
Fundamental and Proprietary Data Methodology

Morningstar Indexes

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Introduction

Morningstar Indexes uses the fundamental data published by companies at periodic intervals to compute per share and price multiples for a given security and aggregate metrics at the index level. In addition, Morningstar Indexes also leverages proprietary data generated by its research ecosystem that includes Equity Research, Credit Research, Fund Research, and Asset Allocation & Portfolio Construction. This document presents the definitions and formulas of these various data points.

Fundamental Data Points

Total Sales

Total sales is the amount of income that a company receives from the sale of products or services in a given time period. For banks, it is calculated as the sum of net interest income and noninterest income.

Net Income

Net income is the amount of money that is available to all the equity shareholders after excluding extraordinary or nonrecurring items, minority interest, and preferred dividends.

Earnings Before Interest and Taxes, or EBIT

EBIT is an indicator of a company's profitability and its ability to generate earnings from its operations; it is computed as follows:

$$\begin{array}{r} \text{Total Sales/Revenue} \\ - \text{Operating Expenses} \\ \hline \text{EBIT} \end{array}$$

Earnings Before Interest, Taxes, Depreciation, and Amortization, or EBITDA

EBITDA is an indicator of a company's profitability that eliminates the effects of accounting and financing decisions; it is computed as follows:

Total Sales/Revenue
– Operating Expenses
EBIT
+ Depreciation and Amortization

EBITDA**Interest Expense**

Interest expense is the cost incurred by an entity for borrowed funds. It represents interest payable on any type of borrowing—bonds, loans, convertible debt, or lines of credit.

Total Assets

Total assets refer to anything that is owned by an entity. It is a resource with economic value that a corporation owns or controls with the expectation that it will provide future benefit.

Capital Expenditure

The funds used by a company to acquire or upgrade physical assets such as property, industrial buildings, or equipment. Companies use capital expenditures to maintain or increase the scope of their operations.

Cash and Cash Equivalents

The aggregate amount of cash, cash equivalents, and marketable securities:

A. Cash

Cash includes currency in hand as well as demand deposits with banks or financial institutions.

B. Cash Equivalents

Cash equivalents exclude items classified as marketable securities. It includes short-term, highly liquid investments that are both readily convertible to cash, and so near their maturity that they present insignificant risk of changes in value because of changes in interest rates.

Current Assets

The total amount of assets considered to be convertible into cash within a relatively short period of time, usually a year.

Total Liabilities

Total liabilities are the aggregate debt and financial obligations owed by a business to individuals and organizations at any specific period of time.

Long-Term Debt

All borrowings lasting over one year, including long-term debt and long-term portions of capital lease obligations.

Short-Term Debt

All borrowings due within one year—current portions of long-term debt, capital leases, short-term debt such as bank loans, and commercial paper, for example.

Current Liabilities

The debts or obligations of the firm that are due within one year.

Common Stock Equity

The portion of stockholders' equity that reflects the amount of common stock, which are units of ownership.

Market Capitalization

Market capitalization is the total market value of a company. It is the product of total shares outstanding and the current market price.

Shares Outstanding

The latest total shares outstanding reported by the company.

Diluted Weighted Average Shares Outstanding

The weighted average shares outstanding used to calculate the diluted EPS, assuming the conversion of all convertible securities and the exercise of warrants or stock options.

Operating Cash Flow

The net cash generated from an entity's core operating activities including its discontinued operations.

Cash Dividend

It is the dividend payment by an entity to its shareholders from its current earnings or accumulated profits. It includes both paid and unpaid dividends declared during the period for both common and preferred stock.

Investing Cash Flow

An item on the cash flow statement that reports the aggregate change in a company's cash position resulting from any gains or losses from investments in the financial markets and operating subsidiaries, and changes resulting from amounts spent on investments in capital assets such as plants and equipment.

Basic Earnings per Share, or EPS

Basic EPS does not take into account the dilutive effect of convertible securities like convertible preferred shares, convertible bonds, and so on. It is further divided into the following categories:

A. Basic EPS from Continuing Operations

Basic EPS from continuing operations is the earnings from continuing operations reported by a company divided by the weighted average number of common shares outstanding.

B. Basic EPS from Discontinued Operations

Basic EPS from discontinued operations is the earnings from discontinued operations reported by a company divided by the weighted average number of common shares outstanding.

Diluted EPS

Diluted EPS takes into account the dilutive effect of convertible securities like convertible preferred shares, convertible bonds, and so on. It is further divided into the following categories:

A. Diluted EPS from Continuing Operations

Diluted EPS from continuing operations is the earnings from continuing operations divided by the number of weighted average shares outstanding adjusted for the assumed conversion of all potentially dilutive securities.

B. Diluted EPS from Discontinued Operations

Diluted EPS from discontinued operations is the earnings from discontinued operations divided by the number of weighted average shares outstanding adjusted for the assumed conversion of all potentially dilutive securities.

EPS After Extraordinary Items

Normalized earnings is the calculation that reverses the effects of extraordinary income or charges on net earnings, by adding back extraordinary expense or subtracting extraordinary income from the net earnings.

It is the ratio of normalized earnings/basic weighted average shares outstanding.

Sales per Share

It is the ratio of sales/average diluted shares outstanding.

Book Value per Share

It is the ratio of common shareholder equity/diluted shares outstanding.

Cash Flow per Share

It is the ratio of cash flow from operations/average diluted shares outstanding.

Sales Yield

It is the ratio of sales per share/price of a security.

Book Value Yield

It is the ratio of book value per share/price of a security.

Cash Flow Yield

It is the ratio of cash flow per share/price of a security.

Book Value per Share Growth

It is the percentage growth of a company's book value per share.

Sales Growth

It is the percentage growth of a company's revenue. Morningstar calculates the growth percentage based on the underlying revenue data in a company's reported income statement.

Security-Level Ratios**Per Share Trailing 12 Month**

$$\text{Per share figure} = \frac{\text{Trailing 12 month figure}}{\text{Total number of shares outstanding}}$$

Trailing 12-month earnings = reported fiscal earnings over the past 12 months.

This formula applies to:

- ▶ Earnings per share (EPS)
- ▶ Sales per share (SPS)
- ▶ Cash flow per share (CPS)
- ▶ Dividend per share (DPS)

Price/Per Share Trailing 12 month

$$\text{Price/per share figure} = \frac{\text{Price of the security}}{\text{Per share (trailing 12 month)}}$$

This formula applies to:

- ▶ Price/sales, or P/S
- ▶ Price/earnings, or P/E
- ▶ Price/cash earnings, or P/CE
- ▶ Price/book value, or P/BV
- ▶ Price/earnings forward, or P/E forward
- ▶ Dividend yield (we use the inverse of the above formula)

n-month EPS Estimate Revision

n-month fiscal EPS estimate revision measures the percentage change over the past n months in the median analyst earnings estimate for a company's current fiscal year.

$$EPS \text{ estimate revision} = \frac{EPS \text{ estimate}_t}{EPS \text{ estimate}_{t-n}} - 1$$

where:

- ▶ EPS estimate t = current fiscal EPS estimate for most recent month end.
- ▶ EPS estimate t - n = current fiscal EPS estimate for n month before.

Earnings Surprise

Earnings surprise is defined as the percentage difference between the actual and expected earnings for the latest reported fiscal period.

$$Earnings \text{ surprise} = \frac{Actual \text{ EPS}}{EPS \text{ estimate}} - 1$$

Return on Equity

Trailing return on equity is the ratio of a company's trailing 12 months of operating EPS as a percentage of the company's average shareholders' equity per share over the corresponding period.

$$Return \text{ on equity} = \frac{Trailing \ 12 \ months \ operating \ EPS}{Average \ book \ value \ share \ over \ 12 \ months}$$

Price Change from Month End 'n' Months Ago

Price change from month end n months ago takes the current price of a stock and compares it with its price n months ago.

$$Price \ change \ from \ month \ end \ n \ months \ ago = \frac{Price \ of \ the \ security}{Price \ at \ month \ end \ n \ months \ ago}$$

M Year Average Earnings Growth Rate

$$g(e)_{-m} = \left(\frac{e_0}{e_{-m}} \right)^{\frac{1}{m}} - 1$$

where:

- ▶ e_0 = Earnings per share for the recently reported fiscal year.
- ▶ e_m = Earnings per share for m years before e_0 .

The growth rate will be calculated only if e_0 is positive. If earnings are negative for a given year, no growth rate is calculated for that year. For example, if e_{-3} is negative, $g(e)_{-3}$ is not calculated.

Estimated EPS Growth Rate

$$g(e) = \text{Average } [g(e)_{-4}, g(e)_{-3}, g(e)_{-2}, g(e)_{-1}]$$

If the average earnings growth rate is not available for a particular year, it will not be considered for calculation.

Forecast EPS

$$e_1 = e_0 \times (1 + g(e_1))$$

Forecast EPS will not be calculated if e_0 is negative.

Prospective Earnings Yield

$$\text{Earnings yield} = \frac{\text{Forecast EPS}}{\text{Price}}$$

Estimated EPS growth rate, forecast EPS, and prospective earnings yield are calculated only if the earnings for the recently reported fiscal year are positive.

The formulas apply to sales per share, book value per share, and cash flow per share.

Forecast or Indicative DPS

$$d_1 = d_0 \times f_0$$

where:

- ▶ d_0 = Most recent dividend per share, or DPS.
- ▶ f_0 = Published frequency of dividend.

In the U.S., the frequency of dividend payments is generally consistent across years, so indicative DPS is a better representative of the DPS because it's forward-looking.

Prospective Dividend Yield

$$\text{Dividend yield} = \frac{\text{Forecast DPS}}{\text{Price}}$$

Dividend Payout Ratio

$$\text{Dividend payout ratio} = \frac{\text{DPS}}{\text{EPS}}$$

Coverage Ratio

$$\text{Coverage ratio} = \frac{EPS}{DPS}$$

Dollar Traded Value

$$\text{Dollar Traded Value} = \text{Close Price} \times \text{Trading Volume}$$

Monthly Dollar Traded Value (MDTV)

Monthly Dollar Traded Value, or MDTV is the median of the daily traded values in a given month

n-month Average Monthly Dollar Traded Value (AMDTV)

Average Monthly Dollar Traded Value is the average of Monthly Dollar Traded Value for the past n months.

One day Total Return

$$\text{One day Total Return} = \frac{(P_{(t)} \times \text{FX rate}) + (D_{(t)} \times \text{FX rate})}{P_{adj(t-1)} \times \text{FX rate}_{(t-1)}} - 1$$

where:

- ▶ $P_{(t)}$ = Daily Close Price at time t.
- ▶ $D_{(t)}$ = Ordinary Cash Dividend at time t.
- ▶ $P_{adj(t-1)}$ = Previous Day's Close Price adjusted for Corporate Actions.

Total Return Index (TRI)

$$TRI_{(t)} = (1 + \text{One day Total Return}_{(t)}) \times TRI_{(t-1)}$$

n-month Total Return Momentum

$$n - \text{Month Total Return Momentum} = \frac{TRI_{(t)}}{TRI_{(t-n \text{ months})}} - 1$$

n-month High Total Return Momentum

$$n - \text{Month High Total Return Momentum} = \frac{TRI_{(t)}}{TRI_{(high)}} - 1$$

where:

- ▶ TRI_{high} = Highest Total Return Momentum within the n-month period

Sustainability Scores

Security sustainability score is defined in such a way that the weighted average of security sustainability scores in the portfolio is equal to the portfolio's Morningstar Fund Sustainability Score, if all the securities in the portfolio have both ESG and controversy scores assigned. For more details for calculation of Normalized ESG Score please and Controversy Deduction, please refer to Morningstar Sustainability Rating Methodology.

$$\text{Security Sustainability Score} = \text{Normalized ESG Score} - \text{Controversy Deduction}$$

Star Score

The star score enables the ranking of stocks across Morningstar's coverage universe using a calculation that is consistent with our star ratings. The price to fair-value (P/FV) ratio alone is insufficient for sorting the coverage universe as the P/FV ratio does not account for the uncertainty rating that alters the investment recommendation. The star ratings account for both valuation and uncertainty, but do not provide an ability to rank stocks more finely than the five-star ratings. The star score allows for an ordinal ranking of portfolio candidates and thus allows more effective and potentially automated screening for portfolio constituents, pick lists, and best ideas.

$$\text{Star Score} = (\text{Price to Fair Value})^{(1+\text{UncMod})}$$

where:

- UncMod = value from Uncertainty Band Modifier table

Uncertainty Band Modifier

	Low	Medium	High	Very High	Extreme
P/FV > 1	0.34	0.00	-0.32	-0.46	-0.78
P/FV < 1	0.60	0.00	-0.30	-0.49	-0.74

Setting the modifiers

The modifiers reflect the relative margin of safety that is required, by uncertainty rating, to trigger a 1-star or a 5-star rating. The 1-star modifiers are calculated as the ratio between the log transformed 1-star trigger price for a given uncertainty rating and the log transformed 1-star trigger price for the medium uncertainty rating. This process is repeated for the 5-star modifiers. Given the breakpoints chosen for our uncertainty bands, we see different modifiers for P/FV ratios above and below the 1.00 level.

Uncertainty Band Modifier

	Low	Medium	High	Very High	Extreme
1-Star	1.25	1.35	1.55	1.75	4.00
5-Star	0.80	0.70	0.60	0.50	0.25

Index Valuation Ratios**Index Price/Earnings**

$$\text{Index } \frac{P}{E} = \frac{\sum \text{Price} \times \text{Index Shares} \times \text{FX rate}}{\sum \text{EPS} \times \text{Index Shares} \times \text{FX rate}}$$

If a security's EPS value is negative or unavailable, the security will be excluded from the calculation.

Exhibit 1.

Security	Price	ToS	Float	FX Rate	EPS	Numerator	Denominator
A	26.65	362	0.33	112.1	411.09	28.40	438.08
B	21.88	2314	0.95	0.96	1.34	50,102.92	3,068.57
C	10.98	157	1	1.12	1.17	1,539.16	163.41
D	13.59	236	0.18	112.1	95.01	5.15	36.00
E	17.34	32	0.55	112.1	119.11	2.72	18.70
F	1.58	328	0.65	30.42	4.46	11.07	31.27
G	0.61	3567	0.4	7.75	0.28	112.30	51.55
H	32.04	35	0.2	0.79	1.71	283.90	15.15
I	18.64	24	0.48	1.12	0.96	191.73	9.87
J	15.81	45	0.6	112.1	133.29	3.81	32.10
Total						52,281.16	3,864.71

Source: Morningstar Direct

$$\text{Index } \frac{P}{E} = \frac{52,281.16}{3,684.71} = 13.52$$

This formula applies to:

- ▶ Index price/sales, or P/S
- ▶ Index price/cash earnings, or P/CE
- ▶ Index price/book value, or P/BV
- ▶ Index price/earnings forward, or P/E Fwd
- ▶ Index price/earnings backward, or P/E Bwd
- ▶ Index price/Fair Value, or P/FV
- ▶ Index dividend yield, or D/P (we use the inverse of the above formula)

Index EPS

$$\text{Index EPS} = \frac{\text{Index level}}{\text{Index } \frac{P}{E}}$$

Morningstar Proprietary Data

Morningstar Economic Moat Rating

In a free-market economy, capital seeks the areas of highest return. Whenever a company develops a profitable product or service, it doesn't take long before competitive forces drive down its economic profits. Only companies with an economic moat—a structural competitive advantage that allows a firm to earn above-average returns on capital over a long period of time—are able to hold competitors at bay. To help investors identify companies that possess a moat, Morningstar's Equity Research analysts assign one of three economic moat ratings: none, narrow, or wide. There are two major requirements for firms to earn either a narrow or wide rating:

- ▶ The prospect of earning above-average returns on capital.
- ▶ Some competitive edge that prevents these returns from quickly deteriorating.

Fair Value Estimate

Fair Value estimate reflects the present value of expected future cash flows. Morningstar's Fair Value estimate model is a detailed projection of a company's future cash flows, resulting from our analysts' independent primary research. Analysts create custom industry and company assumptions to feed income statement, balance sheet, and capital investment assumptions into our globally standardized, proprietary discounted cash flow, or DCF, modeling templates.

Uncertainty Rating

The Uncertainty Rating represents the analysts' ability to bound the estimated value of the shares in a company around the Fair Value Estimate, based on the characteristics of the business underlying the stock, including operating and financial leverage, sales sensitivity to the overall economy, product concentration, pricing power, and other company-specific factors.

Star Rating

Star Ratings run from one to five star and represent Morningstar's belief in the stock. Ratings are automatically re-calculated at the market close on every day and subject to change based on the current share price relative to Morningstar's more stable Fair Value Estimate, after adjusting for an appropriate margin of safety

For more information on the Economic Moat, Fair Value, Uncertainty Rating, and Star Rating process performed by Morningstar Equity Research, refer to the [Morningstar Equity Research Methodology](#).

Morningstar Quantitative Moat Ratings

The Morningstar quantitative rating is analogous to the Morningstar Economic Moat Rating in that both are meant to describe the strength of a firm's competitive position. The quantitative moat rating, expressed as none, narrow, or wide, is calculated using Morningstar Quantitative Moat Scores, ranging from 0 to 1, by labeling them into ratings mentioned above. The Quantitative Moat Scores are calculated using an algorithm designed to predict the rating a Morningstar analyst would assign to a stock.

For more details on calculation of Quantitative Moat Scores, please refer to the [Morningstar's Quantitative Equity & Credit Ratings](#) methodology. For more details regarding conversion of these scores into Quantitative Moat Ratings, please refer to the [Morningstar Quantitative Score Normalization Methodology](#).

Morningstar Quantitative Distance to Default

Distance to Default is a structural or contingent claim model that takes advantage of market and accounting financial information. A firm's equity is viewed as a call option on the value of the firm's assets. If the value of the assets is not sufficient to cover the firm's liabilities (the strike price), default is expected to occur.

For more details on Morningstar Quantitative Distance to Default, please refer to [Morningstar Quantitative Distance to Default methodology](#).

Morningstar Global Equity Classification Structure

Morningstar provides sector structure that is logical, allows for intelligent diversification, and makes it easier to understand the decisions being made by portfolio managers. It divides the stock universe into three major economic spheres, or supersectors: cyclical, defensive, and sensitive. Within each of these supersectors, three groups for defensive and four each for cyclical and sensitive are defined for a total of 11 sectors. Industry groups and specific industries within each sector permit further analysis. The result is a unified system that applies to stocks, funds, and portfolios. It allows investors to quickly evaluate the similarities and differences of funds and portfolios by comparing exposure to the three supersectors, but also permits further examination of holdings at a very granular level.

For more details on Morningstar Equity Classification Structure, please refer to the [Morningstar's Global Equity Classification Structure](#) methodology.

Morningstar Capital Markets Assumptions (CMA)

Capital Markets Assumptions (CMA) is estimates of expected return and risk of various asset classes. Morningstar Indexes leverages CMAs determined by Morningstar's Investment Management group, a leader in capital markets research.

Grounded in Corporate and Economic Fundamentals

Asset class returns are intrinsically linked to the cash flows companies supply to investors. The approach attempts to decompose asset returns into their underlying corporate (such as dividends and earnings) and economic (for example, capital stock and labor hours) fundamentals and predict the key cash flow drivers of an asset class.

The market wide cash flows in the long term are linked to the performance of the real economy. That is, the real economy places bounds on market returns as the market as a whole cannot indefinitely out- or underperform the broader economy. For instance, aggregate total corporate payouts grow in line with

the overall real economy and therefore an assessment of long-run cash flow growth must be consistent with the growth of the overall economy.

A Valuation-based Approach

While expected returns have traditionally been assumed to be constant, the evidence of return predictability suggests that expected returns move away from their long-run equilibrium levels, requiring forecasting models that are time-varying.

Research indicates that returns are predictable at intermediate-term horizons, lending support for a more dynamic return forecasting model that incorporates current valuations. Shiller (1984) was among the first to study the predictability of stock returns using the dividend-to-price ratio, finding that periods of high (low) dividend-to-price ratios are followed by high (low) returns. The literature on the subject has expanded considerably in the last two decades and has documented predictability of returns across different asset classes (see Cochrane, 2011).

Two schools of thought explain return predictability in asset prices. Behavioral economists such as Robert Shiller point to investors' overreaction to information, which leads market prices to temporarily move away from fair value, while proponents of market efficiency such as Eugene Fama point to rational changes of investors' risk aversion as the source of return predictability. Regardless of the explanation, return predictability has important practical implications for return forecasting: It implies that expected returns vary over time.

Morningstar Investment Management incorporates this into its original building blocks approach and generates two sets of forecasts: 1) conditional forecasts, which are specific to a current market environment and are applicable to a shorter horizon, and 2) unconditional forecasts, which are independent of a given market environment and aimed at a longer horizon. Conditional forecasts are available at 10- and 20-year horizons. Unconditional forecasts can be interpreted as fair returns, because asset class returns are expected to move to their fair values over time

Morningstar Index Committee

The Morningstar Index Committee oversees all of the Morningstar indexes. The committee seeks to create indexes of the highest quality that meet the recognized qualities of a good benchmark. All Morningstar indexes are constructed based on their respective published construction rules. Matters arising from undocumented events will be resolved at the discretion of the Morningstar Index Committee.

About Morningstar® Inc.

Morningstar, Inc. is a leading provider of independent investment research in North America, Europe, Australia, and Asia. Morningstar offers an extensive line of products and services for individual investors, financial advisors, asset managers, and retirement plan providers and sponsors. Morningstar provides data on approximately 500,000 investment offerings, including stocks, mutual funds, and similar vehicles, along with real-time global market data on more than 15 million equities, indexes, futures, options, commodities, and precious metals, in addition to foreign exchange and Treasury markets. Morningstar also offers investment management services through its investment advisory subsidiaries.

About Morningstar Indexes

Morningstar® Indexes combine the science and art of indexing to give investors a clearer view into the world's financial markets. Our indexes are based on transparent, rules-based methodologies that are thoroughly back-tested and supported by original research. Covering all major asset classes, our indexes originate from the Morningstar Investment Research Ecosystem—our network of accomplished analysts and researchers working to interpret and improve the investment landscape. Clients such as exchange-traded fund providers and other asset management firms work with our team of experts to create distinct, investor-focused products based on our indexes. Morningstar Indexes also serve as a precise benchmarking resource.

For More Information

For any queries, reach out to us via our [communication page](#).



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