

Morningstar Product Risk Ranking Service



Morningstar Investment Adviser Singapore Pte Limited

Morningstar Product Risk Ranking

Morningstar Product Risk Ranking – Background

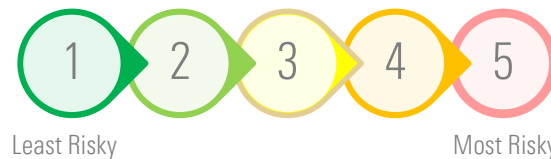
"The Suitability Requirement is the cornerstone of investor protection and is integral to selling practices, which encompass the distribution and provision of advice on investment products by licensed and registered persons"

- Hong Kong SFC

- ▶ Growing number of funds and their increasing complexity has led **regulators to take a more systematic approach to suitability requirements**. New regulations and requirements are periodically introduced by regulators in many jurisdictions to protect investors and minimize risk of mis-selling investment products in the financial industry
 - ▶ Suitability assessments are essential to ensure that investment products are suitably offered to investors
 - ▶ Risk profiling methodologies needs to be properly designed and should take into account both quantitative and qualitative factors in order to comprehensively evaluate investment product risks
 - ▶ Appropriate process is needed to periodically review the risk profiling methodology and mechanism for investment products
- ▶ **To avoid regulatory penalties for non-compliance**, wealth managers are facing escalating compliance costs due to increased headcount and resources

Morningstar Product Risk Ranking – Overview

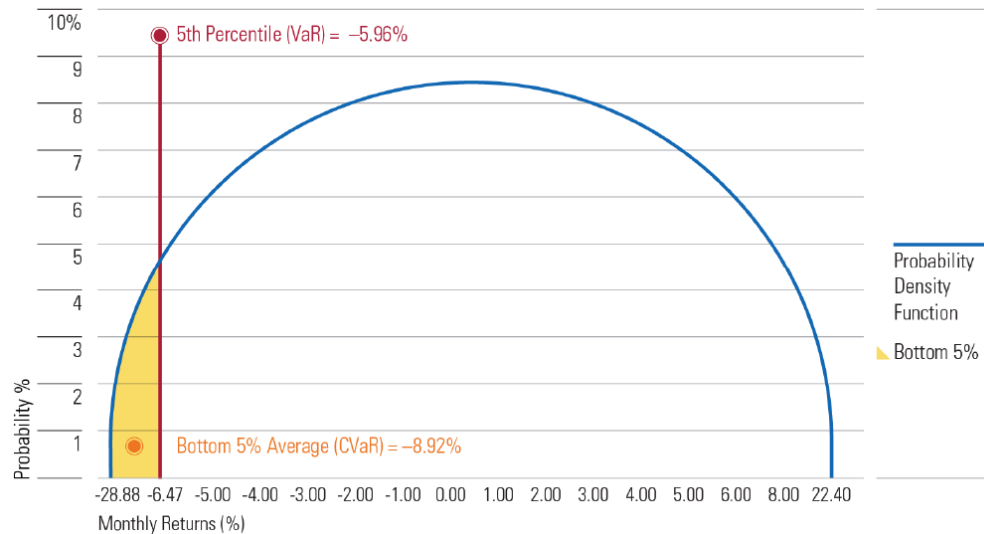
- ▶ Capital markets have continued to broaden and deepen around the world, giving more people access to a wider selection of investment products in which to invest in. Wealth managers need ensure that the funds' inherent risks are effectively captured and matched to their clients' risk profiles and tolerances
- ▶ Morningstar provides a method of ranking the universe of funds available for sale in a target market or regulatory jurisdiction.



- ▶ Ranking scheme is designed to **provide wealth managers, distributors, and end-investors a consistent and comprehensive way to evaluate a fund's riskiness** relative to other investment products.
 - ▶ **Rankings are specific to the target market** – The same product can have a different ranking in different jurisdictions.

Morningstar Product Risk Ranking – Our Methodology

- ▶ Risk rankings are determined by calculating a **conditional value-at-risk (CVaR)**, for each fund in a target market. Then a **risk ranking is assigned based on the relative order of CVaRs**, from least risky to most risky.
- ▶ CVaR is the average of the bottom x% of historical returns of a fund's performance. It answers the question: "what is the expected loss of the fund if losses exceed x%"



Source: Morningstar, Inc. For illustrative purposes only.

- CVaR is related to the concept of value-at-risk (VaR)
- VaR is defined as the lowest potential loss on an investment given a probability.
- VaR tells us what the maximum expected loss on a fund would be 95%, based on historical returns

Morningstar Product Risk Ranking – Our Methodology

- ▶ Generally, the longer the return history the more accurate CVaR estimates are. However fund return histories can vary considerably
- ▶ **To better align the return histories of funds**, a linear regression technique known as returns-based style analysis (RBSA) is used to construct a "synthetic" return series for each fund,
 - ▶ RBSA maps the returns of a fund to the returns of a group of indexes that have a longer return history. 150 indexes are selected to represent the investible universe
 - ▶ The Least Absolute Shrinkage and Selection Operator (LASSO) is used to identify the indexes used for RBSA regression
 - ▶ Only indexes with long enough return histories (since 2002) are included to represent investible universe
 - ▶ Ensures that each fund's **synthetic return series covers the same length and period**

Morningstar Product Risk Ranking – The Quantitative Process

► **Step 1: Assign Index Risk Rankings**

- **Index returns are converted to target market local currency**
- CVaRs are estimated, ordered and ranked
- **Risk ranking = Risk handle + CVaR percentile ranking within handle**

Risk Handle and CVaR Percentage Thresholds

CVaR Percentile Range	Risk Handle
0 – 10 th percentile	0
10 – 25 th percentile	1
25 – 50 th percentile	2
50 – 75 th percentile	3
75 – 100 th percentile	4

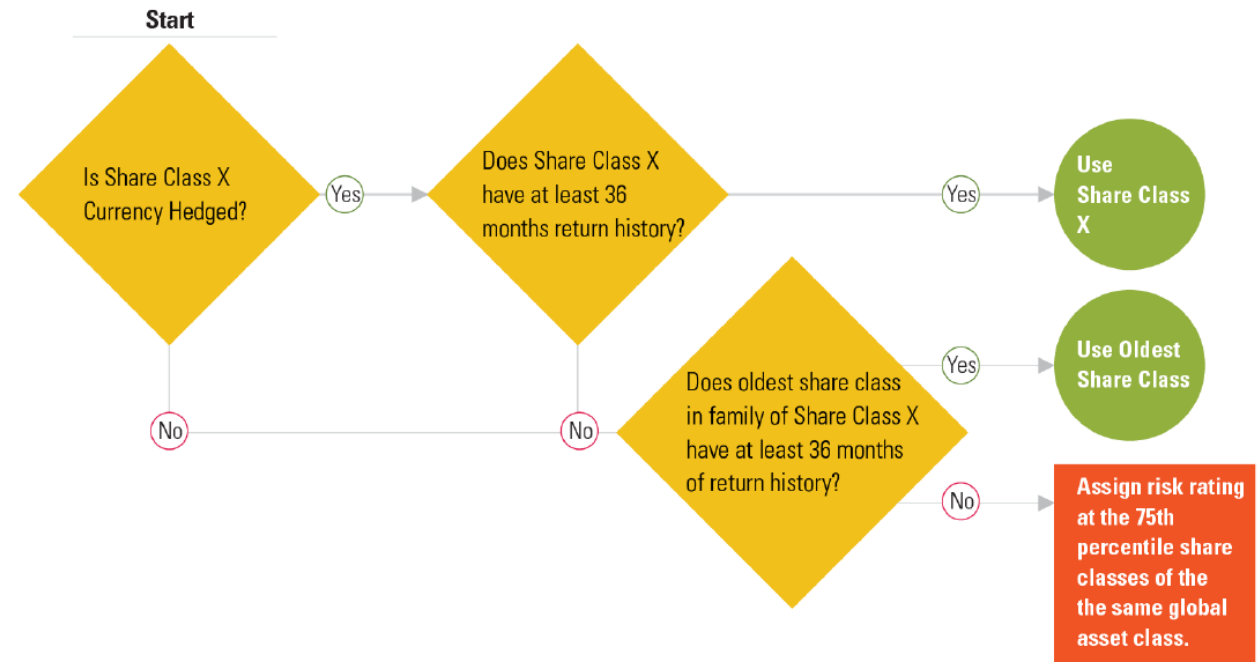
Example of Index 'i' Ranking Assignment

Index	Percentile Rank All Index CVaRs	Percentile Range	Rank Handle	Percentile Rank Among Rank Handle = 3	Final Risk Ranking
f	49	25 - 50th	2	8	3.08
g	50	25 - 50th	2	9	3.09
h	51	50 - 75th	3	10	3.10
i →	52	→ 50 - 75th	→ 3	11	→ 3.11
j	53	50 - 75th	3	12	3.12
k	54	50 - 75th	3	13	3.13

Morningstar Product Risk Ranking – The Quantitative Process

► Step 2: Calculate Fund CVaR

- All fund share classes available in target market are identified.
- LASSO regression is applied
- Construction of synthetic return series



Source: Morningstar.

Morningstar Product Risk Ranking – The Quantitative Process

► Step 3: Assign Fund Risk Ranking

- Example: Assume Fund share class A CVaR = -12% (negative 0.12).

Two indexes with closest matching CVaRs are identified (above and below)

Index	Index CVaR	Risk Ranking
Index 3	-0.10	2.75
Index 4	-0.11	3.05
Index 5	-0.14	4.15
Index 6	-0.16	4.65

Solve for index weight using index CVaR:

$$\begin{aligned}-0.12 &= w_4(-0.11) + w_5(-0.14) \\ -0.12 &= 0.67(-0.11) + 0.33(-0.14)\end{aligned}$$

Apply weights and index risk ranking to solve for fund risk ranking & rounded up to nearest integer:

$$\begin{aligned}\text{Risk Ranking} &= 0.67(3.05) + 0.33(4.15) \\ \text{Risk Ranking} &= 3.41 \\ \text{Risk Ranking (rounded)} &= 4\end{aligned}$$

Morningstar Product Risk Ranking – Review & Analyst Input

- ▶ Quantitative Risk Rankings are typically updated on a semi-annual basis, along with new monthly return data
- ▶ Mechanisms are incorporated to allow analyst teams to review and adjust quantitative ranking process
- ▶ **Floor Rankings** – Minimum rankings can be applied based on asset class characteristics

Fund Share Class	CVaR	Risk Ranking (Unrounded)	Risk Ranking (Rounded)	Risk Ranking (with floor)
Fund Share Class A	-0.12	3.41	4	5

▶ Qualitative Overlay

- ▶ Analysts can apply a **qualitative overlay to ensure the underlying risks are captured sufficiently** in the risk ranking
- ▶ Risk Ranking floor assignments are **reviewed semi-annually**, aligning it with existing processes

Morningstar Product Risk Ranking – Summary

- ▶ Morningstar's Quantitative Risk Ranking can **easily be incorporated into existing product suitability and due diligence processes**
- ▶ The Quantitative Risk Ranking provides wealth managers and distributors a **consistent, scalable and cost-effective way to effectively evaluate a fund product's riskiness**
- ▶ Morningstar's qualitative and quantitative research teams provide an **oversight on the methodology**, which leverages on our proprietary data and category system.
- ▶ **The methodology is periodically reviewed** in accordance with regulatory developments.
- ▶ Complements Morningstar's Manager Research Solution suite

©2024 Morningstar. All rights reserved. FOR PROFESSIONAL INVESTORS ONLY. The information, data, analyses and opinions presented herein has not been reviewed or approved by any regulatory authority and do not constitute investment advice; are provided as of the date written, solely for informational purposes; and subject to change at any time without notice. This content is not an offer to buy or sell any particular security and is not warranted to be correct, complete or accurate. Past performance is not a guarantee of future results. The Morningstar name and logo are registered marks of Morningstar, Inc. This presentation includes proprietary materials of Morningstar; reproduction, transcription or other use, by any means, in whole or in part, without prior, written consent of Morningstar is prohibited.

This presentation contains certain forward-looking statements. We use words such as “expects”, “anticipates”, “believes”, “estimates”, “forecasts”, and similar expressions to identify forward-looking statements. Such forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause the actual results to differ materially and/or substantially from any future results, performance or achievements expressed or implied by those projected in the forward-looking statements for any reason.

Morningstar Investment Adviser Singapore Pte Limited

Morningstar Investment Adviser Singapore Pte Limited is licensed by the Monetary Authority of Singapore to (a) advise on collective investment schemes and securities; and (b) issuing or promulgate analyses or reports on collective investment schemes and securities with Financial Adviser’s License Number FA100063. Morningstar Investment Adviser Singapore Pte Limited is the entity responsible for the creation and distribution of the research services described in this presentation.

Morningstar Medalist Rating™

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. The Medalist Ratings indicate which investments Morningstar believes are likely to outperform a relevant index or peer group average on a risk-adjusted basis over time. Investment products are evaluated on three key pillars (People, Parent, and Process) which, when coupled with a fee assessment, forms the basis for Morningstar’s conviction in those products’ investment merits and determines the Medalist Rating they’re assigned. Pillar ratings take the form of Low, Below Average, Average, Above Average, and High. Pillars may be evaluated via an analyst’s qualitative assessment (either directly to a vehicle the analyst covers or indirectly when the pillar ratings of a covered vehicle are mapped to a related uncovered vehicle) or using algorithmic techniques. Vehicles are sorted by their expected performance into rating groups defined by their Morningstar Category and their active or passive status. When analysts directly cover a vehicle, they assign the three pillar ratings based on their qualitative assessment, subject to the oversight of the Analyst Rating Committee, and monitor and reevaluate them at least every 14 months. When the vehicles are covered either indirectly by analysts or by algorithm, the ratings are assigned monthly. For more detailed information about the Medalist Ratings, including their methodology, please go to <http://global.morningstar.com/managerdisclosures>.

The Morningstar Medalist Ratings are not statements of fact, nor are they credit or risk ratings. The Morningstar Medalist Rating (i) should not be used as the sole basis in evaluating an investment product, (ii) involves unknown risks and uncertainties which may cause expectations not to occur or to differ significantly from what was expected, (iii) are not guaranteed to be based on complete or accurate assumptions or models when determined algorithmically, (iv) involve the risk that the return target will not be met due to such things as unforeseen changes in changes in management, technology, economic development, interest rate development, operating and/or material costs, competitive pressure, supervisory law, exchange rate, tax rates, exchange rate changes, and/or changes in political and social conditions, and (v) should not be considered an offer or solicitation to buy or sell the investment product. A change in the fundamental factors underlying the Morningstar Medalist Rating can mean that the rating is subsequently no longer accurate.

About Morningstar, Inc.

Morningstar, Inc. is a leading provider of independent investment research in North America, Europe, Australia, and Asia. The company offers an extensive line of products and services for individual investors, financial advisors, asset managers, and retirement plan providers and sponsors. Morningstar provides data on more than 500,000 investment offerings, including stocks, mutual funds, and similar vehicles, along with real-time global market data on more than 17 million equities, indexes, futures, options, commodities, and precious metals, in addition to foreign exchange and Treasury markets. The company has operations in 29 jurisdictions.

MORNINGSTAR[®]