in millions of USD)			**721.52**
Index Level Price to Book Value			**3.45**

Example # 3

Calculating price to book value for MSCI Index using companies with different exchange rates

	Security A	Security B	Security C
Price (in local currency)	USD 45.21	USD 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	USD 7.80	€ 13.20
Fundamental Data Exchange Rate	0.80	1.00	0.80
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	0.90	0.80	0.95
Adjusted Market Capitalization (in millions of USD)	2044.22	503.52	362.06
Book Value (in millions of USD)	593.70	255.03	187.50
Total Adjusted Market Capitalization (in millions of USD)			**2909.79**
Recalculated Total Book Value (in millions of USD)			**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	USD 45.21	USD 15.40	USD 25.49
Earnings Per Share	USD 0.12	USD 0.28	USD 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 USD)	2044.22	503.52	300.51
Earnings (in millions of USD)	5.43	9.15	179.32
Total Adjusted Market Capitalization (in millions of USD)			**2848.25**
Recalculated Total Earnings (in millions of USD)			**193.9**
Index Level Price to Earnings			**14.69**

Long-term growth rates and trends at an index level are computed by MSCI 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 (in USD)	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 USD)	2044.22	503.52	300.51
Total Adjusted Market Capitalization (in millions of USD)			**2848.25**
Index Level EGRLF			**13.60%**

MSCI 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 calculates:

- 12 months trailing Index EPS

- 12 months forward Index EPS

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

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

Example # 6 Calculating 12-month index EPS			
	Security A	**Security B**	**Security C**
Price (in USD)	45.21	15.40	25.49
Earnings Per Share (in USD)	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 USD)	2044.22	503.52	300.51
Earnings (in millions of USD)	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, and Dividend Yield) are calculated at security level and their yields are used to evaluate the impact of the incorrect data on the security.

- If the incorrect security yields are within ±0.25% of the correct yields (±0.5% for book value yield), no revision is done on the country and industry index. No announcement is made by MSCI. Per share figures and valuation ratios at security level are revised in the MSCI historical database.

- If the incorrect security yields are **not** within ±0.25% of the correct yields (±0.5% for book value yield), an announcement is made by MSCI with the revised valuation ratios at the security level. The impact of the incorrect security level data on the country index and industry group is evaluated.

- If the incorrect index yields at country/industry level are within ±0.1% of the correct yields (±0.5% for book value yield), no index revision is done. No announcement is made by MSCI.

- If the incorrect index yields are **not** within ±0.1 of the correct yield (±0.5% for book value yield), new valuation ratios are calculated, for all the Indexes in which the security is included. For all Indexes where the incorrect yields lie outside the stated threshold, an announcement is made by MSCI with the revised valuation ratios.

METHODOLOGY BOOK TRACKED CHANGES

The following sections have been updated since July 2017:

1.2 Historical Per Share Data Calculations

2.2.1 Long-Term Historical Growth Trends

4.2 Real Changes in Capital Structure

The following sections have been updated since Nov 2018:

1.1.3 Currency and Frequency

1.2.1 Sales per Share (SPS)

1.2.3 Cash Earnings per Share (CEPS)

5 Balance Sheet Information

CLIENT SERVICE INFORMATION IS AVAILABLE 24 HOURS A DAY

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
San Francisco	+ 1.415.836.8800
Sao Paulo	+ 55.11.3706.1360
Toronto	+ 1.416.628.1007

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
Seoul	+ 00798.8521.3392 (*)
Singapore	+ 800.852.3749 (*)
Sydney	+ 61.2.9033.9333
Taipei	+ 008.0112.7513 (*)
Tokyo	+ 81.3.5290.1555

* = toll free

ABOUT MSCI

For more than 40 years, MSCI's research-based indexes and analytics have helped the world's leading investors build and manage better portfolios. Clients rely on our offerings for deeper insights into the drivers of performance and risk in their portfolios, broad asset class coverage and innovative research.

Our line of products and services includes indexes, analytical models, data, real estate benchmarks and ESG research.

MSCI serves 98 of the top 100 largest money managers, according to the most recent P&I ranking.

For more information, visit us at www.msci.com.

NOTICE AND DISCLAIMER

This document and all of the information contained in it, including without limitation all text, data, graphs, charts (collectively, the "Information") is the property of MSCI Inc. or its subsidiaries (collectively, "MSCI"), or MSCI's licensors, direct or indirect suppliers or any third party involved in making or compiling any Information (collectively, with MSCI, the "Information Providers") and is provided for informational purposes only. The Information may not be modified, reverse-engineered, reproduced or redisseminated in whole or in part without prior written permission from MSCI.

The Information may not be used to create derivative works or to verify or correct other data or information. For example (but without limitation), the Information may not be used to create indexes, databases, risk models, analytics, software, or in connection with the issuing, offering, sponsoring, managing or marketing of any securities, portfolios, financial products or other investment vehicles utilizing or based on, linked to, tracking or otherwise derived from the Information or any other MSCI data, information, products or services.

The user of the Information assumes the entire risk of any use it may make or permit to be made of the Information. NONE OF THE INFORMATION PROVIDERS MAKES ANY EXPRESS OR IMPLIED WARRANTIES OR REPRESENTATIONS WITH RESPECT TO THE INFORMATION (OR THE RESULTS TO BE OBTAINED BY THE USE THEREOF), AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, EACH INFORMATION PROVIDER EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES (INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF ORIGINALITY, ACCURACY, TIMELINESS, NON-INFRINGEMENT, COMPLETENESS, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) WITH RESPECT TO ANY OF THE INFORMATION.

Without limiting any of the foregoing and to the maximum extent permitted by applicable law, in no event shall any Information Provider have any liability regarding any of the Information for any direct, indirect, special, punitive, consequential (including lost profits) or any other damages even if notified of the possibility of such damages. The foregoing shall not exclude or limit any liability that may not by applicable law be excluded or limited, including without limitation (as applicable), any liability for death or personal injury to the extent that such injury results from the negligence or willful default of itself, its servants, agents or sub-contractors.

Information containing any historical information, data or analysis should not be taken as an indication or guarantee of any future performance, analysis, forecast or prediction. Past performance does not guarantee future results.

The Information should not be relied on and is not a substitute for the skill, judgment and experience of the user, its management, employees, advisors and/or clients when making investment and other business decisions. All Information is impersonal and not tailored to the needs of any person, entity or group of persons.

None of the Information constitutes an offer to sell (or a solicitation of an offer to buy), any security, financial product or other investment vehicle or any trading strategy.

It is not possible to invest directly in an index. Exposure to an asset class or trading strategy or other category represented by an index is only available through third party investable instruments (if any) based on that index. MSCI does not issue, sponsor, endorse, market, offer, review or otherwise express any opinion regarding any fund, ETF, derivative or other security, investment, financial product or trading strategy that is based on, linked to or seeks to provide an investment return related to the performance of any MSCI index (collectively, "Index Linked Investments"). MSCI makes no assurance that any Index Linked Investments will accurately track index performance or provide positive investment returns. MSCI Inc. is not an investment adviser or fiduciary and MSCI makes no representation regarding the advisability of investing in any Index Linked Investments.

Index returns do not represent the results of actual trading of investible assets/securities. MSCI maintains and calculates indexes, but does not manage actual assets. Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the index or Index Linked Investments. The imposition of these fees and charges would cause the performance of an Index Linked Investment to be different than the MSCI index performance.

The Information may contain back tested data. Back-tested performance is not actual performance, but is hypothetical. There are frequently material differences between back tested performance results and actual results subsequently achieved by any investment strategy.

Constituents of MSCI equity indexes are listed companies, which are included in or excluded from the indexes according to the application of the relevant index methodologies. Accordingly, constituents in MSCI equity indexes may include MSCI Inc., clients of MSCI or suppliers to MSCI. Inclusion of a security within an MSCI index is not a recommendation by MSCI to buy, sell, or hold such security, nor is it considered to be investment advice.

Data and information produced by various affiliates of MSCI Inc., including MSCI ESG Research Inc. and Barra LLC, may be used in calculating certain MSCI indexes. More information can be found in the relevant index methodologies on www.msci.com.

MSCI receives compensation in connection with licensing its indexes to third parties. MSCI Inc.'s revenue includes fees based on assets in Index Linked Investments. Information can be found in MSCI Inc.'s company filings on the Investor Relations section of www.msci.com.

MSCI ESG Research Inc. is a Registered Investment Adviser under the Investment Advisers Act of 1940 and a subsidiary of MSCI Inc. Except with respect to any applicable products or services from MSCI ESG Research, neither MSCI nor any of its products or services recommends, endorses, approves or otherwise expresses any opinion regarding any issuer, securities, financial products or instruments or trading strategies and MSCI's products or services are not intended to constitute investment advice or a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such. Issuers mentioned or included in any MSCI ESG Research materials may include MSCI Inc., clients of MSCI or suppliers to MSCI, and may also purchase research or other products or services from MSCI ESG Research. MSCI ESG Research materials, including materials utilized in any MSCI ESG Indexes or other products, have not been submitted to, nor received approval from, the United States Securities and Exchange Commission or any other regulatory body.

Any use of or access to products, services or information of MSCI requires a license from MSCI. MSCI, Barra, RiskMetrics, IPD, FEA, InvestorForce, and other MSCI brands and product names are the trademarks, service marks, or registered trademarks of MSCI or its subsidiaries in the United States and other jurisdictions. The Global Industry Classification Standard (GICS) was developed by and is the exclusive property of MSCI and Standard & Poor's. "Global Industry Classification Standard (GICS)" is a service mark of MSCI and Standard & Poor's.