



FUNDATA
INDICES

Fundata Prospectus Risk Indices™

Objectives and Methodology

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Introduction

The purpose of the Fundata Prospectus Risk Indices is to compare the performance and volatility of prospectus-issuing funds with similar risk classifications.

The indices track the performance and risk-return profiles of the constituent mutual funds in each of the five prospectus risk rating groups:

- **Low Risk**
- **Low to Medium Risk**
- **Medium Risk**
- **Medium to High Risk**
- **High Risk**

This unique segmentation of the Canadian retail fund market space allows investors, advisors, and regulators to determine whether or not a fund is categorized with the appropriate risk classification and whether or not the level of return is acceptable for the given risk level.

Objectives

Indices based on asset mixes, sector mixes, and geographical mixes are prevalent and largely available to the public. For the most part, these indices are investable (one can invest in a portfolio to replicate the index), quantifiable (the performance of the index is easily measurable), and transparent; however, they can differ significantly in understandability.

The general purpose of existing indices is to provide performance comparison of a security or portfolio, or to give an overview of the performance of the market or a segment of the market. The segmentation is generally what makes an index unique, the purpose of segmentation being to provide comparison between similar securities.

The motivation for creating the Fundata Prospectus Risk Indices stemmed from the opportunity to cre-

ate a unique segmentation of the Canadian mutual fund market. Fundata collects prospectus risk data on an ongoing basis with tested algorithms in place to ensure current and accurate data. The Fundata database has over 12,300 active prospectus-issuing funds, and Fundata has collected a prospectus risk rating on 99.9% of these funds.

Prospectus Risk rating is one of Fundata's most popular and unique data points, because investors and advisors are becoming increasingly aware of the importance of considering investment risks. The Fundata Prospectus Risk Indices are intended to give mutual fund investors and advisors a tool for performance comparison among mutual funds with similar risk prospects.

There are several important properties assumed by a good index (Financial Enterprise Risk Management, Paul Sweeting, 2011):

- ✓ **Unambiguous:** The components and constituents should be well defined.
- ✓ **Investable:** It should be possible to buy the components and track the index.
- ✓ **Measurable:** It should be possible to quantify the value of the index frequently.
- ✓ **Appropriate:** It should be consistent with an investor's style and objectives.
- ✓ **Reflects current investment opinion:** It should contain components about which the investor has opinions, both positive and negative.
- ✓ **Specified in advance:** It should be known by all participants before the period of assessment has begun.

Structure and Creation

Constituent Funds

First and foremost, only funds with more than three years of history are considered. Merged and terminated funds are included in the historical index components at the time of their existence to avoid survivorship bias. Funds with more than three years are grouped according to their prospectus risk classification at the beginning of the month. Institutional and F-Series funds are excluded on the basis of the different fee structures and the lack of availability to the retail investor. U.S. dollar funds are excluded when they are a purchase option of a Canadian dollar fund because the different currency can add a level of risk not necessarily accounted for in the prospectus risk rating. Money Market funds are excluded on the basis that there is very little variation among the funds in terms of performance or risk-return profiles. The inclusion of Money Market funds would require that they be grouped with the majority of fixed-income funds, which has been determined to be an unjust comparison.

Funds that meet the criteria above are subject to an outlier test outlined below. The test is applied to each group individually.

Outliers

There was a need to identify and remove outliers from each group to prevent potentially misclassified funds from having significant influence on the data. An outlier is defined as “an observation from a different distribution than the rest of the data.” (<http://www.cee.vt.edu/ewr/environmental/teach/smprimer/outlier/outlier.html>)

In the case of prospectus risk data, mutual fund managers can assign a level of risk that they feel is suitable for the fund. Standard deviation is consid-

ered a widely understood risk measure and the most effective tool in quantifying the price volatility risk of a fund. According to the IFIC Voluntary Guidelines for Fund Managers Regarding Fund Volatility Risk Classification, standard deviation is the best measure of portfolio risk and thus should be related to the prospectus risk ranking assigned to the fund. As a result, prospectus risk classification is assumed to be largely derived from the potential standard deviation of the price movement of the fund. For this reason, three-year annualized standard deviation is used for identifying potential outliers in each group.

This can cause significant discrepancies when comparing the standard deviation of the given fund versus the standard deviation of other funds with the same classification.

For example, a fund with prospectus risk rating of “Medium” can actually show a standard deviation that is very high and matches more closely with the funds in the “High” rating group. Such funds can be considered misclassified or outliers relative to the rest of the funds with the same risk classification. Several methods were considered to eliminate or dampen the effect of these misclassified funds.

In determining a method to identify outliers, the underlying data was tested for normality. Initially the PP-Plots showed that the data was not normally distributed for all groups and therefore the normality assumption could not be used in determining and eliminating outliers. After Money Market funds were removed, the data showed a distribution much closer to normal.

Four methods were considered for identifying outliers including percentiles, Z-score, modified Z-score, and Inter-Quartile-Range. The Inter-Quartile-Range (IQR) method was chosen.

Inter-Quartile Range (IQR)

The IQR method considers the overall volatility of the group by determining the first and third quartiles of the group. Taking the difference between the first and third quartiles identifies the level of concentration within the group and thus provides some insight as to the overall volatility of the group. This ensures that the overall volatility of the group is considered before identifying any outliers. It is expected that the overall volatility of each group will change over time, and therefore the IQR numbers are run every month as opposed to creating fixed thresholds.

The IQR is the difference between the first and third quartiles in the data set. Data points are considered to be outliers if they are:

1. Less than the Lower Fence (first quartile minus 1.5 times the IQR)
2. Greater than the Upper Fence (third quartile plus 1.5 times the IQR)

$$\text{Inter Quartile Range} = Q3 - Q1$$

$$\text{Lower inner fence} = Q1 - 1.5 \times \text{IQR}$$

$$\text{Upper inner fence} = Q3 + 1.5 \times \text{IQR}$$

After the risk ratings of the outliers are checked, the list for each risk group is published along with the constituents every month.

Methodology

Several different possibilities were considered for the methodology of the Fundata Prospectus Risk Indices.

The **Laspeyres' concept** takes the value of a "basket" of goods at a specific point in time and then measures the change in the values of the same basket of goods at a later point in time. The change in the index is based on the change in the value of the basket of goods.

The "**active index**" approach for mutual funds looks at the individual holdings of each constituent fund. A base value is created by multiplying the market price by the quantity of each constituent fund's holdings on the base date. A current market value is then created by taking the current market price of the same shares that were evaluated on the base date.

Market weighted indices assign a weighting to each constituent based on market capitalization. The market value of the index is then calculated by adding the collective market caps of the constituents and dividing by the total number of securities belonging to the constituents.

The Fundata Prospectus Risk Indices are **equal weighted**. In other words, each constituent mutual fund is assigned the same weight towards the index movement. Fundata has an extensive mutual fund database complete with monthly performance figures for over 12,300 mutual funds. Because a mutual fund is unitized by calculating the net asset value per share (NAVPS), taking a "size weighted" average is not necessary.

Performance Index

Each performance index is constructed by taking the average monthly returns of the constituent funds within each Prospect Risk group. This average is then applied to an index value to determine the change in the index value. Historical monthly returns are used to back-fill the index.

Risk versus Return Index

The Risk versus Return Index is based on the same constituents as the Performance Index. Funds are grouped according to prospectus risk rating, and their 3-year annualized standard deviation is plotted against their 3-year compound return in scatter plot format. The same is done for 5-year standard deviation and compound return.

To be repeated each month:

1. The starting index value is determined (value of 1,000 at January 1, 2000).
2. The constituents test is run.
 - 2.1 Funds must have at least three years of history.
 - 2.2 Funds with terminated or merged status are added to avoid survivorship bias.
 - 2.3 Money Market funds are excluded.
 - 2.4 Institutional and F-Series funds are excluded.
 - 2.5 U.S. dollar funds are excluded when they are a purchase option of Canadian dollar funds
 - 2.6 Funds are grouped according to prospectus risk ratings on the first day of the month.
 - 2.7 The outlier test is run.
3. Funds that survive the outlier become the constituent funds.
4. The average 1-month return of the constituent funds is calculated for each risk group and applied to the previous value of the index.
5. New index value is created.

By using Fundata's data warehouse, there will be no survivorship bias.

Occasionally Fundata is required to make changes to the historical NAVPS or distributions of a fund. The historical index values will be frozen and will not vary, even with changes in Fundata's historical database unless the change is deemed significant enough to have a substantial impact on the value of the index. In that case the change will be announced to subscribers, and the index values will be recalculated.

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Transforming raw market data into mission-critical information flow

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