Morningstar Medalist Rating™
Methodology

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Contents

1 Overview
2 Forward-Looking Analysis
4 Methodology
8 Pillar Evaluation

Appendix A: Random Forest
Appendix B: Algorithmic Pillar Models
Appendix C: FAQ on Data Inputs to Algorithmic Model
Appendix D: FAQ on Eligibility for Algorithmic Rating Assignment
Appendix E: FAQ on Separately Managed Accounts Model
Appendix F: FAQ on Model Portfolios Model
Appendix G: Special Cases

Jeffrey Ptak
Chief Ratings Officer
+1 312 384-4928
jeffrey.ptak@morningstar.com

Lee Davidson
Chief Data & Analytics Officer
+1 312 244-7541
lee.davidson@morningstar.com

Chris Traulsen
Director of Ratings
+44 020 3107 0061
christopher.traulsen@morningstar.com

Madison Sargis
Head of Quantitative Research
+1 312 244-7352
madison.sargis@morningstar.com

Overview

Morningstar has conducted research on active and passive investment strategies and their associated vehicles since 1986. From November 2011, this research was expressed globally through the Morningstar Analyst Rating™ for funds, which Morningstar's manager research analysts assigned to strategies and vehicles that they qualitatively analyzed.

In 2017, Morningstar expanded its manager research with the launch of the Morningstar Quantitative Rating™ for funds, which used algorithmic techniques to assign ratings to strategies and vehicles that Morningstar's manager research analysts didn't cover. The Morningstar Quantitative Rating was designed specifically to mimic analyst decision-making as much as possible via a quantitative approach.

In 2023, Morningstar combined the Morningstar Analyst Rating and the Morningstar Quantitative Rating into a single, encompassing forward-looking rating, the Morningstar Medalist Rating.™

The Morningstar Medalist Rating

An essential complement to Morningstar's database of investment information and Morningstar's suite of quantitative research tools, such as the Morningstar Rating™ (the "star rating") and the Morningstar Style Box,™ the Morningstar Medalist Rating and accompanying research report:

- Identify active strategies Morningstar believes should be able to outperform their Morningstar Category index (for example, Russell 1000 for US large-cap blend equity strategies) on a risk-adjusted basis over time;
- Identify passive strategies that Morningstar believes should be able to outperform the majority of their Morningstar Category peers on a risk-adjusted basis over time;
- Call out strategies that Morningstar expects to underperform their Morningstar Category index on a risk-adjusted basis over time;
- Help investors and fund selectors understand the suitability of strategies for an intended purpose and give clear expectations for the likely behavior of strategies in different market environments;
- Place a strategy and its vehicles in comparative and historical context in terms of criteria such as expenses, manager tenure, investment style, and asset size; and
- Monitor strategies for changes that could materially affect the suitability and investment opinion.

Independent Research

Morningstar is committed to the principle of independence. Morningstar does not charge asset managers to rate their strategies and associated vehicles and does not permit asset managers to commission ratings from us. Morningstar commercializes its manager research by including ratings and reports in various products and services and through licensing its intellectual property.

Morningstar produces this analysis for the benefit of investors, advisors, and institutions, not asset managers. Morningstar separates its researchers from any commercial relationships the company may have with asset managers in order to avoid any real or perceived conflicts of interest. Morningstar's assessment aims to provide in-depth, accurate, and useful analysis that will help investors select strategies that will outperform, avoid those that will underperform, and build more cohesive portfolios. This analysis is independent and objective, conveying Morningstar's genuine opinion of a strategy and associated vehicles, including negative views when warranted.

Forward-Looking Analysis

The Morningstar Medalist Rating for funds is the summary expression of Morningstar's forward-looking analysis of investment strategies as offered via the specific vehicles. Vehicles can include but are not limited to open-end funds, closed-end funds, exchange-traded funds, and separately managed accounts domiciled throughout the world. The Medalist Rating does not express a view on a given asset class or peer group; rather, it seeks to evaluate each strategy and associated vehicle within the context of an appropriate benchmark and peer group.

Morningstar assigns Morningstar Medalist Ratings at the vehicle level to accurately capture the impact of fee differences on expected net-of-fee alpha between different types of vehicles, including different share classes of the same fund. Morningstar's research and academic studies have repeatedly shown that a vehicle's ability to outperform erodes as fees become higher. Morningstar's analysis of each specific vehicle under coverage ensures the most precise accounting possible of fees. For open-end funds, for example, this means that share classes of the same fund that charge different amounts may receive different Morningstar Medalist Ratings.

Morningstar expresses the Morningstar Medalist Rating on a five-tier scale running from Gold to Negative. For actively managed funds, Morningstar assigns Gold, Silver, and Bronze ratings to vehicles expected to add value, or "positive alpha," over the long term when compared with a relevant Morningstar Category index after accounting for fees and risk. For passive strategies, Morningstar assigns Gold, Silver, and Bronze ratings to vehicles expected to deliver alpha that exceeds the lesser of the category median net alpha, or zero, over the long term. (Morningstar defines "long term" as periods lasting at least five years.)

Morningstar Medalist Ratings should be interpreted as follows:

Rating	Actively Managed Vehicles	Passively Managed Vehicles
Gold Morningstar's top recommendations, these investments are expected to add the most value within their Morningstar Category.	Expected to deliver positive net alpha (versus the category index) that ranks among the top 15% of all active investments in the Morningstar Category expected to generate positive net alpha.	Expected to deliver net alpha (versus the category index) that exceeds the lesser of the Morningstar Category median net alpha or zero and ranks among the top 15% of all passive investments in the Morningstar Category expected to achieve the same.
Silver Just below Gold but still expected to add significant value within their Morningstar Category.	Expected to deliver positive net alpha (versus the category index) that ranks among the next 35% of all active investments in the Morningstar Category expected to generate positive net alpha.	Expected to deliver net alpha (versus the category index) that exceeds the lesser of the Morningstar Category median net alpha or zero and ranks among the next 35% of all passive investments in the Morningstar Category expected to achieve the same.
Bronze Not expected to perform as well as Gold or Silver but should add at least some value within their Morningstar Category.	Expected to deliver positive net alpha (versus the category index) that ranks in the bottom half of all active investments in the Morningstar Category expected to generate positive net alpha.	Expected to deliver net alpha (versus the category index) that exceeds the lesser of the Morningstar Category median net alpha or zero and ranks in the bottom half of all passive investments in the Morningstar Category expected to achieve the same.
Neutral Not expected to outperform within their Morningstar Category but shouldn't subtract as much value as Negative.	Expected to deliver negative net alpha (versus the category index) that ranks in the top 70% of all active investments in the Morningstar Category expected to generate no alpha or negative net alpha.	Expected to deliver net alpha (versus the category index) that falls shy of the lesser of the Morningstar Category median net alpha or zero and ranks in the top 70% of all passive investments in the Morningstar Category expected to fall shy.
Negative Expected to be the worst performers, subtracting significant value within their Morningstar Category.	Expected to deliver negative net alpha (versus the category index) that ranks in the bottom 30% of all active investments in the Morningstar Category expected to generate negative net alpha.	Expected to deliver net alpha (versus the category index) that falls shy of the lesser of the Morningstar Category median net alpha or zero and ranks in the bottom 30% of all passive investments in the Morningstar Category expected to fall shy.
Under Review Denotes a change at a rated strategy that requires further review to determine its impact on the rating.	N/A	N/A

Methodology

In more than two decades of manager research, Morningstar's global analyst team has identified three key areas that evidence suggests are crucial to predicting the future gross performance of strategies and their associated vehicles: People, Parent, and Process. These three pillars form the spine of Morningstar's research approach, with analysis coalescing around an evaluation of the strategy's management team, the parent firm, and the underlying investment process itself. In this way, the analysis considers not just each pillar in isolation but also the interaction between them, which is crucial to understanding a vehicle's overall merit.

To provide a consistent repeatable framework for the Morningstar Medalist Ratings, reflective of the opportunity set within their Morningstar category, Morningstar assigns ratings in three steps: 1) Assess the opportunity to add value; 2) Score pillars; 3) Derive the rating. Those three steps are described in further detail below.

Assess the Opportunity to Add Value

Different investment styles offer more or fewer opportunities to derive alpha from active management. US large-cap blend equity strategies, for example, have typically had a very difficult time generating alpha versus a relevant index such as the Russell 1000, and thus alphas in the category have a relatively low dispersion. On the other hand, global small-cap strategies have typically displayed a wider dispersion of alphas, indicative of a broader opportunity set.

To systematically assess the opportunity to add value, it is necessary to first define relevant peer groups that correspond to different investment styles. To do this, Morningstar aggregates Morningstar categories that have been assigned a similar Morningstar Category index. For example, Morningstar rolls up all US large-cap blend equity categories from vehicle universes in Europe, Asia, Australia, and the United States into a single aggregate group. This ensures similar vehicles are treated consistently worldwide and makes the peer groups more robust. These aggregate peer groups are used solely to assess the alpha opportunity for categories following highly similar indexes. (As further explained in this methodology, the remainder of ratings setting takes place within a vehicle's assigned Morningstar category.)

To assess the opportunity to add value within the aggregate peer group, Morningstar runs rolling three-year regressions of each constituent vehicle's gross-of-fee returns against the index chosen for the aggregate peer group concerned. From these regressions, Morningstar derives each vehicle's three-year gross alpha versus the index, repeating this for each rolling period and compiling this series of gross alphas for all other vehicles that are part of the aggregate peer group. (Morningstar runs these regressions on a periodic basis, adding new rolling three-year measurements to the historical series with the passage of time. The start date for the regression series is Jan. 1, 2002, or the first date thereafter in the case of peer groups created subsequently.)

Morningstar then uses the resulting range of gross alphas to estimate the potential that funds in the peer group can generate positive gross-of-fee alpha. This alpha-potential estimate, or APE, is the factor

used by Morningstar to adjust its estimate of a vehicle's gross alpha up or down based on the pillar ratings that it assigns to the vehicle. Higher pillar ratings push Morningstar's estimate higher by the magnitude of the APE, while, conversely, lower pillar ratings pull the estimate down by the amount of the APE.

These adjustments will be larger in categories that have higher APEs and lower in those with lower APEs. This ensures the impact of the pillar ratings on a vehicle's rating is proportionate to the size of the opportunity set in the peer group.

Morningstar calculates separate APEs for active and passive strategies in each aggregated peer group. These separate APEs are then applied to active and passive funds, respectively, in the relevant Morningstar Categories.

Score Pillars

Morningstar assigns scores to the People, Process, and Parent Pillars ranging from negative 2 to positive 2. Those scores correspond to the pillar ratings assigned to a vehicle based either on an analyst's qualitative assessment or the use of algorithmic techniques (as explained in further detail in the "Pillar Evaluation" section of this methodology). The pillar ratings take the form of Low, Below Average, Average, Above Average, and High.

Derive the Rating

Active Strategies

Morningstar starts with the assumption that a vehicle will deliver a gross-of-fee alpha of 0. The pillar scores are then used in conjunction with set pillar weights and the APE for the vehicle's assigned category to derive a gross-of-fee expected alpha. The pillars are weighted as follows for actively managed vehicles:

People:	45%
Process:	45%
Parent:	10%

The equation to derive an actively managed vehicle's expected gross-of-fee alpha is thus:

(0.45 * People Score * APE)
+ (0.45 * Process Score * APE)
+ (0.10 * Parent Score * APE)
= Expected gross-of-fee alpha
where "APE" = Alpha potential estimate for the peer group

To obtain expected net-of-fee alpha, Morningstar subtracts the relevant cost ratio from its estimate of expected gross-of-fee alpha.

Expected gross-of-fee alpha
- Expense ratio
= Expected net-of-fee alpha

Arithmetically, this means that expenses have as much weight in the net alpha calculation as the other three pillars combined.

Once Morningstar has estimated a vehicle's expected net-of-fee alpha, it compares that vehicle's expected net alpha with that of all other actively managed investments in its Morningstar category, over a 12-month average. This includes vehicles for which Morningstar has derived net alpha estimates using pillar scores that were assigned by algorithmic means. The vehicle's estimated net alpha must be positive for it to be eligible for a Gold, Silver, or Bronze rating; otherwise, it will be assigned a Neutral or Negative rating. Morningstar assigns ratings to actively managed vehicles as follows:

Gold	Top 15% of actively managed vehicles with positive expected net-of-fee alpha over a 12-month average
Silver	Next 35% of actively managed vehicles with positive expected net-of-fee alpha over a 12-month average
Bronze	Bottom 50% of actively managed vehicles with positive expected net-of-fee alpha over a 12-month average
Neutral	Top 70% of actively managed vehicles with negative or zero expected net-of-fee alpha over a 12-month average
Negative	Bottom 30% of actively managed vehicles with negative or zero expected net-of-fee alpha over a 12-month average

To prevent frequent ratings changes when offerings are near the threshold between ratings levels, Morningstar applies a buffer. For a more detailed description of the buffering procedure, see Appendix G: Special Cases.

Passive Strategies

Morningstar derives the rating for passive strategies using the same process as for actively managed strategies, but with a few differences. As with active strategies, Morningstar starts with the assumption that a passive investment will deliver a gross-of-fee alpha of 0. Similarly, the pillar scores are then used in conjunction with set pillar weights and the APE of passives for the vehicle's assigned category to derive a gross-of-fee expected alpha.

The process for deriving ratings for passive strategies differs from the process for deriving ratings for active strategies in the way pillars are weighted. To reflect the lesser importance of the management team to the success of passive strategies and, conversely, to emphasize the primacy of the underlying process, including index construction, Morningstar weights the pillars as follows:

People:	10%
Process:	80%
Parent:	10%

The equation to derive a passively managed vehicle's expected gross-of-fee alpha is thus:

(0.10 * People Score * APE)
+ (0.80 * Process Score * APE)
+ (0.10 * Parent Score * APE)
= Expected gross-of-fee alpha
where "APE" = Alpha potential estimate for the peer group

To obtain expected net-of-fee alpha, Morningstar subtracts the relevant cost ratio from its estimate of expected gross-of-fee alpha.

Expected gross-of-fee alpha
- Expense ratio
= Expected net-of-fee alpha

Once Morningstar has estimated a passive vehicle's expected net-of-fee alpha, it compares that vehicle's expected net alpha with that of all other passively managed investments in its Morningstar category over a 12-month average. This includes vehicles for which Morningstar has derived net alpha estimates using pillar scores that were assigned by algorithmic means. To be eligible for a Gold, Silver, or Bronze rating, a passively managed vehicle's estimated net alpha must exceed the lesser of the Morningstar category's median net alpha or zero; otherwise, it will be assigned a Neutral or Negative rating. Morningstar assigns ratings to passively managed vehicles as follows:

Gold	Top 15% of passive vehicles whose expected net alpha exceeds lesser of zero or category median net alpha over a 12-month average
Silver	Next 35% of passive vehicles whose expected net alpha exceeds lesser of zero or category median net alpha over a 12-month average
Bronze	Bottom 50% of passive vehicles whose expected net alpha exceeds lesser of zero or category median net alpha over a 12-month average
Neutral	Top 70% of passive vehicles whose expected net alpha does not exceed lesser of zero or category median net alpha over a 12-month average
Negative	Bottom 30% of passive vehicles whose expected net alpha does not exceed lesser of zero or category median net alpha over a 12-month average

Strategic-beta strategies are vehicles that track indexes employing rules-based strategies to generate excess returns. Given this, when assigning ratings to strategic-beta strategies, Morningstar follows the approach outlined for passive strategies above, including applying the relevant pillar weightings. However, instead of sorting and ranking strategic-beta vehicles against other passively managed, non-strategic-beta vehicles in the same Morningstar category, Morningstar sorts and ranks strategic-beta vehicles against actively managed strategies in the same Morningstar category.

To prevent frequent ratings changes when offerings are near the threshold between ratings levels, Morningstar applies a buffer. In addition, Morningstar caps the ratings of passively managed vehicles in certain circumstances. For a more detailed description of the buffering and ratings-cap procedures, see Appendix G: Special Cases.

Performance and Price

Morningstar evaluates a vehicle's performance as part of its overall assessment. However, performance is not a distinct pillar. Rather, Morningstar considers performance within the context of the other pillar assessments it conducts, notably People and Process. This ensures that performance doesn't play an outsize role in the overall assessment while tying performance analysis to factors that Morningstar's research has found are better predictors of future outcomes, like the prudence and repeatability of a vehicle's investment approach; the depth, breadth, and continuity of the management team implementing the strategy; and the investor-centricity of the parent firm that stands behind the vehicle concerned.

Likewise, Morningstar takes fees into account when assigning ratings to vehicles but does not maintain a separate Price Pillar. The reason for this is that Morningstar accounts for fees arithmetically, subtracting them from its estimate of a vehicle's expected gross alpha. In this way, fees have as much weight in the calculation as the other three pillars combined and are incorporated in a way that mirrors how they reduce gross investment returns basis point for basis point in practice.

Special Cases

For further information on cases where Morningstar adapts the ratings assignment process to special circumstances that may arise, see Appendix G: Special Cases.

Pillar Evaluation

The following sections detail the process by which Morningstar assigns pillar ratings to vehicles. Broadly speaking, Morningstar assigns pillar ratings to vehicles in one of three ways:

Approach	Description
Directly, by Analysts	Pillar ratings assigned by analysts to vehicles they cover, based on their qualitative assessment. When analysts cover a vehicle, they assign all three pillars: People, Process, and Parent.
Indirectly, by Analysts	Pillar ratings assigned to vehicles that are not covered directly by analysts. This is achieved by mapping the pillar ratings analysts have assigned to vehicles they cover to uncovered vehicles that are related in some way to the vehicles they cover. These relationships can take a few forms, such as when an uncovered vehicle follows the same strategy as a covered vehicle, when an uncovered vehicle is managed by the same team that runs a covered vehicle, or when an uncovered vehicle shares the same parent firm as a covered vehicle.
Directly, by Algorithm	Pillar ratings assigned algorithmically to vehicles not assigned pillar ratings directly or indirectly by an analyst.

For any given pillar—for example, Process—a pillar rating may be assigned either by an analyst—directly or indirectly—or by algorithm, but not both. In other words, a vehicle will not receive a pillar rating assigned by an analyst and a pillar rating assigned algorithmically for the same pillar. Rather, it

will receive one or the other, depending on whether the vehicle is being directly or indirectly covered by analysts.

That said, it is possible for a vehicle to receive one or more pillar ratings assigned indirectly by analysts and one or more pillar ratings assigned algorithmically. For instance, an uncovered vehicle could be indirectly assigned People and Process Pillar ratings and directly assigned a Parent Pillar rating by the algorithm.

The Analyst-Driven % data point displays the weighted percentage of a vehicle's pillar ratings assigned directly or indirectly by analysts. For example, if the People and Parent ratings are assigned directly or indirectly by analysts but the Process rating is assigned algorithmically, the Analyst-Driven % for an actively managed vehicle would disclose that 55% of the pillar weight was assigned by analysts and the Analyst-Driven % for a passively managed vehicle would disclose that 20% of the pillar weight was assigned by analysts.

The following sections describe the pillar evaluation process under each of these three approaches in further detail.

Pillar Assignment: Directly, by Analysts

This section explains how Morningstar determines which vehicles it will assign to analysts for coverage and provides an overview of the assessments analysts make when evaluating the People, Process, and Parent Pillars in assigning ratings to the vehicles they cover.

How Morningstar Makes Coverage Decisions

As Morningstar analysts only directly assign pillar ratings to vehicles on their coverage lists, it is worth taking a moment to review the principles Morningstar follows in determining which vehicles will be covered by analysts.

In making coverage decisions, Morningstar seeks to ensure that users of its research have access to analysis on a broad spectrum of vehicles that are important to them and meet their needs for portfolio construction. Hence, Morningstar doesn't determine coverage strictly based on quantitative screens of investment returns, net assets, or performance history. Moreover, analyst teams have ample discretion in determining their coverage universe, focusing on investment merit, investor interest, and client demand.

Although these criteria can tilt coverage toward vehicles that are larger in terms of assets under management, analysts will cover new and/or small vehicles if they have merit. In addition, Morningstar frequently canvasses its analyst team, internal consulting units, and external users of Morningstar's research to identify offerings that might merit coverage. Regional coverage committees internal to the manager research team must approve all coverage decisions.

People

The overall quality of a strategy's investment team is a significant key to a strategy's ability to deliver superior performance relative to its benchmark and/or peers. Evaluating an investment team requires

that analysts assess, among other things, the individuals who make the key decisions on the portfolio; if there is more than one person in charge, how conflicts are resolved; resources that directly support the managers' work on the strategy; other resources that are not part of the team; the expertise and relevance of available resources to the strategy; and how incentive pay influences decision-making and team stability.

The relevant personnel are judged along several axes:

- Experience & ability
- Fit & structure
- Workload
- Communication/information flow
- Temperament
- Alignment of interests
- Key-person risk
- Team stability

Process

Morningstar analysts are style-agnostic, meaning that, for equity strategies, they do not prefer value to growth or momentum, or vice versa. For fixed-income strategies, both high-quality and credit-sensitive styles are viable. For multi-asset strategies, a wide range of approaches to asset allocation can succeed. Analysts look for strategies with a performance objective and investment process (for both security selection and portfolio construction) that is sensible, clearly defined, and repeatable. It must also be implemented effectively. In addition, the portfolio should be constructed in a manner that is consistent with the investment process and performance objective. Analysts seek to understand the context in which managers think about risk and how this is expressed when constructing the portfolio. Morningstar analysts make extensive use of Morningstar's global database and holdings-based analytical capabilities to evaluate the portfolio. Analysts look for strategies with a process distinctive enough to generate standout results in the future.

More specifically, analysts seek to understand:

- The investment philosophy that underpins the strategy;
- The key "edge" of the process as executed by the manager;
- Elements that are systematic and repeatable, if any;
- The fit of the process with the resources backing the strategy and with the size of the asset base tied to the strategy (including all vehicles across all domiciles);
- Whether the process has been consistently applied, as demonstrated by the composition of the portfolio over time;
- The risks entailed in the process, from a portfolio-bias point of view and from an ability-to-execute point of view;
- The managers' approach to risk management;

- Analysts' expectations for performance in different market environments assuming the process is adhered to;
- Whether there is reason to believe the process can add value across the cycle versus the relevant benchmark or category on a risk-adjusted basis;
- The suitability of the strategy for different types of investors given the risks one would expect to see in its portfolio; and
- Any historical changes in approach or style, and the reasons for those changes.

Parent

Morningstar believes the parent organization is important in evaluating both active and passive funds. Although other factors may have more immediate impact, they would not be durable without backing from the asset-management firm. Further, the asset manager and its management set the tone for key elements of Morningstar's evaluation, including capacity management, risk management, recruitment and retention of talent, and firmwide policies, such as incentive pay, which drive or impede the alignment of the firm's interests with those of fund investors.

Beyond these operational areas, Morningstar analysts prefer firms that have a culture of stewardship and put investors first to those that are too heavily weighted to salesmanship. The former tend to operate within their circle of competence, do a good job of aligning manager interests with those of investors in their funds, charge reasonable fees, communicate well with strategy investors, and treat investors' capital as if it were their own. Firms oriented to putting their own interests too much to the fore might be characterized by their view of investors as sales opportunities—they tend to offer faddish products in an attempt to gather assets and have higher charges and incentive programs that do a poor job of aligning managers' interests with those of investors. Although relatively few firms fall obviously to one extreme or another, determining where an asset manager falls on the spectrum is a key part of the parent research approach.

Key areas of evaluation include:

- Recruitment and retention of talent
- Organizational structure
- Capacity management
- Organizational and business strategy
- Quality of product lineup
- Alignment of interests with investors
- Regulatory compliance
- Investment/group culture

Pillar Assignment: Indirectly, by Analyst

In some circumstances, Morningstar will map pillar ratings assigned to vehicles that are not covered directly by analysts. This is achieved by mapping the pillar ratings that analysts have assigned to vehicles they cover to uncovered vehicles that are related in some way to the vehicles they cover.

These relationships can take a few forms, such as when an uncovered vehicle follows the same strategy as a covered vehicle; when an uncovered vehicle is managed by the same team that runs a covered vehicle; or when an uncovered vehicle shares the same parent firm as a covered vehicle.

The following table explains these relationships, breaking the mapping down by strategy type and pillars that are mapped.

Strategy type	Pillar(s) Mapped	Description
Actively managed and passively managed	People and Process	When an analyst covers a vehicle that follows a given strategy (as codified by Morningstar's StrategyID data point), Morningstar maps the covered vehicle's People and Process Pillar ratings to any other uncovered vehicles that follow the same strategy (that is, share the same StrategyID). This ensures that the analyst's view is leveraged whenever available and promotes consistency when assigning People and Process Pillar ratings to vehicles that follow the same strategy.
Actively managed and passively managed	Parent	When an analyst covers a vehicle that is associated with a given parent firm (as codified by Morningstar's BrandingID data point), Morningstar maps the covered vehicle's Parent Pillar ratings to any other uncovered vehicles associated with the same parent (that is, share the same BrandingID). This ensures that the analyst's view is leveraged whenever available and promotes consistency when assigning Parent Pillar ratings to vehicles associated with a given parent firm.
Actively managed only	People	When an analyst covers a vehicle that is managed by a given individual (as codified by Morningstar's PersonID data point), Morningstar associates the People Pillar rating assigned to that vehicle with the manager concerned.[1] Morningstar then maps the People Pillar rating associated with a given manager (identified by the PersonID data point) to any other uncovered vehicles on which the manager's name (that is, PersonID) appears, provided the uncovered vehicles are not following the same strategy (that is, do not share the same StrategyID) as any of the covered vehicles from which the manager's People Pillar rating was mapped. To arrive at the overall People Pillar rating for an uncovered vehicle being run by multiple managers, Morningstar averages the People Pillar ratings associated with each PersonID data point, weighting by manager tenure. This ensures that the analyst's view is leveraged whenever available and promotes consistency when assigning People Pillar ratings to vehicles associated with a given manager. In these cases, if the longest-tenured manager is covered directly by an analyst on any other strategy, the People Pillar rating is considered mapped from an analyst.
Passively managed only	People	When an analyst covers a vehicle that is managed by a given individual, Morningstar associates the People Pillar rating assigned to that vehicle with the manager concerned. Morningstar then maps the People Pillar rating associated with a given manager to any other uncovered vehicles at the same firm on which the manager's name appears,

1 Analyst-assigned People Pillar ratings are assumed to apply equally to all named managers for a covered vehicle and are associated with each individual manager's PersonID. If a given manager is part of more than one team and those teams are assigned different People Pillar ratings by analysts covering those vehicles, Morningstar takes an average of the different People Pillar ratings and associates that average with the PersonID. When an analyst-assigned People rating is not available for a given manager, Morningstar assigns a People Pillar rating algorithmically, associating it with that PersonID.

Strategy type	Pillar(s) Mapped	Description
		provided the uncovered vehicles are not following the same strategy (that is, do not share the same StrategyID) as any of the covered vehicles from which the manager's People Pillar rating was mapped and the uncovered vehicles are in the same asset class as the covered vehicles. This ensures that the analyst's view is leveraged whenever available and promotes consistency when assigning People Pillar ratings to vehicles associated with a given manager.
Passively managed only	Process	When an analyst covers a passively managed vehicle that tracks a particular index (as codified by Morningstar's IndexID data point), Morningstar associates the Process Pillar rating assigned to that vehicle with the index concerned. Morningstar then maps the Process Pillar rating associated with a given index (identified by the IndexID data point) to any other uncovered passively managed vehicles that track the same index (that is, share the same IndexID), provided the uncovered vehicles are not following the same strategy (that is, do not share the same StrategyID) as any of the covered vehicles from which the index's Process Pillar rating was mapped. This ensures that the analyst's view is leveraged whenever available and promotes consistency when assigning Process Pillar ratings to passively managed vehicles associated with a given index.

Pillar Assignment: Directly, by Algorithm

Morningstar has developed a machine-learning model to expand its coverage beyond ratings assigned directly or indirectly by analysts. The model algorithmically derives pillar ratings for vehicles not assigned ratings directly or indirectly by analysts. It does so by using the decision-making processes of analysts, their past ratings decisions, and the data used to support those decisions. These pillar ratings are then used to derive each vehicle's Morningstar Medalist Rating as described elsewhere in this methodology.

With this algorithmic approach, Morningstar can rate more than 10 times more vehicles than would be feasible through analyst coverage alone. Additionally, the algorithmic approach allows for monthly updates of each vehicle's rating, a much higher frequency than the roughly annual update schedule that analysts observe when assigning ratings. When pillar scores are assigned directly, by algorithm, the overall rating is assessed on a monthly cadence—utilizing a month-end date, on an approximate one-month lag.

To be eligible for pillar ratings assigned by algorithm, a vehicle must meet the following requirements:

- It must be classified as one of the following investment types: open-end funds, exchange-traded funds, separately managed accounts, model portfolios, variable annuity subaccounts, and variable life subaccounts.
- It must not currently have a pillar rating assigned directly or indirectly by an analyst.
- It must reside in a Morningstar category that Morningstar has classified as eligible to receive ratings. (Some Morningstar categories are ineligible for ratings.)

Algorithmic Pillar Evaluation Methodology

Morningstar uses a series of six individual models working in unison to algorithmically assess a vehicle and assign the People, Process, and Parent Pillar ratings to it. The models are designed to provide a best

approximation for the analyst's evaluation of the same pillars were the analysts to cover it. Morningstar Medalist Ratings are derived from the pillar ratings as specified elsewhere in this methodology.

To estimate the pillar ratings, Morningstar uses a machine-learning algorithm known as a "random forest" to fit a relationship between the vehicle's pillar ratings and its attributes. (For further details on the random forest model methodology, see Appendix A: Random Forest.) For each pillar, two random forest models were estimated that seek to determine the probability that the fund will be rated Positive or Negative, respectively. There are three pillars, so Morningstar estimates six individual random forest models to answer these questions and produce six probabilities. Then, at the pillar level, Morningstar aggregates these probabilities to produce one overall pillar rating.

To estimate the pillar ratings, Morningstar collects data from vehicles with analyst-assigned pillar ratings. In total, 180-plus attributes and 10,000-plus rating updates were considered in order to train the random forest model. After numerous iterations, only the attributes most crucial to classifying each pillar rating were retained. (For further details on the pillar rating estimation process, see Appendix B: Algorithmic Pillar Models.)

Each pillar rating is estimated using a combination of two random forest models. First, a model is estimated that seeks to distinguish vehicles based on whether that vehicle's pillar rating would be rated Positive, defined as High or Above Average. Second, a different model is estimated that seeks to distinguish vehicles based on whether that vehicle's pillar rating would be rated Negative, defined as Low or Below Average. Each model puts out probability scores that the vehicle would be Positive or Negative. By combining these two probabilities via a weighted summation, a more robust estimator is achieved.

$$Estimated\ Pillar\ Rating = \frac{(Prob(Positive)+[1-Prob(Negative)]}{2}$$

The output for these pillar ratings will, therefore, be on a scale of 0 to 1. The closer to 1 a vehicle's estimated pillar rating is, the more likely it is that the true pillar rating is High. Similarly, the closer to 0 a vehicle's estimated pillar rating is, the more likely that the true pillar rating is Low. After the ratings were computed, thresholds were assigned that tended to correspond to natural distinctions between the five rating options for each pillar.

The intuition underlying this method is subtle, yet important. First, the weighted summation captures information about a vehicle along two dimensions—the likelihood that a vehicle's pillar is High and the likelihood that a vehicle is not Low. In practice, this has the result of classifying many Average pillars as decidedly not High and not Low.

Furthermore, by using two models to estimate a pillar rating, Morningstar can distinguish between data points that are important to each model individually. It makes intuitive sense that the data points that might lead an analyst to assign a High rating could be different from those that might lead the analyst to assign a Low rating. By adding that flexibility, the model's estimation is improved. Empirically, several

pillar models exhibited significant overlap in data points used to estimate each model, but that did not always hold.

People and Process Pillar Business Logic

Morningstar implements business rules to ensure that People and Process Pillar ratings do not vary between related vehicles, such as different share classes of the same fund. Morningstar also implements business rules to prevent People ratings from varying within portfolio management teams.

Technically, each fund share class will have its own People and Process Pillar scores produced by the model, but steps are taken to ensure that these are consistent for the same fund. To ensure this, Morningstar implements an asset-weighted average of raw People and Process Pillar scores across share classes with the weights determined by share class-level net assets. In the case where net assets are not available, share class-level ratings will be equally weighted. To ensure the People Pillar rating is applied consistently to a team, Morningstar creates manager-level scores by averaging the People Pillar scores of the funds they manage. Morningstar then rolls back up People Pillar scores for funds by averaging the manager scores, weighted by tenure. For funds that do not report the manager names, this logic is not applied. The final raw pillar scores, after smoothing, asset-weighting, and adjusting for teams, are saved as the pillar rating estimate for the current month for each fund share class.

For passive investments, the analyst team assigns the same People Pillar to all products linked to a firm. To mimic this behavior, the algorithmic system will assign the same People rating to all passive investments within an asset class at a firm. (This is done within asset classes to acknowledge that subject-matter expertise can vary by asset class within firms.) Similarly, the analyst team assigns the same Process Pillar to all index products tracking the same benchmark. The algorithmic system applies the same logic by averaging all raw Process Pillar scores tied to a primary prospectus benchmark.

For passive investments, Morningstar also implements business rules to ensure consistency between Process Pillar ratings issued directly by analysts, those inherited indirectly from analysts, or those algorithmically generated. If the analyst team assigns the Process a rating of Below Average or lower, the strategy will not be eligible for a Medalist Rating above Neutral in our system. We have codified this rule to apply to all Medalist Ratings whether algorithmic or analyst-generated—if an investment is issued a Process Pillar rating of Below Average or lower, its overall rating will be capped at Neutral across all Medalist Ratings. In addition, algorithmically assigned People scores are limited to Above Average for passive investments.

Parent Pillar Business Logic

Morningstar implements business rules to ensure consistency between Parent Pillar ratings issued directly by analysts and those inherited indirectly from analysts or those algorithmically generated. If the analyst team assigns the Parent a rating of Low, none of that Parent's investment vehicles will receive a Medalist Rating above Neutral in our system. We have codified this rule to apply to all Medalist Ratings whether algorithmic or analyst-generated—if an investment is issued a Parent Pillar rating of Low, its overall rating will be capped at Neutral across all Medalist Ratings.

Smoothing Algorithm

After raw pillar scores have been computed, a smoothing algorithm is utilized to reduce intermonth volatility. This algorithm takes the average of the current raw pillar scores and the two prior months' raw pillar scores to create a three-month moving average. The three-month moving average was chosen to balance the desire to reduce unnecessary volatility of ratings from month to month and allow the ratings to be adaptable to significant changes at the fund, such as a manager change.

Pillar Threshold

For those pillars where an Analyst Rating is not available, pillar ratings (High, Above Average, Average, Below Average, or Low) are assigned according to a static threshold to the raw pillar scores using a symmetric distribution of 10%, 22.5%, 35%, 22.5%, and 10%.

If raw pillar score ≤ 0.10, then 1—Low
If 0.10 < raw pillar score ≤ 0.325, then 2—Below Average
If 0.325 < raw pillar score ≤ 0.675, then 3—Average
If 0.675 < raw pillar score ≤ 0.90, then 4—Above Average
If raw pillar score > 0.90, then 5—High

Pillar Buffers

To stabilize the pillar ratings of vehicles whose raw pillar scores sit near the breakpoints, a buffering system is utilized. For the Parent Pillar, the buffer is 5%; for the People Pillar, the buffer is 7.5%; and for the Process Pillar, the buffer is 7.5%. A vehicle near a pillar threshold must move past the buffer before the rating changes. For example, a vehicle below the 10.0 percentile for Parent must move to the 15.0 percentile before the pillar rating upgrades to Below Average from Low. Similarly, a vehicle above the 10.0 percentile will need to move below the 5.0 percentile before being downgraded to Low from Below Average.

Data Coverage

The Data Coverage % data point is a summary metric describing the level of data completeness used to generate the overall rating. If the pillar is assigned directly or indirectly by analysts, the pillar has complete data availability, as no model was used to estimate the pillar score. If the pillar is assigned directly by algorithm, Morningstar counts the number of data points feeding both the positive and negative models and counts whether the vehicle has strategy-specific data available. A simple percentage is calculated per pillar. Each pillar-completeness metric is scaled by the weights listed in the section "Derive the Rating." For example, consider an active fund where all three pillar ratings are indirectly assigned by an analyst. In that scenario, the Data Coverage % data point would be 100%. However, if the analyst coverage changed and the People Pillar was no longer indirectly assigned by an analyst, then the People Pillar would be assigned directly by an algorithm. Across both the Positive and Negative People models, the algorithm uses 28 data points. Suppose the fund has all the input data for those data points except for the Manager Excess Return – 5-Year data point, which appears in both the Positive and Negative models. Under that scenario, Morningstar would have coverage of 26 out of 28 required People Pillar data points, or 92.9%. Since the People Pillar is a 45% weight for active funds, that would mean the overall data coverage would be 96.9% (45% for the Process Pillar plus 10% for the Parent Pillar plus 41.9% for the People Pillar).

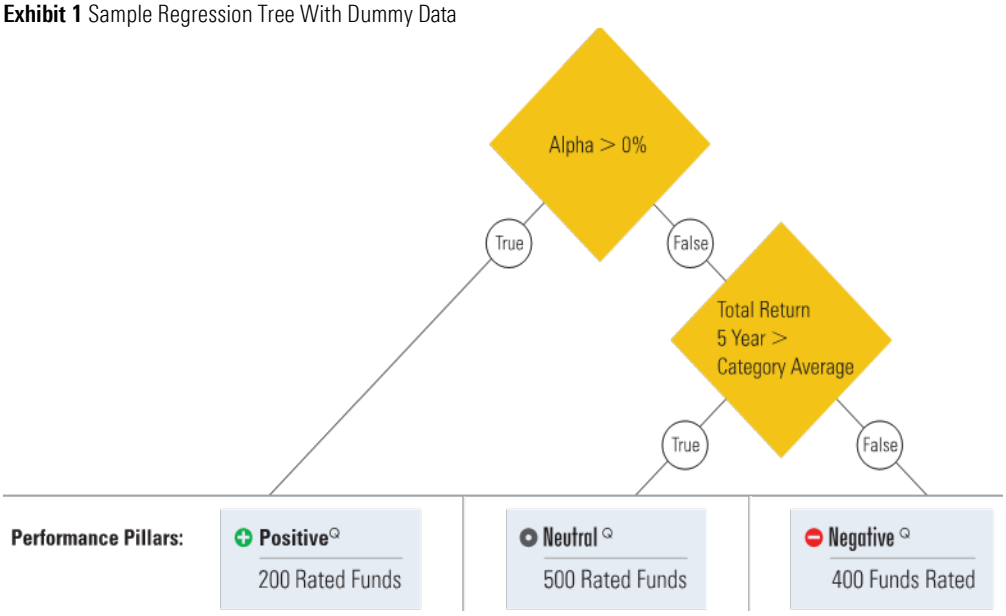
Appendix A: Random Forest

A random forest is an ensemble model, meaning its end prediction is formed based on the combination of the predictions of several submodels. In the case of a random forest, these submodels are typically regression or classification trees (hence the "forest" in "random forest"). To understand the random forest model, we must first understand how these trees are fit.

Regression Trees

A regression tree is a model based on the idea of splitting data into separate buckets based on your input variables. A visualization of a typical regression tree is shown in Exhibit 1. The tree is fit from the top down, splitting the data into a more complex structure as you go. The end nodes contain groupings of records from your input data. Each grouping contains records that are similar to each other based on the splits that have been made in the tree.

Exhibit 1 Sample Regression Tree With Dummy Data



Source: Morningstar, Inc.

How Are Splits Determined?

The tree is composed of nodes that then are split until they reach terminal nodes that no longer split. Each split represents a division of our data based on a particular input variable, such as alpha, or total return five-year versus the category average (Exhibit 1). The algorithm determines where to make these splits by attempting to split our data using all possible split points for all of the input variables, and it chooses the split variable and split point to maximize the difference between the variance of the unsplit data and the sum of the variances of the two groups of split data as shown in the following function.

$$VarDiff = \frac{\sum(y - \bar{y}_{presplit})^2}{N_{presplit}} - \left[\frac{\sum(y - \bar{y}_{left})^2}{N_{left}} + \frac{\sum(y - \bar{y}_{right})^2}{N_{right}}\right]$$

Intuitively, we want the split that maximizes the function because the maximizing split is the one that reduces the heterogeneity of our output variable the most. That is, the companies that are grouped on each side of the split are more like each other than the grouping before the split.

A regression or classification tree will generally continue splitting until a set of user-defined conditions has been met. One of the conditions for this tree is the significance of the split. That is, if the split does not reduce heterogeneity beyond a user-defined threshold, then it will not be made. Another condition commonly used is to place a floor on the number of records in each end node. These conditions can be made more or less constrictive in order to tailor the model's bias-variance trade-off.

How Are the End-Node Values Assigned?

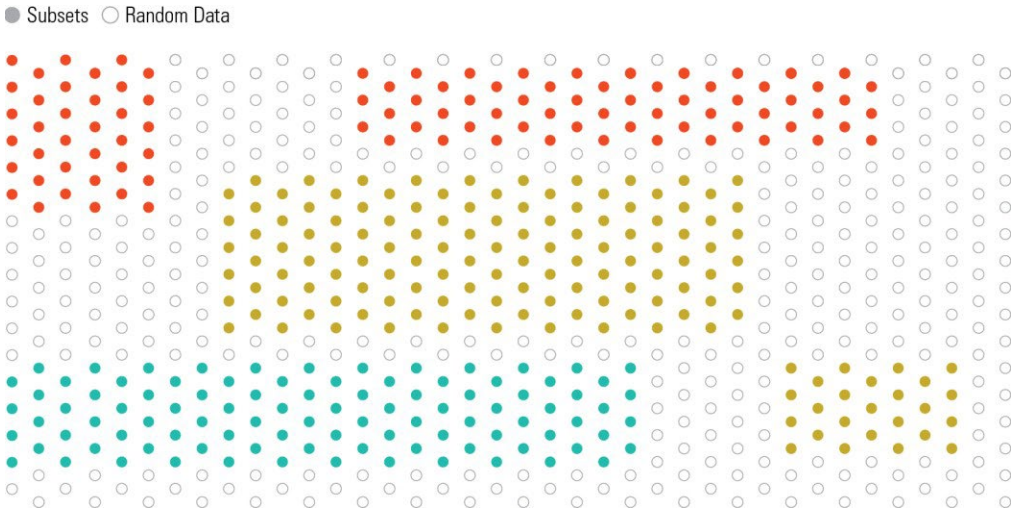
Each tree, once fully split, can be used to generate predictions on new data. If a new record is run through the tree, it will inevitably fall into one of the terminal nodes. The prediction for this record then becomes the arithmetic mean of the output variable for all of the training set records that fell into that terminal node.

Aggregating the Trees

Now that we understand how trees are fit and how they can generate predictions, we can move further in our understanding of random forests. To arrive at an end prediction from a random forest, we first fit N trees (where N can be whatever number desired—in practice, 100 to 500 are common values), and we run our input variables through each of the N trees to arrive at N individual predictions. From there, we take the simple arithmetic mean of the N predictions to arrive at the random forest's prediction.

A logical question at this point is: Why would the N trees we fit generate different predictions if we give them the same data? The answer is: They wouldn't. That's why we give each tree a different and random subset of our data for fitting purposes (this is the “random” part of “random forest”). Think of your data as represented in Exhibit 2.

Exhibit 2 Sample Random Forest Data Representation



Source: Morningstar, Inc.

A random forest will choose random chunks of your data, including random cross-sectional records as well as random input variables, as represented by the highlighted sections in Exhibit 2, each time it attempts to make a new split. While Exhibit 2 shows three random subsets, the actual random forest model would choose N random subsets of your data, which may overlap, and variables selected may not be adjacent. The purpose of this is to provide each of your trees with a differentiated dataset and thus a differentiated view of the world.

Ensemble models use a "wisdom of crowds" type of approach to prediction. The theory behind this approach is that many "weak learners," which are only slightly better than random at predicting your output variable, can be aggregated to form a "strong learner" so long as the weak learners are not perfectly correlated. Mathematically, combining differentiated, better-than-random, weak learners will always result in a strong learner or a better overall prediction than any of your weak learners individually. The archetypal example of this technique is when a group of individuals is asked to estimate the number of jelly beans in a large jar. Typically, the average of a large group of guesses is more accurate than a large percentage of the individual guesses.

Random forests can also be used for classification tasks. They are largely the same as described in this appendix except for the following changes: Slightly different rules are used for the splitting of nodes in the individual tree models (Gini coefficient or information gain), and the predictor variable is a binary 0 or 1 rather than a continuous variable. This means that the end predictions of a random forest for classification purposes can be interpreted as a probability of being a member of the class designated as 1 in your data.

Appendix B: Algorithmic Pillar Models

Parent Pillar Model

What are the algorithmic Parent Pillar threshold values?

The threshold values for the Parent Pillar are set using a symmetric distribution: 10%, 22.5%, 35%, 22.5%, and 10%. The breakpoints for the labels are below:

If raw pillar score ≤ 0.10, then 1—Low

- If 0.10 < raw pillar score ≤ 0.325, then 2—Below Average
- If 0.325 < raw pillar score ≤ 0.675, then 3—Average
- If 0.675 < raw pillar score ≤ 0.90, then 4—Above Average
- If raw pillar score > 0.90, then 5—High

What variables are used in each of the random forest models (Positive and Negative)?

Each model's variables and their ranked relative importance are shown below. Average Actual Management Fee Rank and Average Net Expense Ratio Rank are the most important inputs to the Positive Parent Pillar and Negative Parent Pillar model, respectively.

Exhibit 3 Ranked Importance Input Variable for the Quantitative Parent Pillar Model

Parent	Positive	Negative
% Net Assets Team Managed	10	8
% Funds With a Management Change TTM	20	21
Asset-Weighted Manager Tenure	13	5
Average Actual Management Fee Rank	1	6
Average Net Expense Ratio Rank	2	1
Average Max Management Fee Rank	9	7
Average Prospectus Operating Expense Ratio Rank	5	3
Average Manager Tenure	14	4
Average Morningstar Rating 3 Yr	19	20
Average Morningstar Rating 5 Yr	12	14
Average Morningstar Rating 10 Yr	16	9
Average Morningstar Rating Overall	17	16
Average Number of Months Since Manager Change	15	11
Firm Age	11	2
Retention 5 Yr	6	10
Risk-Adjusted Success Ratio 3 Yr	18	18
Risk-Adjusted Success Ratio 5 Yr	4	15
Risk-Adjusted Success Ratio 10 Yr	8	12
Success Ratio 3 Yr	21	19
Success Ratio 5 Yr	7	13
Success Ratio 10 Yr	3	17

Source: Morningstar, Inc. Data as of May 28, 2024.

People Pillar Model

What are the algorithmic People Pillar threshold values?

The threshold values for the People Pillar are set using a symmetric distribution: 10%, 22.5%, 35%, 22.5%, and 10%. The breakpoints for the labels are below:

If raw pillar score < 0.10, then 1—Low

- If 0.10 < raw pillar score ≤ 0.325, then 2—Below Average
- If 0.325 < raw pillar score ≤ 0.675, then 3—Average
- If 0.675 < raw pillar score ≤ 0.90, then 4—Above Average
- If raw pillar score > 0.90, then 5—High

What variables are used in each of the random forest models (Positive and Negative)?

Each model's variables and their ranked relative importance are shown below. Success Ratio – 5 Year and Average Morningstar Rating Overall are the most important inputs for the Positive People Pillar and Negative People Pillar model, respectively. Please note that Manager Investment and Manager Investment – 1 Million are currently limited to funds domiciled in the United States.

Exhibit 4 Ranked Importance of Input Variables for the Quantitative People Pillar Model

People	Positive	Negative
Actual Management Fee Rank	8	9
Alpha 10 Yr - Category Average	13	—
Asset-Weighted Manager Tenure	4	—
Average Manager Tenure	—	—
Average Morningstar Rating 5 Yr	—	5
Average Morningstar Rating 10 Yr	2	—
Average Morningstar Rating Overall	—	1
Index Fund	15	13
Max Management Fee Rank	9	7
Manager Excess Return 3 Yr	10	6
Manager Excess Return 5 Yr	7	10
Manager Experience	5	3
Manager Investment	—	12
Manager Investment - 1 Million	14	—
Net Expense Ratio Rank	11	11
Number of Months Since Management Change	6	2
Retention 5 Yr	3	8
Success Ratio 5 Yr	1	—
Team Size	12	4

Source: Morningstar, Inc. Data as of Sept. 30, 2022.

Process Pillar Model

What are the algorithmic Process Pillar threshold values?

The threshold values for the Process Pillar are set using a symmetric distribution: 10%, 22.5%, 35%, 22.5%, and 10%. The breakpoints for the labels are below:

If raw pillar score < 0.10, then 1—Low

- If 0.10 < raw pillar score ≤ 0.325, then 2—Below Average
- If 0.325 < raw pillar score ≤ 0.675, then 3—Average
- If 0.675 < raw pillar score ≤ 0.90, then 4—Above Average
- If raw pillar score > 0.90, then 5—High

What variables are used in each of the random forest models (Positive and Negative)?

Each model's variables and their ranked relative importance are shown below. Average Morningstar Rating – 10 Year and Average Morningstar Rating Overall are the most important inputs for the Positive Process Pillar and Negative Process Pillar model, respectively.

Exhibit 5 Input Variable Importance for the Quantitative Process Pillar Model

Process	Positive	Negative
% Assets in Top 10 Holdings	—	2
Alpha 10 Yr - Category Average	9	—
Alpha 5 Yr - Category Average	8	6
Alpha 5 Yr - MPT Benchmark	7	4
Asset-Weighted Manager Tenure	6	—
Average Actual Management Fee Rank	—	13
Average Max Management Fee Rank	—	10
Average Morningstar Rating 10 Yr	1	—
Average Morningstar Rating Overall	—	1
Average Net Expense Ratio Rank	—	5
Average Prospectus Operating Expense Ratio Rank	—	7
Index Fund	13	16
Information Ratio 5 Yr - Category Average	—	3
Information Ratio 5 Yr - MPT Benchmark	11	—
Manager Experience	4	11
Max Management Fee Rank	—	12
Net Expense Ratio Rank	—	14
Number of Months Since Management Change	5	9
Retention 5 Yr	3	8
Risk-Adjusted Success Ratio 5 Yr	2	—
Team Managed	14	17
Team Size	12	15
Trailing 5 Yr Return Rank	10	—

Source: Morningstar, Inc. Data as of Sept. 30, 2022.

Appendix C: FAQ on Data Inputs to Algorithmic Model

Are all the input variables used in each pillar model?

No. The input variables depend on the pillar model. For example, Manager Investment is only used within the Negative People model. The binary signal of investment helps the model sort between Negative-rated People scores. On the other hand, Manager Investment – 1 Million is only used within the Positive People model to help discern the positively rated People scores.

How does Morningstar normalize the input data?

After all data is calculated and collected, Morningstar cross-sectionally normalizes the data by region to be mean zero and standard deviation 1. This puts everything into the same units (in terms of standard deviation), which makes the data a bit easier to interpret.

How does Morningstar assign regions?

In order to normalize by region, Morningstar needs to know what funds belong to what regions. Countries are assigned to regions based on the Morningstar Region classification system. Morningstar assigns funds to regions based on the fund's domicile, unless the fund's domicile is not contained within the set of Available for Sale countries. In that case, Morningstar chooses an Available for Sale country depending on which of those countries belongs to the domicile with the most industrywide assets (for example, US > emerging-markets Asia).

How does Morningstar handle missing data?

First, Morningstar carries forward the latest available data three months. Second, if the data is still missing, we cross-sectionally impute the median value of the region to which the fund is assigned. We use region-level imputation, as opposed to category-level, because we want to have a relatively broad sample of funds on which to draw. Sometimes imputing the median value in the place of missing data can be harmful, especially when you need to calculate an average (for example, a regression), but in this case, we believe that we are justified because the random forest algorithm splits data based on percentiles in the distribution and does not require us to reliably estimate moments. Imputed values will be treated as "average" and hence likely to pull the final ratings decisions toward Neutral. We think that, in the absence of any data, the average fund should probably be Neutral and would be the stance that an analyst would take presumptively before any data about the fund was presented to them.

What are the eligible pillar ratings for funds with a significant amount of missing data?

The High and Low pillar ratings are restricted for funds with the following missing input data:
People Pillar: Manager Experience and Manager Excess Return 3-yr, Manager Excess Return 5-yr
Process Pillar: Trailing Return 5-yr Category Rank, Manager Experience, and Manager Excess Return 3-Yr, Manager Excess Return 5-Yr.

How does Morningstar handle small sample sizes at the BrandingID level?

The High and Low Parent Pillar ratings are restricted for firms with less than five years of history, or seven or fewer investment offerings. Additionally, if a parent company has fewer than five investment offerings, we do not consider the following firm-level data points: Average Morningstar Rating – 10 Year, Risk-Adjusted Success Ratio – 10 Year, and Success Ratio – 10 Year.

How does Morningstar handle category changes?

Input data reflects information available at a given time. Therefore, historical data incorporates the fund's historical category. For performance-related metrics where Morningstar requires a time series of a fund's category average performance or category index return, Morningstar uses the monthly track record reflecting the fund's category for that specific month.

How does Morningstar handle multiple analyst-assigned Process ratings to passive products tracking the same benchmark?

Morningstar selects the largest share class with assets under management and then applies the analyst-assigned Process rating to all other passive products tracking the same benchmark.

What data points are category-relative?

First, most data points will be calculated relative to the category (for example, category average alpha, success ratios, return ranks, beta, fee ranks, star ratings, and so on), but some will not (for example, tenure, retention ratio, or number of holdings). Morningstar prefers to use category-relative data points where possible but tends to refrain when the data point is more operational in nature.

What currency does Morningstar use for calculating fund performance statistics?

To estimate fund performance, Morningstar converts all fund and index returns to US dollars prior to running the regressions. This eliminates any effects due to the difference in currency return.

What does "average" stand for?

Average stands for an equally weighted average of all share classes given a BrandingID.

When are the input data and ratings updated?

The input data and ratings are updated on the 15th day of each month.

When do new funds receive a rating?

A new share class or fund receives a rating when it has a full month of data present. For example, if a new fund's inception is on May 12 and the April production run completes on May 18, then the fund will not receive a rating for the month of April as it has no data for the month of April. Further, when the May production runs on June 18, the fund will not receive a rating for the month of May because the data for the month of May is not complete. The first rating the fund will receive will be a rating for the month of June when June production runs on July 18.

Why are fee data points used as inputs to the People Pillar estimation?

Here, fees are directly related to how much a fund charges for managing money for clients for two reasons. One, model testing shows that fees do help explain the variance in the People Pillar rating. Two, fees empirically affect all pillars directly or indirectly.

Why does Morningstar use the input variables Percentage of Assets in Top 10 Holdings for the Process Pillar? What is the effective relationship between the variable and the pillar rating?

Percentage of Assets in Top 10 Holdings is a good indicator to measure the level of concentration in a fund portfolio. The higher the top-10 asset percentage, the more concentrated the portfolio. Such portfolios are implicitly taking on higher risk. The variable reflects a fund's investment philosophy and actual investment process.

Appendix D: FAQ on Eligibility for Algorithmic Rating Assignment

What are the universes covered?

Algorithmically generated Morningstar Medalist Ratings cover exchange-traded funds, open-end funds, separate accounts, variable annuity subaccounts, and variable life subaccounts.

How does Morningstar assign pillar ratings to subaccounts?

A subaccount receives pillar ratings when the underlying FundID has at least one class with a Morningstar Medalist Rating. The subaccount inherits the Parent, Process, and People Pillar ratings of the underlying FundID.

What is the fee used in the ratings for subaccounts?

The fee data point used is the Total Net Expense ratio. It includes the insurance expense and the underlying fund expenses. The insurance expense includes M&E Risk Charge, Administrative Charge, and Distribution Charge.

How does Morningstar assign ratings to subaccounts?

Ratings are assigned using the same process elsewhere in this methodology. The expected forward performance is calculated using a combination of pillar ratings, fee, and distribution width of the underlying FundID's category. The ratings are assigned based on the expected performance threshold set using the open-end and exchange-traded funds' rating distribution.

Why does a fund not receive a rating?

Managed investments must meet data freshness and completeness requirements to be eligible for ratings.

- Screening logic is applied in certain markets to remove zero-fee share classes that have purchase constraints as well as share classes for which there is evidence of data irregularities.
- Pillars already assigned ratings by a Morningstar analyst are not eligible for ratings assigned by the algorithm.
- Investments within a Morningstar category that do not receive star ratings are not eligible for ratings.
- Investments within the alternative Morningstar categories of digital assets, equity market neutral, event-driven, macro trading, multistrategy, options trading, relative value arbitrage, and systematic trend are not eligible for ratings because of limited peer-group size and limitations on available portfolio data. This also applies to the commodities focused, derivative income, miscellaneous region, miscellaneous sector, muni target maturity, trading-inverse commodities, trading-inverse debt, trading-inverse equity, trading-leveraged debt, trading-leveraged equity, and trading-miscellaneous categories.
- Investments that do not have the necessary fee data available for the most recent month are not eligible for ratings:
    A. For investments domiciled in the United States, Morningstar Adjusted Prospectus Net Expense Ratio is necessary.
    B. For investments domiciled outside the United States, Representative Cost is necessary.

C. For investments domiciled in Canada where Representative Cost is not available or is less than the stated Management Fee, the stated Management Fee will be used.

- Investments within the open-end funds, exchange-traded funds, separate accounts, variable annuity subaccounts, or variable life subaccounts are eligible for ratings. Investments not in one of these universes are not eligible for ratings.
- Investments must have at least one month of total returns to be eligible for a rating.
- Investments must not be flagged as dormant funds.
- Investments included on Morningstar's compliance list are not eligible for ratings. These include investments under the Morningstar brand and investments for which Morningstar has deemed a conflict of interest.

Appendix E: FAQ on Separately Managed Accounts Model

General Information

Universe Coverage

Only separately managed accounts that have been issued by firms flagged as Global Investment Performance Standards-compliant, or GIPS-compliant, are eligible to receive an algorithmically generated Morningstar Medalist Rating.

How does Morningstar assign ratings to separately managed accounts?

Ratings are assigned using the same process as described elsewhere in this methodology. The expected forward performance is calculated using a combination of pillar ratings, fee, and distribution width of the underlying FundID's category. The ratings are assigned based on the expected performance threshold set using the open-end and exchange-traded funds' rating distribution.

What is the fee used in the ratings for separately managed accounts?

Algorithmically generated Morningstar Medalist Ratings use the same fee assigned to separately managed accounts as the analyst-generated Morningstar Medalist Ratings. The annual fees used for active products as of September 2022 are in Exhibit 6. Fees for passive products are proxied at 10% of the corresponding active fee.

Exhibit 6 Proxy Fee Used for Separately Managed Accounts

Morningstar Category	Proxy Fee, %
US Fund Allocation—15% to 30% Equity	0.30
US Fund Allocation—30% to 50% Equity	0.30
US Fund Allocation—50% to 70% Equity	0.30
US Fund Allocation—70% to 85% Equity	0.30
US Fund Allocation—85%+ Equity	0.30
US Fund Bank Loan	0.20
US Fund China Region	0.40
US Fund Commodities Broad Basket	0.40
US Fund Commodities Focused	0.40
US Fund Communications	0.35
US Fund Consumer Cyclical	0.35
US Fund Consumer Defensive	0.35
US Fund Convertibles	0.20
US Fund Corporate Bond	0.20
US Fund Diversified Emerging Mkts	0.40
US Fund Diversified Pacific/Asia	0.40

Source: Morningstar, Inc. Data as of Sept. 30, 2022.

Exhibit 6 Proxy Fee Used for Separately Managed Accounts (continued)

Morningstar Category	Proxy Fee, %
US Fund Emerging-Markets Bond	0.20
US Fund Emerging-Markets Local-Currency Bond	0.20
US Fund Energy Limited Partnership	0.35
US Fund Equity Energy	0.35
US Fund Equity Precious Metals	0.35
US Fund Europe Stock	0.40
US Fund Financial	0.35
US Fund Foreign Large Blend	0.40
US Fund Foreign Large Growth	0.40
US Fund Foreign Large Value	0.40
US Fund Foreign Small/Mid Blend	0.40
US Fund Foreign Small/Mid Growth	0.40
US Fund Foreign Small/Mid Value	0.40
US Fund Global Real Estate	0.35
US Fund Health	0.35
US Fund High-Yield Bond	0.20
US Fund High-Yield Muni	0.20
US Fund India Equity	0.40
US Fund Industrials	0.35
US Fund Inflation-Protected Bond	0.20
US Fund Infrastructure	0.35
US Fund Intermediate Core Bond	0.20
US Fund Intermediate Core-Plus Bond	0.20
US Fund Intermediate Government	0.20
US Fund Japan Stock	0.40
US Fund Large Blend	0.30
US Fund Large Growth	0.30
US Fund Large Value	0.30
US Fund Latin America Stock	0.40
US Fund Long Government	0.20
US Fund Long-Term Bond	0.20
US Fund Mid-Cap Blend	0.35
US Fund Mid-Cap Growth	0.35
US Fund Mid-Cap Value	0.35
US Fund Miscellaneous Region	0.40
US Fund Miscellaneous Sector	0.35
US Fund Multisector Bond	0.20
US Fund Muni California Intermediate	0.20
US Fund Muni California Long	0.20
US Fund Muni Massachusetts	0.20
US Fund Muni Minnesota	0.20

Source: Morningstar, Inc. Data as of Sept. 30, 2022.

Exhibit 6 Proxy Fee Used for Separately Managed Accounts (continued)

Morningstar Category	Proxy Fee, %
US Fund Muni National Interm	0.25
US Fund Muni National Long	0.25
US Fund Muni National Short	0.25
US Fund Muni New Jersey	0.25
US Fund Muni New York Intermediate	0.25
US Fund Muni New York Long	0.25
US Fund Muni Ohio	0.25
US Fund Muni Pennsylvania	0.25
US Fund Muni Single State Interm	0.25
US Fund Muni Single State Long	0.25
US Fund Muni Single State Short	0.25
US Fund Muni Target Maturity	0.25
US Fund Natural Resources	0.40
US Fund Nontraditional Bond	0.25
US Fund Pacific/Asia ex-Japan Stk	0.45
US Fund Preferred Stock	0.25
US Fund Real Estate	0.40
US Fund Short Government	0.25
US Fund Short-Term Bond	0.25
US Fund Small Blend	0.45
US Fund Small Growth	0.45
US Fund Small Value	0.45
US Fund Tactical Allocation	0.35
US Fund Target Maturity	0.25
US Fund Target-Date 2000-2010	0.35
US Fund Target-Date 2015	0.35
US Fund Target-Date 2020	0.35
US Fund Target-Date 2025	0.35
US Fund Target-Date 2030	0.35
US Fund Target-Date 2035	0.35
US Fund Target-Date 2040	0.35
US Fund Target-Date 2045	0.35
US Fund Target-Date 2050	0.35
US Fund Target-Date 2055	0.35
US Fund Target-Date 2060+	0.35
US Fund Target-Date Retirement	0.35
US Fund Technology	0.40
US Fund Ultrashort Bond	0.25
US Fund Utilities	0.40

Source: Morningstar, Inc. Data as of Sept. 30, 2022.

Exhibit 6 Proxy Fee Used for Separately Managed Accounts (continued)

Morningstar Category	Proxy Fee, %
US Fund World Allocation	0.35
US Fund World Bond	0.25
US Fund World Bond-USD Hedged	0.25
US Fund World Large Stock	0.45
US Fund World Small/Mid Stock	0.45

Source: Morningstar, Inc. Data as of Sept. 30, 2022.

Pillar Models for Separately Managed Accounts

What is the distribution used for the pillar ratings?

For those pillars where a pillar rating of an open-end or exchange-traded fund is not available, pillar ratings (High, Above Average, Average, Below Average, or Low) will be assigned according to a static threshold to the raw pillar scores using the same symmetric distribution as open-end and exchange-traded funds.

What are the People and Process Pillar business rules specific to separately managed accounts?

Separately managed accounts follow all the business rules that are implemented for open-end and exchange-traded funds. There are three notable enhancements.

First, in the case where an analyst has rated a fund belonging to the same strategy or portfolio identifier or where there is an algorithmically generated Morningstar Medalist Rating on an open-end or exchange-traded fund belonging to the same strategy or portfolio identifier, all separately managed accounts under that same strategy or portfolio identifier will inherit the People and Process Pillar rating assignments as determined by the analyst or the algorithmic system.

Second, for the People Pillar, Morningstar implements additional mapping using the reported manager information. For separately managed accounts that report manager names, Morningstar creates manager-level scores by averaging the People Pillar ratings of the open-end and exchange-traded funds they manage. Morningstar then rolls back up People Pillar ratings for accounts by averaging the manager scores, weighted equally. For accounts that do not report manager names, this logic is not applied.

Third, for the People and Process Pillars in cases where the number of input data points for an account is below a specified threshold, Morningstar pulls the ratings toward the center.

What are the Parent business rules specific to separately managed accounts?

Morningstar assigns Parent ratings for separately managed accounts at the advisor level. If an advisor is not reported, Morningstar assigns Parent ratings at the provider-company level.

In the case where there is a Parent Pillar rating of an open-end or exchange-traded fund for a particular advisor entity, Morningstar will default to that rating. Likewise, if the account does not have an advisor entity, then Morningstar will default to the Parent Pillar rating of an open-end or exchange-traded fund for a particular provider company.

For accounts belonging to a particular branding entity that has multiple provider companies or multiple advisor entities, Morningstar does not assign a Parent Pillar if there is no rating available through the mapping system. In the same spirit, if a fund has multiple advisor entities, Morningstar does not algorithmically rate the account's Parent Pillar.

What variables are used in each of the Parent random forest models (Positive and Negative)?
The variables used in each model are found in Exhibit 7.

Exhibit 7 Input Variables for the Quantitative Parent Pillar for Positive and Negative Random Forest Models

Parent	Positive	Negative
Asset-Weighted Manager Tenure	Yes	Yes
Average Manager Tenure	Yes	Yes
Average Morningstar Rating 3 Yr	Yes	Yes
Average Morningstar Rating 5 Yr	Yes	Yes
Average Morningstar Rating 10 Yr	Yes	Yes
Average Morningstar Rating Overall	Yes	Yes
Average Number of Months Since Manager Change	Yes	Yes
Firm Age	Yes	Yes
Retention 5 Yr	Yes	Yes
Risk-Adjusted Success Ratio 3 Yr	Yes	Yes
Risk-Adjusted Success Ratio 5 Yr	Yes	Yes
Risk-Adjusted Success Ratio 10 Yr	Yes	Yes
% Net Assets Team Managed	Yes	Yes
% Funds With a Management Change TTM	Yes	Yes

Source: Morningstar, Inc.

What variables are used in each of the People random forest models (Positive and Negative)?

The variables used in each model are found in Exhibit 8.

Exhibit 8 Input Variables for the Quantitative People Pillar for Positive and Negative Random Forest Models

People	Positive	Negative
Alpha 5 Year—Category Average	Yes	Yes
Alpha 10 Year—Category Average	Yes	No
Alpha 5 Year—Category Benchmark	Yes	Yes
Asset-Weighted Manager Tenure	Yes	No
Average Morningstar Rating 3 Year	Yes	No
Average Morningstar Rating 5 Year	No	Yes
Average Morningstar Rating 10 Year	Yes	No
Average Morningstar Rating Overall	No	Yes
Beta 3 Year—Category Average	Yes	Yes
Down Capture 3 Year—Category Average	Yes	Yes
Index Fund	Yes	Yes
Information Ratio 5 Year—Category Average	Yes	Yes
Information Ratio 10 Year—Category Average	Yes	Yes
Information Ratio 5 Year—Category Benchmark	Yes	Yes
Manager Experience	Yes	Yes
Manager Investment	No	Yes
Manager Investment—$1 Million	Yes	No
Morningstar Rating 3 Year	Yes	Yes
Morningstar Rating 5 Year	Yes	Yes
Number of Months Since Last Management Change	Yes	Yes
Overall Morningstar Rating	Yes	Yes
Retention 5 Year	Yes	Yes
Sharpe Ratio 5 Year—Category Average	Yes	Yes
Success Ratio 5 Year	Yes	No
Team Size	Yes	Yes

Source: Morningstar, Inc.

What variables are used in each of the Process random forest models (Positive and Negative)?

The variables used in each model are found in Exhibit 9.

Exhibit 9 Input Variables for the Quantitative Process Pillar for Positive and Negative Random Forest Models

Process	Positive	Negative
Alpha 5 Year—Category Average	Yes	Yes
Alpha 10 Year—Category Average	Yes	No
Alpha 5 Year—Category Benchmark	Yes	Yes
Asset-Weighted Manager Tenure	Yes	No
Average Actual Management Fee Rank	No	Yes
Average Max Management Fee Rank	No	Yes
Average Morningstar Rating 10 Year	Yes	No
Average Morningstar Rating Overall	No	Yes
Average Net Expense Ratio Rank	No	Yes
Average Prospectus Operating Expense Ratio Rank	No	Yes
Beta 3 Year—Category Average	Yes	Yes
Down Capture 3 Year—Category Average	Yes	Yes
Index Fund	Yes	Yes
Information Ratio 5 Year—Category Average	No	Yes
Information Ratio 10 Year—Category Average	Yes	Yes
Information Ratio 5 Year—Category Benchmark	Yes	No
Longest Tenure	Yes	Yes
Manager Excess Return 3 Year	Yes	Yes
Manager Excess Return 5 Year	Yes	Yes
Manager Experience	Yes	Yes
Morningstar Rating 3 Year	Yes	Yes
Morningstar Rating 5 Year	Yes	Yes
Number of Months Since Last Management Change	Yes	Yes
Overall Morningstar Rating	Yes	Yes
Retention 5 Year	Yes	Yes
Risk-Adjusted Success Ratio 5 Year	Yes	No
Sharpe Ratio 5 Year—Category Average	Yes	Yes
Team Managed	Yes	Yes
Team Size	Yes	Yes
Trailing 5-Year Return Rank	Yes	No
% Assets in Top 10 Holdings	No	Yes

Source: Morningstar, Inc.

Appendix F: FAQ on Model Portfolios Model

General Information

Universe Coverage

Only US-domiciled Model Portfolios that have been issued by firms flagged as compliant with Global Investment Performance Standards or that have USD 10 billion in assets under management are eligible to receive a Morningstar Medalist Rating. With this new methodology, we are able to cover more than 1,000 Model Portfolios.

How do we assign ratings to Model Portfolios?

Ratings are assigned using the same process as open-end or exchange-traded funds. The expected forward performance is calculated using a combination of pillar ratings, fee, and distribution width of the underlying category. The ratings are assigned based on the expected performance threshold set using the open-end and exchange-traded funds' rating distribution.

In order to receive a Silver or Gold rating, models must have more than 18 months of activation returns and have quarterly holdings.

What is the fee used in the ratings for Model Portfolios?

The Morningstar Medalist Rating system calculates fees based on the weighted average expense ratios of the underlying holdings. For separate account positions, fees are assigned using Morningstar Medalist Rating's Fee Proxy Logic.

The annual fees used for active products are in Exhibit 6. Strategist Fee Proxy Logic will be implemented based on Broad Category Group, consistent with the methodology used for Separately Managed Accounts. Details of the proxy logic can be found in Appendix E, Exhibit 6.

Quantitative Pillar Models for Models Methodology

What is the distribution used for the pillar ratings?

For those pillars where an existing Medalist Rating of an open-end or exchange-traded fund is not available, pillar ratings (High, Above Average, Average, Below Average, or Low) will be assigned according to a static threshold to the raw pillar scores using the same symmetric distribution as open-end, exchange-traded funds, and separately managed accounts.

What are the People and Process business rules specific to models?

Models follow all the business rules that are implemented for open-end and exchange-traded funds. There are a few notable enhancements.

First, in the case where an opinion has been issued via an existing Medalist Rating for an open-end, exchange-traded fund, or separately managed account belonging to the same strategy or portfolio

identifier, all Model Portfolios under that same strategy or portfolio identifier will inherit the People and Process Pillar rating assignments as determined first by the analyst and then by the quantitative system.

Second, for the People Pillar, we implement additional mapping using the reported manager information. For models that report manager names, we create manager-level scores by averaging the People Pillar ratings of the open-end and exchange-traded funds, or separately managed account they manage. We then roll back up People Pillar ratings for accounts by averaging the manager scores, weighted equally. For accounts that do not report manager names, this logic is not applied.

Third, for the People and Process Pillars in cases where the number of input data points for a Model Portfolio is below a specified threshold, we pull the ratings toward the center.

Finally, we apply pillar consistency to People and Process, based on a Model's Strategy Series ID, by utilizing an average.

What are the Parent business rules specific to models?
Morningstar assigns Parent ratings for models at the branding level.

In the case where there is a Medalist Rating for the Parent Pillar of an open-end or exchange-traded fund, or separately managed account for a particular entity, Model Portfolios will inherit the opinion on the managed product.

For Model Portfolios belonging to a particular branding entity that cannot be inherited, we assign a Parent Pillar via the random forest model. For a comprehensive list of the data points considered, please see Appendix E, Exhibit 7.

What variables are used in each of the Parent random forest models (Positive and Negative)?
The variables used in each Model Portfolio are the same as the variable used for separately managed accounts. They can be found in Appendix E, Exhibit 7.

What variables are used in each of the People random forest models (Positive and Negative)?

The variables used in each model are found in Exhibit 10.

Exhibit 10 Input Variables for the Quantitative People Pillar for Positive and Negative Random Forest Models

People	Positive	Negative
Alpha 5 Year—Category Average	Yes	Yes
Alpha 5 Year—Category Benchmark	Yes	No
Alpha 10 Year--Category Average	Yes	Yes
Asset-Weighted Manager Tenure	Yes	No
Average Morningstar Rating 3 Year	Yes	No
Average Morningstar Rating 5 Year	No	Yes
Average Morningstar Rating 10 Year	Yes	No
Average Morningstar Rating Overall	No	Yes
Beta 3 Year—Category Average	Yes	Yes
Cumulative Excess Return 36 Months	Yes	Yes
Cumulative Excess Return 60 Months	Yes	Yes
Index Fund	Yes	Yes
Information Ratio 5 Year—Category Average	Yes	Yes
Information Ratio 10 Year—Category Average	Yes	Yes
Information Ratio 5 Year—Category Benchmark	Yes	Yes
Longest Manager Tenure	No	Yes
Manager Experience	Yes	Yes
Manager Investment	No	Yes
Morningstar Investment—$1 Million	Yes	Yes
Morningstar Rating 3 Year	Yes	Yes
Morningstar Rating 5 Year	Yes	Yes
Number of Months Since Last Management Change	Yes	Yes
Overall Morningstar Rating	Yes	Yes
Retention 5 Year	Yes	Yes
Sharpe Ratio 5 Year—Category Average	Yes	Yes
Success Ratio 5 Year	Yes	No
Team Size	Yes	Yes

Source: Morningstar, Inc.

What variables are used in each of the Process random forest models (Positive and Negative)?

The variables used in each model are found in Exhibit 11.

Exhibit 11 Input Variables for the Quantitative Process Pillar for Positive and Negative Random Forest Models

Process	Positive	Negative
Alpha 5 Year—Category Average	Yes	Yes
Alpha 5 Year—Category Benchmark	Yes	No
Alpha 10 Year—Category Average	Yes	Yes
Asset-Weighted Manager Tenure	Yes	No
Average Actual Management Fee Rank	No	Yes
Average Max Management Fee Rank	No	Yes
Average Morningstar Rating 10 Year	Yes	No
Average Net Expense Ratio Rank	No	Yes
Average Prospectus Operating Expense Ratio Rank	No	Yes
Beta 3 Year—Category Average	Yes	Yes
Down Capture 3 Year—Category Average	Yes	Yes
Index Fund	Yes	Yes
Information Ratio 5 Year—Category Average	No	Yes
Information Ratio 10 Year—Category Average	Yes	Yes
Information Ratio 5 Year—Category Benchmark	Yes	No
Longest Tenure	Yes	Yes
Manager Excess Return 3 Year	Yes	Yes
Manager Excess Return 5 Year	Yes	Yes
Manager Experience	Yes	Yes
Morningstar Rating 3 Year	Yes	Yes
Morningstar Rating 5 Year	Yes	Yes
Number of Months Since Last Management Change	Yes	Yes
Overall Morningstar Rating	Yes	Yes
Retention 5 Year	Yes	Yes
Risk-Adjusted Success Ratio 3 Year	Yes	Yes
Risk-Adjusted Success Ratio 5 Year	No	Yes
Sharpe Ratio 5 Year—Category Average	Yes	Yes
Team Managed	Yes	Yes
Team Size	Yes	Yes
Trailing 5-Year Return Rank	Yes	No
% Assets in Top 10 Holdings	Yes	Yes

Source: Morningstar, Inc.

Appendix G: Special Cases

This section describes how Morningstar adapts the ratings assignment process to various circumstances that may arise.

Effective Dates for Rating Assignment

This section outlines the display and updated rules for each type of pillar score assignment.

Directly, by Analyst

People and Process Pillar Ratings

- An analyst will update the People and Process Pillar ratings approximately once per year unless circumstances warrant an interim update.
- The "published on" date of the People Pillar rating and the Process Pillar rating denotes the date the analyst publishes the report that sets forth the People and Process Pillar ratings that have been assigned.
- The "rated on" date of the People Pillar rating and the Process Pillar rating denotes the date the analyst incorporates the People and Process Pillar ratings into the calculation of the overall Medalist Rating. Typically, the "published on" and "rated on" dates are the same.

Parent Pillar Rating

- An analyst will update the Parent Pillar rating approximately once every 18 months unless circumstances warrant an interim update.
- The "published on" date of the Parent Pillar rating denotes the date the analyst responsible for covering that parent firm completes the Parent Pillar rating analysis. The Parent Pillar rating and accompanying pillar rating text flow into the analyst report of all vehicles linked to that parent firm on that date.
- The "rated on" date of the Parent Pillar rating denotes the first date the Parent pillar rating could be incorporated into the calculation of the overall Medalist Rating of a vehicle linked to that parent firm. However, an analyst will not incorporate the Parent Pillar rating into the calculation of the overall Medalist Rating of a vehicle linked to that parent firm until the next time the analyst publishes a new report on that vehicle. (The analyst responsible for covering the parent firm and the analyst covering vehicles linked to that parent firm can be different and, thus, the timing of updates can differ.)

Indirectly, by Analyst

The display and update rules for the pillar ratings are the same as described for "Directly, by Analyst" above, with a few differences as noted below. If a single pillar is assigned indirectly, by analyst, the overall rating is calculated each month. The "rated on" date denotes the most recent month-end date and reflects the inherited pillar score that was in force as of that date.

People and Process Pillar Ratings

- The "published on" date denotes the date the analyst publishes the report that sets forth the People and Process Pillar ratings that have been assigned to a *different* vehicle that shares a strategyID in common with the vehicle concerned (such as, the vehicle being assigned a rating indirectly).
- The "rated on" date denotes the date the People Pillar rating and Process Pillar rating is incorporated into the calculation of the overall Medalist Rating. Typically, the "rated on" date is the *most recent month-end* and reflects the People or Process Pillar rating that was in force as of that date. As such, the "rated on" date can differ from the "published on" date.
- With respect to vehicles that track an index, the Process Pillar rating "published on" date could denote the date an analyst publishes the report that sets forth the Process Pillar rating that has been assigned to a different vehicle that tracks the same index.

Parent Pillar Rating

- The Parent Pillar rating "rated on" date denotes the date the Parent Pillar rating is incorporated into the calculation of the overall Medalist Rating of a vehicle linked to that parent firm. Typically, the "rated on" date is *the most recent month-end* and reflects the Parent Pillar rating that was in force as of that date.

Directly, by Algorithm

The display and update rules for the pillar ratings are the same as described for "Directly, by Analyst" above with a few differences as noted below. If a single pillar is assigned directly, by algorithm, the overall rating is calculated monthly. The "rated on" date denotes the most recent month-end date and reflects the input data that was in force as of that date.

People and Process Pillar Ratings

- The People and Process Pillar ratings are updated *by an algorithm monthly*.
- The "published on" date denotes the date *the algorithm* publishes its report that sets forth the People and Process Pillar ratings it has assigned.
- The "rated on" date denotes the date the People and Process Pillar rating is incorporated into the calculation of the overall Medalist Rating. Typically, the "rated on" date is the most recent *month-end* and reflects the People and Process Pillar rating that was in force as of that date.

Parent Pillar Rating

- The Parent Pillar rating is updated *by an algorithm monthly*.
- The "published on" date denotes the date the *algorithm* publishes its report that sets forth the Parent Pillar rating it has assigned. The Parent Pillar "rated on" date is the date the Parent Pillar rating is incorporated into the calculation of the overall Medalist Rating of a vehicle linked to that parent firm. Typically, the "rated on" date is the most recent *month-end* and reflects the Parent Pillar rating that was in force as of that date.

Ratings-Change Buffering and Ratings Cap

To prevent frequent ratings changes when actively managed offerings are near the threshold between ratings levels, Morningstar applies a buffer. If there are no changes to a vehicle's pillar rating, and if the vehicle's fee has not changed by more than 5 basis points since the last rating was assigned, then the vehicle's expected net alpha must cross a rating's threshold by at least 0.05% annualized, or 5% of the category APE, before the rating will change. (The "threshold" refers to the expected net alpha at each relevant percentile. For active vehicles expected to generate positive net alpha, it is the 15th percentile for Gold/Silver and the 50th percentile for Silver/Bronze. With respect to active vehicles not expected to generate positive net alpha, it is the 30th percentile for Neutral/Negative.)

To ensure that ratings of passive vehicles with identical pillar ratings in a given category do not diverge on the basis of extremely small differences in fees, Morningstar applies the following buffer: For every combination of People, Process, and Parent Pillar ratings assigned to vehicles within a Morningstar category, Morningstar calculates the minimum fee and maximum rating. If a passively managed vehicle is assigned the same combination of People, Process, and Parent Pillar ratings and its fees differ from the minimum fee calculated for that Morningstar category and pillar combination by less than 3 basis points annualized, it will earn the maximum rating.

In addition, if a passively managed vehicle is assigned a Process Pillar rating of Average, Below Average, or Low, Morningstar caps its rating at Bronze.

Target-Date Strategies

Target-date allocation offerings are ranked and rated by share class type (span across target dates) instead of by individual share classes. Each class in a series consequently has the same rating. Target-date ratings use the same pillar weighting as actively managed strategies, and their medalist share classes are defined as having net-of-fee alpha above 0.

Separately Managed Accounts

Separately managed accounts are rated using the methodology for actively managed strategies. Morningstar deducts a proxy fee from all separately managed accounts in a given Morningstar category. The proxy fee is based on a survey of separately managed account model-delivery fees. For complete details, see Appendix E.

Model Portfolios

Model portfolios are rated using the methodology for actively managed strategies. For model portfolios of funds, Morningstar determines the fee based on underlying fund fees and strategist overlay fees. For

model portfolios of securities, Morningstar uses a proxy fee based on a survey of separately managed account model delivery fees.

To derive the rating, Morningstar ranks model portfolios by their expected net of fee alpha versus their category index. Because firms report model portfolio data voluntarily, selection bias exists in model portfolio categories. Therefore, Morningstar uses the APEs calculated for the equivalent mutual fund categories to derive expected before-fee alpha and assigns ratings to model portfolios. For complete details, see Appendix F.

Regional Eligibility Requirements

Morningstar may adjust eligibility requirements for ratings assignments regionally, based on input from local manager research and compliance teams. Below, please find specific eligibility requirements and ratings business logic by region.

Australia

- Managed investments domiciled in Australia will receive a rating if the % Data Coverage is greater than 80%.
    - For the superannuation, pension, and annuities universes, a Morningstar Medalist Rating can be available only for vehicles that have all three pillar ratings directly or indirectly assigned by an analyst.
- If holdings data is not reported to Morningstar at least semiannually, the maximum rating a managed investment can receive is Bronze.
- If an investment is domiciled in Australia, and it is required under Australian law to have a Target Market Determination, a rating will only be generated if Morningstar has been provided with that TMD.
- For the purpose of Parent Pillar assignment and inheritance, the Advisor CompanyID is used in place of BrandingID.

Other Eligibility Requirements

Managed investments that do not meet data freshness and completeness requirements are not eligible for ratings. In addition, Morningstar applies screening logic in certain markets to remove zero-fee share classes that have purchase constraints.

Currency-Hedged Categories or Share Classes in Unbenchmarked Categories

Morningstar maintains a variety of currency-hedged versions of fund categories that are not currency-hedged and sometimes assigns ratings to vehicles residing in a currency-hedged category. In the event there is no benchmark for such a category, Morningstar follows these steps in assigning ratings:

- If a benchmarked, unhedged category exists that would otherwise be applicable, Morningstar applies the APE for that category to the weighted pillar scores for the vehicle in question, then compares the resulting expected net-of-fee alpha with the alpha thresholds that apply in the same unhedged, benchmarked category (that is, the expected net alpha at the 15th and 50th percentiles for vehicles expected to deliver positive net alpha; the expected net alpha at the 30th percentile for vehicles not expected to deliver positive net alpha).

Otherwise, Morningstar assigns ratings per the following matrix. This is presently used primarily for funds in unrated, unbenchmarked alternatives categories.

Pillar Ratings		**Fee Quintile Relative to Category Peers**				
People & Process[2]	Parent	Cheapest	Second Cheapest	Middle	Second Costliest	Costliest
High/High	High	Gold	Gold	Silver	Bronze	Bronze
High/Above Average	High	Gold	Silver	Silver	Bronze	Bronze
Both Above Average	High	Silver	Bronze	Bronze	Neutral	Neutral
Above Average/Average	High	Bronze	Neutral	Neutral	Neutral	Negative
Both Average	High	Neutral	Neutral	Neutral	Negative	Negative
Average/Below Average	High	Neutral	Neutral	Negative	Negative	Negative
Both Below Average	High	Negative	Negative	Negative	Negative	Negative
Below Average/Low	High	Negative	Negative	Negative	Negative	Negative
Both Low	High	Negative	Negative	Negative	Negative	Negative
High/High	Above Average or Average	Gold	Gold	Silver	Bronze	Bronze
High/Above Average	Above Average or Average	Silver	Silver	Silver	Bronze	Bronze
Both Above Average	Above Average or Average	Bronze	Bronze	Bronze	Neutral	Neutral
Above Average/Average	Above Average or Average	Neutral	Neutral	Neutral	Neutral	Negative
Both Average	Above Average or Average	Neutral	Neutral	Neutral	Negative	Negative
Average/Below Average	Above Average or Average	Neutral	Neutral	Negative	Negative	Negative
Both Below Average	Above Average or Average	Negative	Negative	Negative	Negative	Negative
Below Average/Low	Above Average or Average	Negative	Negative	Negative	Negative	Negative
Both Low	Above Average or Average	Negative	Negative	Negative	Negative	Negative
High/High	Below Average	Gold	Silver	Silver	Bronze	Bronze
High/Above Average	Below Average	Silver	Silver	Bronze	Bronze	Bronze
Both Above Average	Below Average	Bronze	Bronze	Neutral	Neutral	Neutral
Above Average/Average	Below Average	Neutral	Neutral	Neutral	Negative	Negative
Both Average	Below Average	Neutral	Neutral	Negative	Negative	Negative
Average/Below Average	Below Average	Neutral	Negative	Negative	Negative	Negative
Both Below Average	Below Average	Negative	Negative	Negative	Negative	Negative
Below Average/Low	Below Average	Negative	Negative	Negative	Negative	Negative
Both Low	Below Average	Negative	Negative	Negative	Negative	Negative
High/High	Low	Gold	Silver	Bronze	Bronze	Bronze
High/Above Average	Low	Silver	Bronze	Bronze	Neutral	Neutral
Both Above Average	Low	Bronze	Neutral	Neutral	Negative	Negative
Above Average/Average	Low	Neutral	Neutral	Negative	Negative	Negative
Both Average	Low	Neutral	Negative	Negative	Negative	Negative
Average/Below Average	Low	Negative	Negative	Negative	Negative	Negative
Both Below Average	Low	Negative	Negative	Negative	Negative	Negative
Below Average/Low	Low	Negative	Negative	Negative	Negative	Negative
Both Low	Low	Negative	Negative	Negative	Negative	Negative

2 The People and Process Pillars are equal-weighted in Morningstar's rating system. As such, the order of pillar ratings in any given row in the first column is not material.

Historical Analysis Content

Morningstar generates algorithmically assigned ratings and analysis content on a monthly production cycle, while analyst-generated ratings are generally reviewed on a yearly cycle, with updates occurring ad hoc. All inquiries regarding historical ratings or analysis content can be made by contacting Morningstar.

Document Version History

Version 1.0	May 2, 2023	Original publication
Version 1.1	Aug. 31, 2023	Addition of Australia
Version 1.2	Nov. 28, 2023	Parent Pillar methodology additions
Version 1.3	Dec. 26, 2023	Update to People Pillar inheritance, Passives business logic
Version 1.4	April 30, 2024	Update to threshold calculation and pillar-level buffers
Version 1.5	May 28, 2024	Removal of Portfolio Transparency

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Morningstar Manager Research provides independent, fundamental analysis on managed investment strategies. Morningstar views are expressed in the form of Morningstar Medalist Ratings, which are derived through research of three key pillars—People, Process, and Parent. The Morningstar Medalist Rating is the summary expression of Morningstar's forward-looking analysis of investment strategies as offered via specific vehicles using a rating scale of Gold, Silver, Bronze, Neutral, and Negative. A global research team issues detailed research reports on strategies that span vehicle, asset class, and geography.

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22 West Washington Street
Chicago, IL 60602 USA

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