



The New Morningstar Style Box™ Methodology

Morningstar Research Report
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Determining the Value-Core-Growth Assignment for U.S. Common Stocks

Basic Concepts

A stock's value orientation and growth orientation are separate measures, each of interest to investors. As such, they are estimated using related but separate variables. Once estimated, depending on the purpose, they may be used individually, or they may be combined into a single value-core-growth ("VCG") orientation measure. For instance, style-based index construction requires the use of a single VCG measure for each stock.

VCG orientation is calculated within capitalization classes ("cap bands"). That is, a stock is assigned to a cap band before its VCG orientation is determined; and two stocks that have similar financial ratios and growth prospects, but are in different cap bands, may be given different VCG assignments.

A high value orientation score (as defined below) indicates that a stock's price is relatively low, given the anticipated per-share earnings, book value, revenues and so forth that the stock provides to investors. A high price relative to these measures indicates that a stock's value orientation is weak, but does not necessarily mean that the stock is growth-oriented.

A high growth orientation score (as defined below) indicates that a stock's per-share earnings, book value, revenues etc. are expected to grow quickly relative to those of other stocks in the same cap band. A weak growth orientation does not necessarily mean that a stock has a strong value orientation.

It follows that an individual stock may have any combination of strong or weak growth and value characteristics. Where one set of characteristics is dominant, the stock can be classified accordingly. Where the stock's growth and value characteristics are similar in strength, the stock will be assigned a "core" VCG orientation.

VCG orientation may be viewed from both a short-term and a longer-term perspective. An individual stock shows continuous short-term variation as its price and other attributes change. To capture the effects of such changes, Morningstar determines a monthly VCG "assignment" for each stock. U.S. common stock VCG assignment is the subject of the first part of this document.

Terminology and Notation

The following short forms relate to prospective yield variables used in determining

a stock's value orientation:

| | | |
|---------|---|--|
| e_i/p | = | prospective earnings yield (forecasted earnings per share for the current fiscal year, divided by current price per share) |
| r_i/p | = | prospective revenue yield |
| c_i/p | = | prospective cash flow yield |
| d_i/p | = | prospective dividend yield |
| b_i/p | = | prospective book value yield |

The following short forms relate to company earnings per share:

| | | |
|----------|---|---|
| e_1 | = | forecasted earnings per share (EPS) for the current fiscal year (the basis for the yield variable defined above) |
| e_0 | = | EPS for most recent fiscal year |
| e_{-1} | = | EPS for the fiscal year prior to e_0 |
| e_{-2} | = | EPS for the fiscal year prior to e_{-1} |
| e_{-3} | = | EPS for the fiscal year prior to e_{-2} |
| e_{-4} | = | EPS for the fiscal year prior to e_{-3} |
| $g(e_1)$ | = | forecasted growth in EPS during the current fiscal year, based on historical growth rates, and used to calculate e_1 in determining a stock's value orientation |

The same notation convention is used for dividends per share, cash flow per share, revenue per share and book value per share except that “d,” “c,” “r” or “b,” respectively, are substituted for “e” in the example above.

For the purposes of determining stock growth orientation, an additional growth measure is used:

| | | |
|---------|---|---|
| $g'(e)$ | = | forecasted average growth rate of EPS, based on historical and forecasted short-term growth rates, used in determining a stock's growth orientation |
|---------|---|---|

The same notation convention is used for forecasted average growth rates in cash flow per share, revenue per share and book value per share except that “c,” “r” or “b,” respectively, are substituted for “e” in the example above.

In addition, for earnings growth only, the following notation applies:

| | | |
|----------|---|---|
| $g(e_3)$ | = | median of third-party long-term earnings growth forecasts |
|----------|---|---|

Stock capitalization (“cap”) and company size are treated as synonymous in this document.

Value-Core-Growth Assignment Frequency

Stock VCG assignments are determined each month. They are therefore more variable than VCG categorizations, which usually remain unchanged for a minimum of six months.

The Morningstar® U.S. Equity Sample

Stock VCG assignments are based on information drawn from Morningstar’s U.S. equity sample (“the equity sample”). The equity sample comprises stocks representing approximately 99% of the total capitalization of traded U.S. common stocks.

In determining stock VCG “thresholds” (the division points between stocks with different VCG assignments), the following security types are excluded from consideration:

- ▶ American Depository Receipts (ADRs)
- ▶ American Depository Shares (ADSs)
- ▶ fixed-dividend shares
- ▶ convertible notes, warrants and rights
- ▶ tracking stocks
- ▶ mutual funds

VCG Assignments, VCG Categories & Capitalization Effects

VCG assignment is a monthly process whereas categorization occurs semi-annually. Each process is a form of classification, and each is carried out within individual cap bands.

VCG assignments can appear inconsistent where stocks are in different cap bands but are otherwise similar. For instance, if mid-cap stocks have an average price-earnings ratio (p/e) of 20 and large-cap stocks have an average p/e of 16, a mid-cap stock with a p/e of 18 might be considered strongly value-oriented, whereas a large-cap stock with the same p/e might be considered to have a weak value orientation.

For the same reason, stocks that are “borderline” in their cap size, and vary from month to month between the large-cap and mid-cap bands, for example, may experience variation in their VCG assignments. This variation may be due to the use of different comparison groups in successive months, not to variation in VCG characteristics.

Stocks may therefore experience changes in their month to month VCG assignment for two separate reasons:

- 1) their fundamental characteristics vary from month to month
- 2) their cap band varies from month to month, thus changing the peer group on which their VCG assignment is based

Knowledge of the contribution of each of these is important to understanding variation in a stock’s VCG assignment.

Assigning Stocks to Capitalization Bands

Each stock's VCG assignment is determined within a specific cap band. Monthly cap band assignments are made as follows:

- 1) the stocks in the equity sample are ordered by size in descending order, and cumulative cap as a percentage of total sample cap is calculated as each stock is added to the list;
- 2) the stock that causes cumulative capitalization to equal or exceed 70% of the total capitalization of the equity sample is the final one assigned to the large-cap class;
- 3) the largest of the remaining stocks are assigned to the mid-cap band until cumulative capitalization equals or exceeds 90% of the total capitalization of the equity sample;
- 4) the largest of the remaining stocks are assigned to the small-cap band until cumulative capitalization equals or exceeds 97% of the total capitalization of the equity sample.¹

Measuring Stock Value Orientation

Basic Process

A stock's value orientation reflects the price investors are willing to pay for a share of some combination of the stock's prospective earnings, dividends, sales, cash flow and book value.

Value orientation is determined using the following three steps:

- 1) Calculate up to five prospective yields (e_1/p , d_1/p , c_1/p , r_1/p and b_1/p : as many as are available) for each stock. Where possible, third-party forecasts for earnings, dividends, cash flow, revenues and book value per share are used; otherwise e_1 , d_1 , c_1 , r_1 and b_1 are determined using the process described in the next section.
- 2) Calculate a float-weighted percentile score for each available yield factor, for each stock, within each cap band (large, mid and small-cap).
- 3) Calculate a weighted average of the individual percentile scores for each stock, using the weighting scheme detailed in "Calculating Overall Value Orientation Scores," below. The weighted average score represents the strength of the stock's value orientation.

Details of each of these steps are provided below.

Calculating Prospective Yields

As many as possible of e_1/p , d_1/p , c_1/p , r_1/p and b_1/p are calculated for each stock. Because p is known, the method used to forecast e_1 , d_1 etc. is key.

If a positive third-party forecast of e_1 , d_1 , c_1 , r_1 or b_1 is available, it is used to calculate the prospective yield. If e_1 , d_1 , c_1 , r_1 or b_1 is forecasted to be negative by a third party, or if e_0 , d_0 , c_0 , r_0 or b_0 is negative and no third party forecast is available, prospective yield on that factor is excluded for that stock. If no third party forecast is available and e_0 , d_0 , c_0 , r_0 or b_0 is positive, then forecasted values are calculated as described below (using EPS as an example).

The relationship between prospective and current EPS is straightforward:

$$[1] \quad e_1 = e_0 \cdot (1 + g(e_1))$$

Because e_0 is known, only $g(e_1)$ must be calculated to provide a forecast of e_1 . $g(e_1)$ is calculated from historical earnings information.

First calculate as many as possible of four periodic growth rates:²

$$[2] \quad g(e)_{-4} = \left(\frac{e_0}{e_{-4}} \right)^{\frac{1}{4}} - 1$$

$$[3] \quad g(e)_{-3} = \left(\frac{e_0}{e_{-3}} \right)^{\frac{1}{3}} - 1$$

$$[4] \quad g(e)_{-2} = \left(\frac{e_0}{e_{-2}} \right)^{\frac{1}{2}} - 1$$

$$[5] \quad g(e)_{-1} = \left(\frac{e_0}{e_{-1}} \right) - 1$$

Where e_{-1} , e_{-2} , e_{-3} or e_{-4} is negative, no growth rate is calculated using that data point.

When as many as possible of the growth rates defined above have been calculated, average the results:

$$[6] \quad g(e_1) = \text{Average}[g(e)_{-4}, g(e)_{-3}, g(e)_{-2}, g(e)_{-1}]$$

Thus,

- ▶ estimated earnings growth $g(e_1)$ and forecasted earnings (e_1) are calculated only for stocks where e_0 is a positive number
- ▶ in calculating $g(e_1)$, recent growth rates are included in more of the averaged terms than are older growth rates; recent growth rates are therefore weighted more heavily than are older growth rates

If third party forecasts are unavailable, prospective dividend, revenue, cash flow and book value yields are calculated in the same way.

If only forecasted dividend yield, or no information, is available for a given stock, the stock is not given a VCG assignment.

Calculating Percentile Scores For Each Value Factor

When one or more of e_1/p , c_1/p , r_1/p and b_1/p values have been calculated, with or without d_1/p , each stock is assigned a float-weighted percentile score for each relevant factor. The percentile scores are calculated within the stock's cap band.

Prospective earnings yield scores for large-capitalization stocks are used in the following example.

To calculate an earnings yield score for each stock in the large-cap band:

- ▶ order all stocks in the large-cap band by their e_1/p scores
- ▶ calculate the float-weighted trimmed mean e_1/p for all stocks in the large-cap band—where the upper and lower 5% of the float is trimmed before the average is calculated. When a stock “straddles” the 5th percentile point or 95th percentile point, remove it from the sample.
- ▶ calculate the ratio of each stock's e_1/p to the trimmed mean e_1/p for the large-cap band
- ▶ assign each stock to an e/p “bucket” as follows:
 - 1) if the stock's e_1/p is equal to or less than 0.75 times the trimmed mean e_1/p (“the lower value cutoff”), the stock is assigned to the low e/p bucket; or
 - 2) if the stock's e_1/p is equal to or less than the trimmed mean e_1/p , the stock is assigned to the mid-minus e/p bucket; or
 - 3) if the stock's e_1/p is equal to or less than 1.25 (“the upper value cutoff”) times the trimmed mean e_1/p , the stock is assigned to the mid-plus e/p bucket; or
 - 4) the stock is assigned to the high e/p bucket

When each stock has been assigned to an e/p bucket, it is then scaled relative to other stocks in the same bucket. The low e/p bucket is used as an example here:

- ▶ order the stocks within the low e/p bucket by their raw e_1/p scores, from lowest to highest
- ▶ within the low e/p bucket, assign each stock a value equal to the

cumulative float represented by that stock and all stocks with a lower e_1/p ; thus the stocks in the low e/p bucket have values ranging from 0.00+ (the stock with the lowest e_1/p in the low e/p bucket) to 100 (the stock with the highest e_1/p in the low e/p bucket)

- ▶ where two or more stocks have the same e_1/p , they are assigned a value which represents the cumulative float of all stocks with a lower e_1/p plus one-half of the total float of the stocks that share the same e_1/p .³
- ▶ re-scale the scores in the low e/p bucket to final values between 0.00+ and 33.33

Repeat the four steps immediately above for each of the mid-minus, mid-plus and high e/p buckets; and re-scale the values as follows:

| Bucket | Minimum Score | Maximum Score |
|-----------------|---------------|---------------|
| Low e/p | 0.00+ | 33.33 |
| Mid-minus e/p | 33.34 | 50.00 |
| Mid-plus e/p | 50.01 | 66.66 |
| High e/p | 66.67 | 100.00 |

All of the steps in this section are then repeated for each of c_1/p , r_1/p , b_1/p and d_1/p .

Calculating Overall Value Orientation Scores

When the steps above are complete for each of the five value factors, a weighted average is calculated for each stock. In calculating the weighted average, e/p scores, if available, are assigned a weight of 50%; each of the other value factors is assigned an equal share of the remaining weight (either 50% or, if e/p is unavailable, 100%). The weighted average result is the stock's overall value orientation score.

Measuring Stock Growth Orientation

Basic Process

A stock's growth orientation reflects the rates at which its earnings, sales, cash flow and book value are expected to grow. Forecasted dividend growth rates are not used in determining stock growth orientation.

Determining a stock's growth orientation comprises three steps:

- 1) For each stock, calculate as many as possible of the four average growth rates $g'(e)$, $g'(c)$, $g'(r)$ and $g'(b)$, using the process described in the next section.
- 2) Calculate a float-weighted percentile score for each calculated growth rate, for each stock, within each capitalization band (large-cap, mid-cap and small-cap), and a float-weighted percentile score for $g(e_5)$ if this is available from a third party source.
- 3) Calculate a weighted average of the individual growth rate percentile scores for each stock, using the weighting scheme detailed in "Calculating Overall Growth Orientation Scores," below.

The weighted average score calculated in step 3 above represents the strength of the stock's growth orientation.

Calculating Stock Growth Scores

As many as possible of $g'(e)$, $g'(c)$, $g'(r)$ and $g'(b)$ are calculated for each stock. In addition, if $g(e_5)$ is available from a third party, it is used as a fifth growth rate indicator. The example growth rate calculation below uses $g'(e)$, but the process is identical for $g'(c)$, $g'(r)$ and $g'(b)$.

If e_1 , e_0 and e_{-1} are all negative, then $g'(e)$ is not calculated. If e_1 , e_0 or e_{-1} is positive, then $g'(e)$ is calculated as follows:

First calculate as many as possible of five periodic growth rates:

$$[1] \quad g'(e)_{-4} = \left(\frac{e_n}{e_{-4}} \right)^{\frac{1}{n+4}} - 1$$

$$[2] \quad g'(e)_{-3} = \left(\frac{e_n}{e_{-3}} \right)^{\frac{1}{n+3}} - 1$$

$$[3] \quad g'(e)_{-2} = \left(\frac{e_n}{e_{-2}} \right)^{\frac{1}{n+2}} - 1$$

$$[4] \quad g'(e)_{-1} = \left(\frac{e_n}{e_{-1}} \right)^{\frac{1}{n+1}} - 1$$

$$[5] \quad g'(e)_0 = \left(\frac{e_n}{e_0} \right)^{\frac{1}{n}} - 1$$

where:

n = the latest period (1, 0 or -1) in which EPS is positive

If e_0 , e_{-1} , e_{-2} , e_{-3} or e_{-4} is negative, no growth rate is calculated using that data point. If $n=1$, up to five growth rates are calculated; if $n=0$, up to four rates are calculated; and if $n=-1$, up to three growth rates are calculated.

When all available growth rates defined above have been calculated, average the results:

$$[6] \quad g'(e) = \text{Average}[g'(e)_{-4}, g'(e)_{-3}, g'(e)_{-2}, g'(e)_{-1}, g'(e)_0]$$

Revenue, cash flow and book value growth rates are calculated in the same way. At the time of writing, forecasts for these factors are not available from third parties.

If growth information for at least one factor, spanning at least two separate growth periods, is unavailable for a given stock, the stock is not given a VCG assignment.

For factors other than earnings, only one-year growth forecasts are used. These are already known from the calculation of each stock's value orientation.

Calculating Percentile Scores For Each Growth Factor

As with value orientation factors, the growth orientation factor scores for each stock are next translated into re-scaled percentile scores. The percentile scores are calculated within the stock's cap band.

Prospective earnings growth rate scores for large-cap stocks are used in the following example.

To calculate a prospective earnings growth rate score for each stock in the large-cap band:

- ▶ order all stocks in the large-cap band by their growth rate $g'(e)$ scores
- ▶ calculate the float weighted trimmed mean growth rate $g'(e)$ for all stocks in the large-cap band—where the upper and lower 5% of float is trimmed, before the average is calculated
- ▶ calculate the ratio of each stock's $g'(e)$ to the trimmed mean $g'(e)$ for the large-cap band
- ▶ assign each stock to a $g'(e)$ “bucket” as follows:
 - 1) if the stock's $g'(e)$ is equal to or less than 0.75 times the trimmed mean $g'(e)$ (“the lower growth cutoff”), the stock is assigned to the low $g'(e)$ bucket; or
 - 2) if the stock's $g'(e)$ is equal to or less than the trimmed mean $g'(e)$, the stock is assigned to the mid-minus $g'(e)$ bucket; or
 - 3) if the stock's $g'(e)$ is equal to or less than 1.25 times the trimmed mean $g'(e)$ (“the upper growth cutoff”), the stock is assigned to the mid-plus bucket; or
 - 4) the stock is assigned to the high $g'(e)$ bucket

When each stock has been assigned to a $g'(e)$ bucket, it is then scaled relative to other stocks in the same bucket. The low $g'(e)$ bucket is used as an example here:

- ▶ order the stocks within each bucket by raw $g'(e)$ score, from lowest to highest
- ▶ within the low $g'(e)$ bucket, assign each stock a value equal to the cumulative float represented by that stock and all stocks with a lower $g'(e)$; thus the stocks in the low $g'(e)$ bucket have values ranging from 0.00+ (the stock with the lowest $g'(e)$ in the low $g'(e)$ bucket) to 100 (the stock with the highest $g'(e)$ in the low $g'(e)$ bucket)

- ▶ where two or more stocks have the same $g'(e)$, they are assigned a value which represents the cumulative float of all stocks with a lower $g'(e)$, plus one-half of the total float of the stocks that share the same $g'(e)$
- ▶ re-scale the scores in the low $g'(e)$ bucket to final values between 0.00+ and 33.33

Repeat the four steps immediately above for each of the mid-minus, mid-plus and high $g'(e)$ buckets; but re-scale the values as follows:

| Bucket | Minimum Score | Maximum Score |
|-------------------|---------------|---------------|
| Low $g'(e)$ | 0.00+ | 33.33 |
| Mid-minus $g'(e)$ | 33.34 | 50.00 |
| Mid-plus $g'(e)$ | 50.01 | 66.66 |
| High $g'(e)$ | 66.67 | 100.00 |

All of the steps in this section are then repeated for each of the other four growth orientation factors, including $g(e_5)$.

Calculating Overall Growth Orientation Scores

When the steps above are completed for each of the five growth orientation factors, a weighted average is calculated for each stock. In calculating the weighted average, $g(e_5)$ scores, if available, are assigned a weight of 50%; each of the other growth factors is assigned an equal share of the remaining weight (either 50% or, if $g(e_5)$ is unavailable, 100%). The weighted average result is the stock's overall growth orientation score.

Determining the Stock's Final Value-Core-Growth Assignment

Each stock now has a value orientation score and a growth orientation score; each of these ranges between zero and 100. A net VCG orientation score is calculated for each stock by subtracting the stock's value orientation score from its growth orientation score. The result can range from 100 (for low-yield, extremely growth-oriented stocks) to -100 (high-yield, low-growth stocks).

A stock is deemed to be growth-oriented if its net VCG orientation score equals or exceeds the "growth threshold" (normally about 25 for large-cap stocks). It is deemed to be value-oriented if its net VCG orientation score equals or falls below the "value threshold" (normally about -15 for large-cap stocks). And it is given a VCG assignment of "core" if its net VCG orientation score lies between the two thresholds.

Calculating Threshold Levels

Value-oriented, growth-oriented, and core stocks are each assumed, over time, to account for one-third of the total float of each cap band. The value and growth thresholds for each band are recalculated monthly using a three-step process:

- 1) Calculate the hypothetical value and growth thresholds that would result in each stock type representing exactly one-third of the total float at the current month-end.
- 2) Repeat Step 1 for the periods ending six, 12, 18, 24, and 30 months ago.
- 3) Calculate the simple average of the six hypothetical value thresholds and of the six hypothetical growth thresholds.

The two simple averages calculated in Step 3 are used as the current threshold values.

Assigning a Fund to a Location in the Morningstar Style Box

Morningstar's nine-square Style Box™, introduced in 1992, has become the standard method for depicting an equity fund's investment style. A fund is classified by Morningstar as being large-cap, mid-cap, or small-cap based on the market capitalizations of its stock holdings; and as value, blend, or growth based on the value-growth orientation of the stock holdings. The nine possible combinations of these characteristics correspond to the nine squares of the Style Box.™

Beginning With Stocks

The fund classification process begins with the classification of individual common stocks⁵. Morningstar classifies each stock in its database as being large-cap, mid-cap, small-cap, or micro-cap based on the stock's market capitalization. Once classified, each stock is then assigned a size score.

Let:

| | | |
|------------------|---|--|
| cap ₂ | = | the threshold between large-cap and mid-cap stocks (the "large-mid threshold") |
| cap ₁ | = | the threshold between mid-cap and small-cap stocks (the "small-mid threshold") |

In stock and fund analysis, Morningstar uses the natural logarithm of market capitalization to measure stock size. This number is scaled so that each mid-cap stock has a size score "y" between 100 and 200. Hence, given a stock with a market capitalization of "cap,"

$$[1] \quad y = 100 \left[1 + \frac{\ln(\text{cap}) - \ln(\text{cap}_1)}{\ln(\text{cap}_2) - \ln(\text{cap}_1)} \right]$$

y is unbounded for large-cap and small-cap stocks.

Morningstar also assigns a value score and a growth score to each stock; each score ranges from 0.00 to 100.00. To determine a stock's overall orientation—value, growth or core—Morningstar first subtracts the value score from the growth score; the resulting "net value-growth score" ranges from -100.00 to 100.00. If the stock's net value-growth score equals or exceeds the "growth threshold" (usually about 25 for large-cap stocks) the stock is classified as growth-oriented; if it is equal to or less than the "value threshold" (usually about -15 for large-cap stocks) the

stock is classified as value-oriented; and if the net value-growth score lies between these two points the stock is assigned to the core column of the Style Box.TM

Value and growth thresholds—the dividing points between value, core and growth stocks—are calculated separately for large-cap, mid-cap and small-cap stocks.

Let:

| | | |
|-------------------|---|--|
| $s_1(\text{cap})$ | = | the threshold between the scores of value-oriented and core stocks with capitalization = cap (the "value threshold") |
| $s_2(\text{cap})$ | = | the threshold between the scores of core and growth-oriented stocks with capitalization = cap (the "growth threshold") |

For a given stock, let:

| | | |
|-----|---|--|
| cap | = | the stock's market capitalization |
| v | = | the stock's value score (based on the five value factors from Morningstar's 10-Factor stock style model) |
| g | = | the stock's growth score (based on the five growth factors from Morningstar's 10-Factor stock style model) |

Morningstar scales the net value-growth score of each stock so that core stocks have "x" scores ranging from 100 to 200. Hence,

$$[2] \quad x = 100 \left[1 + \frac{g - v - s_1(\text{cap})}{s_2(\text{cap}) - s_1(\text{cap})} \right]$$

When all stocks have been assigned size (y) and value-growth orientation (x) scores, the process of classifying the funds that contain those stocks can begin.

Using Stock Scores to Determine Fund Value-Growth Orientation

Let:

| | | |
|-----------|---|--|
| \bar{x} | = | the asset-weighted average of the x-scores of the stocks in a fund |
| \bar{y} | = | the asset-weighted average of the y-scores of the stocks in a fund |
| N | = | the number of stocks in the fund |
| w_i | = | the fraction of the fund's assets held in an individual stock "i" |

so that:

$$[3] \quad \bar{x} = \sum_{i=1}^N w_i x_i$$

$$[4] \quad \bar{y} = \sum_{i=1}^N w_i y_i$$

Because \bar{x} and \bar{y} represent the fund's weighted average value-growth orientation and size, in combination they determine the fund's Style Box™ assignment. For instance, a fund with an \bar{x} that falls in the value column of the Style Box™ is a value fund; a fund with an \bar{x} in the growth column is a growth fund. However, deciding which funds are blend funds is a little more complex.

Few or no funds contain only stocks with extreme value-growth orientation scores, and both value and growth managers often hold core stocks for diversification or other reasons. As a result, funds show less variation than stocks do on the x-axis; that is, funds tend to cluster nearer the middle of the x-axis.

It follows that the threshold points between value, blend and growth funds are closer to the center of the x-axis than are the threshold points between value, core and growth stocks. Therefore, when groups of funds are portrayed on the Morningstar Style Box™, the value and growth regions are expanded toward the center. The remaining “blend fund” region is narrower than the “core stock” region.

Let γ denote the ratio of the width of the blend fund region to the width of the core stock region. Currently Morningstar sets $\gamma = 0.5$ so that a fund is considered to be a “value fund” if $\bar{x} < 125$, a “growth fund” if $\bar{x} > 175$, and a “blend fund” if $125 \leq \bar{x} \leq 175$ (recall that value stocks have an x score less than 100 and growth stocks have an x score greater than 200).

The full nine-square fund scoring scheme:

| | | |
|---|---|---|
| $\bar{x} < 150 \left(1 - \frac{\gamma}{3}\right)$ $\bar{y} > 200$ | $150 \left(1 - \frac{\gamma}{3}\right) \leq \bar{x} \leq 150 \left(1 + \frac{\gamma}{3}\right)$ $\bar{y} > 200$ | $\bar{x} > 150 \left(1 + \frac{\gamma}{3}\right)$ $\bar{y} > 200$ |
| $\bar{x} < 150 \left(1 - \frac{\gamma}{3}\right)$ $100 \leq \bar{y} \leq 200$ | $150 \left(1 - \frac{\gamma}{3}\right) \leq \bar{x} \leq 150 \left(1 + \frac{\gamma}{3}\right)$ $100 \leq \bar{y} \leq 200$ | $\bar{x} > 150 \left(1 + \frac{\gamma}{3}\right)$ $100 \leq \bar{y} \leq 200$ |
| $\bar{x} < 150 \left(1 - \frac{\gamma}{3}\right)$ $\bar{y} < 100$ | $150 \left(1 - \frac{\gamma}{3}\right) \leq \bar{x} \leq 150 \left(1 + \frac{\gamma}{3}\right)$ $\bar{y} < 100$ | $\bar{x} > 150 \left(1 + \frac{\gamma}{3}\right)$ $\bar{y} < 100$ |

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Notes

- 1 The remaining stocks are assigned to the micro-cap band. VCG thresholds for small-cap stocks are used to determine micro-cap stock VCG assignments (see “Determining the Final Value-Core-Growth Assignment,” page 16).
- 2 Restated cash flow availability is limited to three years.
- 3 In the case of dividends, zero is considered a valid data point. If d_0 is zero, then d_1 is set to zero.
- 4 Micro-cap stocks are assigned a VCG orientation using small-cap threshold values.
- 5 Refer to the preceding “Determining Value-Core-Growth Orientation for U.S. Common Stocks,” pages 3–16, for a more detailed discussion of Morningstar’s stock classification methodology.