

S&P Dow Jones Indices

A Division of **S&P Global**

Dow Jones Target Date Indices *Methodology*

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Table of Contents

Introduction	3
Index Objective	3
Highlights and Index Family	3
Supporting Documents	4
Index Construction	5
Index Composition	5
Index Calculations	5
Determining CMAC Allocations	5
Risk Allocation	6
Application of Modern Portfolio Theory Principles	6
The Optimization Process	7
Additional Constraints and Rules Affecting CMAC Allocations	7
Index Maintenance	9
Rebalancing	9
Currency of Calculation and Additional Index Return Series	9
Base Dates and History Availability	10
Index Governance	11
Index Committee	11
Index Policy	12
Announcements	12
Holiday Schedule	12
Unexpected Exchange Closures	12
Recalculation Policy	12
Contact Information	12
Index Dissemination	13
Tickers	13
Index Data	13
Web site	13
Appendix A	14
Relative Equity Risk	14
Appendix B	15
Methodology Changes	15

Introduction

Index Objective

The Dow Jones Target Date Indices serve as market risk-sensitive benchmarks for target date, or "lifecycle", funds. They are typically used in defined contribution retirement or similar plans for long-term capital accumulation goals.

The indices comprise a series of risk allocations corresponding to target date years. They are composed of sub-indices ranging across several asset classes. The indices adjust their asset allocations over time to reflect reductions in potential risk as an investor's target date approaches. This aspect of asset class exposure is frequently referred to as a "target date glide path", wherein total equity exposure typically lessens with the passage of time.

Highlights and Index Family

The indices reflect a target date glide path comprising stocks, bonds, and cash. Each target date index is a combination of sub-indices, each representing one of the major asset classes and referred to as a Composite Major Asset Class (CMAC). In turn CMAC's are composed of sub-asset class indices. The table below shows the asset class structure.

Dow Jones Target 20XX Index			
CMAC	Equities	Fixed Income	Cash Equivalents
Sub-Asset Class	Domestic, Developed International, Emerging Markets	U.S. Governments, U.S. Corporates, U.S. Mortgages, International	1-3 Month T-bills

Sub-asset class indices are equally weighted within each CMAC. However, CMAC's are weighted differently within each target date index depending on its time horizon. Each month, CMAC allocations are rebalanced to reflect an increasingly conservative asset mix.

The Dow Jones Target Date Index family currently includes global and U.S. indices with target dates extending through 2065. New indices are expected to be added in five-year increments.

Currently available are global and U.S. series, for target dates extending through 2065:

Global Series	U.S. Series
Dow Jones Target 2065 Index	Dow Jones U.S. Target 2065 Index
Dow Jones Target 2060 Index	Dow Jones U.S. Target 2060 Index
Dow Jones Target 2055 Index	Dow Jones U.S. Target 2055 Index
Dow Jones Target 2050 Index	Dow Jones U.S. Target 2050 Index
Dow Jones Target 2045 Index	Dow Jones U.S. Target 2045 Index
Dow Jones Target 2040 Index	Dow Jones U.S. Target 2040 Index
Dow Jones Target 2035 Index	Dow Jones U.S. Target 2035 Index
Dow Jones Target 2030 Index	Dow Jones U.S. Target 2030 Index
Dow Jones Target 2025 Index	Dow Jones U.S. Target 2025 Index
Dow Jones Target 2020 Index	Dow Jones U.S. Target 2020 Index
Dow Jones Target 2015 Index	Dow Jones U.S. Target 2015 Index
Dow Jones Target 2010 Index	Dow Jones U.S. Target 2010 Index
Dow Jones Target 2005 Index	Dow Jones U.S. Target 2005 Index
Dow Jones Target Today Index	Dow Jones U.S. Target Today Index

Supporting Documents

This methodology is meant to be read in conjunction with supporting documents providing greater detail with respect to the policies, procedures and calculations described herein. References throughout the methodology direct the reader to the relevant supporting document for further information on a specific topic. The list of the main supplemental documents for this methodology and the hyperlinks to those documents is as follows:

Supporting Document	URL
S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology	Equity Indices Policies & Practices
S&P Dow Jones Indices' Index Mathematics Methodology	Index Mathematics Methodology
S&P Dow Jones Indices' Fixed Income Policies & Practices Methodology	Fixed Income Policies & Practices
S&P Dow Jones Indices' Fixed Income Index Mathematics Methodology	Index Mathematics Methodology

This methodology was created by S&P Dow Jones Indices to achieve the aforementioned objective of measuring the underlying interest of each index governed by this methodology document. Any changes to or deviations from this methodology are made in the sole judgment and discretion of S&P Dow Jones Indices so that the index continues to achieve its objective.

Index Construction

Index Composition

Each Dow Jones Target Date Index tracks three Composite Major Asset Classes (CMACs) – stocks, bonds and cash. The CMACs are represented by the sub-indices listed below.

Global Series	U.S. Series
Dow Jones Global Stock CMAC Index	Dow Jones U.S. Stock CMAC Index
Dow Jones U.S. Large-Cap Growth Index	Dow Jones U.S. Large-Cap Growth Index
Dow Jones U.S. Large-Cap Value Index	Dow Jones U.S. Large-Cap Value Index
Dow Jones U.S. Mid-Cap Growth Index	Dow Jones U.S. Mid-Cap Growth Index
Dow Jones U.S. Mid-Cap Value Index	Dow Jones U.S. Mid-Cap Value Index
Dow Jones U.S. Small-Cap Growth Index	Dow Jones U.S. Small-Cap Growth Index
Dow Jones U.S. Small-Cap Value Index	Dow Jones U.S. Small-Cap Value Index
Dow Jones Europe/Canada/Middle East Developed Markets Index	
Dow Jones Asia/Pacific Developed Markets Index	
S&P Emerging LargeMidCap Index	
S&P Bond Composite – Global Index	S&P Bond Composite – U.S. Index
S&P U.S. Government Bond Index	S&P U.S. Government Bond Index
S&P U.S. Dollar Global Investment Grade Corporate Bond Index	S&P U.S. Dollar Global Investment Grade Corporate Bond Index
S&P U.S. Mortgage-Backed Securities Index	S&P U.S. Mortgage-Backed Securities Index
S&P Global Developed Sovereign Ex-U.S. Bond Index	
S&P Cash Composite – Global Index	S&P Cash Composite – U.S. Index
S&P U.S. Treasury Bill 0-3 Month Index	S&P U.S. Treasury Bill 0-3 Month Index

For information on the underlying component indices, please refer to their respective index methodologies available at www.spdji.com.

Index Calculations

Index returns are calculated daily. Each index return is equal to the sum of the weighted returns of its components.

Determining CMAC Allocations

Each Dow Jones Target Date Index adjusts its risk level according to the time remaining to its target date. Allocations to stocks, bonds and cash are modified monthly to achieve a decreasing level of risk (from aggressive to conservative) beginning 35 years (420 months) prior to December 31 of the target date year, and continuing for 10 years (120 months) past the target date year. Target years are in five-year increments.

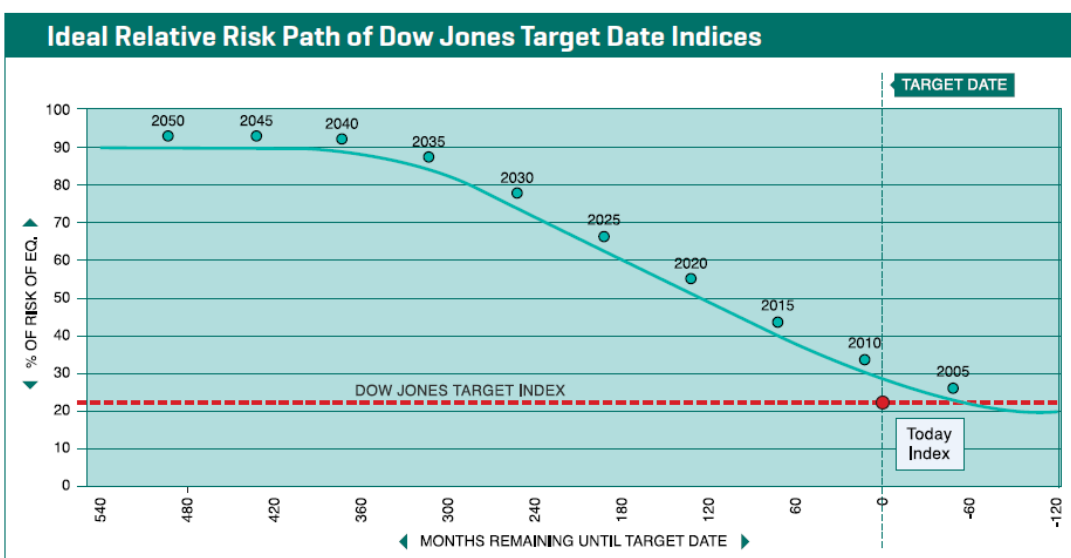
The Dow Jones Target Date Indices assign CMAC allocations that target specific market risk levels based on a pre-determined glide path providing a planned level of market risk exposure over a fifty-year period.

Risk levels are measured as a percentage of the amount of the historic market risk (based on a 36-month rolling semi-variance) experienced by the equity portion of the index.

Risk Allocation

The risk space addressed in the Dow Jones Target Date Indices lies between the risk of a diversified stock portfolio and T-Bills (cash). Risk is approached as a proportion of the risk of the stock market, so this construct assumes the market risk of the stock CMAC will always be greater than that of the fixed income and cash CMAC's.

The risk of the Dow Jones Target Date Indices begins with 90% of the risk of an all-stock portfolio (as measured by the stock CMAC) 35 years or more from the respective target date and decreases to 20% of the risk of an all-stock portfolio on December 31 of the tenth year past the target date year.



The Dow Jones Target Date Indices' systematic reduction of potential risk [as represented by the equity index component] over time reflects higher levels of potential risk in the early years and lower levels of potential risk in the years immediately prior to the target date.

Please refer to Appendix A for a Relative Equity Risk Table.

Rather than using the variance of all returns (positive and negative), the Dow Jones Target Date Indices optimize the expected return of the index based on historic rolling 36-month below-mean semi-variance of monthly returns – in short, negative return variance.

The appeal of using semi-variance as a measure of risk is that it measures only the below-average outcomes (negative outcomes) rather than positive and negative outcomes – as variance does. If the return distributions of the asset class were perfectly symmetrical, semi-variance would be half the full variance and the effects of using semi-variance would be moot. However, the distributions are rarely perfectly symmetrical.

Application of Modern Portfolio Theory Principles

A simple but important assumption underlies the Dow Jones Target Date Indices: The primary goal of any portfolio is to maximize return for the amount of risk incurred. To incorporate this premise into the index construction process, the Dow Jones Target Date Indices utilize an optimization algorithm to derive CMAC allocations.

In Modern Portfolio Theory (MPT) optimization, the optimal allocation depends on three aspects of the returns being optimized: historical risk, expected return, and historical covariance of returns. The optimization program seeks allocations that maximize expected return for a given portfolio risk based on below-average historical risk, as well as historical covariance.

The Optimization Process

The model attempts to maximize returns for given levels of risk. Running the optimization process with a given portfolio risk means that the individual risk and portfolio covariance leads to a set of allocations that historically produced the particular portfolio risk. The optimal return of this portfolio, therefore, is a function of the weighted expected returns of the CMACs:

$$R_{ab} = X_a R_a + X_b R_b + X_c R_c$$

where:

R_{ab} = Index Expected Return

R_a = Expected Return Cash CMAC

R_b = Expected Return Bond CMAC

R_c = Expected Return Stock CMAC

X_a = Allocation to Cash CMAC

X_b = Allocation to Bond CMAC

X_c = Allocation to Stock CMAC

The Dow Jones Target Date Indices use expected returns of 6% for the stock CMAC, 3% for the bond CMAC, and 1% for the cash equivalent CMAC as inputs to the optimization calculation. The model is constrained to a minimum allocation of 4% for any of the three CMACs. For the Dow Jones Target Today Indices, the minimum allocation for cash is set at 5%. These minimums can, in certain cases, affect the allocations of the optimal portfolio.

Additional Constraints and Rules Affecting CMAC Allocations

Dow Jones Target Date Indices' risk levels are primarily defined by the risk allocation of the glide path. Optimization is used to tilt allocations around the targeted risk level to enhance risk management.

The Dow Jones Target Date Indices impose two additional rules on the optimized allocations:

1. At any point along the glide path, each Target Date Index's equity exposure must fall within plus or minus 5% of its targeted level of equity risk.
 - a. To implement Rule 1, if an index's optimized equity allocation falls within plus or minus 5%, no adjustment is made. If an index's equity allocation falls outside the plus or minus 5% range, an adjustment is made, as follows:
 - i. **Equity Allocation Exceeds Acceptable Ceiling.** If the equity allocation exceeds the targeted equity risk by more than 5%, the equity allocation is lowered to equal the targeted equity risk plus 5%. Bond exposure is increased by an amount equal to the reduction in equity. In other words, any reduction in equity is offset by an increase in bonds.
 - ii. **Equity Allocation below Acceptable Floor.** If the equity allocation falls below the targeted equity risk by more than 5%, the equity allocation is increased to equal the targeted equity risk minus 5%. The cash allocation is lowered to offset the increase in equity exposure. Once the minimum cash allocation (4% for "Dated" Target Date Indices and 5% for the "Today" Indices) has been reached, a reduction in the bond allocation is implemented.

2. The month-to-month allocation changes for both the equity and bond asset classes are limited to 3%.
 - a. If optimized stock or bond allocations move more than 3% from the end-of-prior-month allocations, the stock and bond allocations are limited to a 3% change with the cash allocation changing to accommodate a 100% allocation over the combined three asset classes.

Interaction of Rule 1 and Rule 2. If the optimized stock allocations move to an amount outside the 5% risk bands, Rule 1 takes precedence and the final stock allocation for the month is set at the upper or lower limit as necessary. The bond allocation is then set based on Rule 1 unless this causes a violation of Rule 2 which then automatically limits the change in the bond allocation to within 3% of the previous month's bond allocation. The cash allocation makes up the remaining allocation after Rules 1 and 2 are applied.

If neither Rule 1 nor 2 is triggered, then the allocations are set as indicated by the optimizer.

Sub-Index Weights within each CMAC. Each sub-index is equally weighted within each CMAC.

Index Maintenance

Rebalancing

The indices are rebalanced monthly after the close of the last index calculation day of each month. The new CMAC allocation will take effect on the first index calculation day of the following month.

At each rebalancing, each Dow Jones Target Date Index always represents at least 4% stocks, 4% bonds, and 4% cash through its underlying indices. The weighting of each asset class as represented by the sub-indices is not allowed to drop below 4%.

Currency of Calculation and Additional Index Return Series

The indices are calculated in U.S. dollars.

WM/Reuters foreign exchange rates are taken daily at 04:00 PM London time and used in the calculation of the indices. These mid-market fixings are calculated by the WM Company based on Reuters' data and appear on Reuters pages WMRA.

In addition to the indices detailed in this methodology, additional return series versions of the indices may be available, including, but not limited to: currency, currency hedged, decrement, fair value, inverse, leveraged, and risk control versions. For a list of available indices, please refer to [S&P DJI's All Indices by Methodology Report](#).

For information on the calculation of different types of indices, please refer to S&P Dow Jones Indices' Index Mathematics Methodology.

For the inputs necessary to calculate certain types of indices, including decrement, dynamic hedged, fair value, and risk control indices, please refer to the Parameters documents available at www.spdji.com.

Base Dates and History Availability

Index history availability, base dates, and base values are shown in the table below.

Dow Jones Target Date Indices	Launch Date	First Value Date	Base Date	Base Value
Global Series				
Dow Jones Target 2065 Index	08/31/2020	12/31/1982	12/31/1982	10.62
Dow Jones Target 2060 Index	03/09/2015	12/31/1982	12/31/1982	10.62
Dow Jones Target 2055 Index	03/01/2010	12/31/1982	12/31/1982	10.62
Dow Jones Target 2050 Index	12/31/2009	12/31/1982	12/31/1982	10.62
Dow Jones Target 2045 Index	03/07/2005	12/31/1982	12/31/1982	10.62
Dow Jones Target 2040 Index	03/07/2005	12/31/2005	12/31/2005	183.17
Dow Jones Target 2035 Index	03/07/2005	12/31/1982	12/31/1982	10.62
Dow Jones Target 2030 Index	03/07/2005	12/31/1982	12/31/1982	10.62
Dow Jones Target 2025 Index	03/07/2005	12/31/1982	12/31/1982	10.71
Dow Jones Target 2020 Index	03/07/2005	12/31/1982	12/31/1982	11.02
Dow Jones Target 2015 Index	03/07/2005	12/31/2006	12/31/2006	194.48
Dow Jones Target 2010 Index	03/07/2005	12/31/1982	12/31/1982	12.73
Dow Jones Target 2005 Index	03/07/2005	12/31/1982	12/31/1982	14.73
Dow Jones Target Today Index	03/07/2005	12/31/1982	12/31/1982	11.98
U.S. Series				
Dow Jones U.S. Target 2065 Index	08/31/2020	12/31/1982	12/31/1982	11.98
Dow Jones U.S. Target 2060 Index	03/09/2015	12/31/1982	12/31/1982	11.98
Dow Jones U.S. Target 2055 Index	03/01/2010	12/31/1982	12/31/1982	11.98
Dow Jones U.S. Target 2050 Index	12/31/2009	12/31/1982	12/31/1982	11.98
Dow Jones U.S. Target 2045 Index	03/07/2005	08/31/2005	08/31/2005	179
Dow Jones U.S. Target 2040 Index	03/07/2005	12/31/1982	12/31/1982	11.98
Dow Jones U.S. Target 2035 Index	03/07/2005	12/31/2000	12/31/2000	145.68
Dow Jones U.S. Target 2030 Index	03/07/2005	12/31/1982	12/31/1982	11.98
Dow Jones U.S. Target 2025 Index	03/07/2005	12/31/1982	12/31/1982	12.14
Dow Jones U.S. Target 2020 Index	03/07/2005	12/31/1982	12/31/1982	12.64
Dow Jones U.S. Target 2015 Index	03/07/2005	12/31/1982	12/31/1982	13.51
Dow Jones U.S. Target 2010 Index	03/07/2005	12/31/2004	12/31/2004	172.34
Dow Jones U.S. Target 2005 Index	03/07/2005	12/31/1982	12/31/1982	16.62
Dow Jones U.S. Target Today Index	03/07/2005	12/31/1982	12/31/1982	11.98

Index Governance

Index Committee

S&P Dow Jones Indices' Factor Index Committee maintains the indices. All Committee members are full-time professional members of S&P Dow Jones Indices' staff. The Committee meets monthly.

The Committee may revise index policy covering rules for including other component indices, currencies, the timing of rebalancing, or other matters. S&P Dow Jones Indices considers information about changes to its indices and related matters to be potentially market moving and material. Therefore, all Index Committee discussions are confidential.

S&P Dow Jones Indices' Index Committees reserve the right to make exceptions when applying the methodology if the need arises. In any scenario where the treatment differs from the general rules stated in this document or supplemental documents, clients will receive sufficient notice, whenever possible.

In addition to the daily governance of indices and maintenance of index methodologies, at least once within any 12-month period, the Index Committee reviews the methodology to ensure the indices continue to achieve the stated objectives, and that the data and methodology remain effective. In certain instances, S&P Dow Jones Indices may publish a consultation inviting comments from external parties.

For information on Quality Assurance and Internal Reviews of Methodology, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Index Policy

Announcements

Index data is evaluated daily. Anything affecting the daily index calculation is announced to clients via an index announcement.

For more information, please refer to the Announcements section of S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Holiday Schedule

The global series is calculated daily, Sunday through Friday. The U.S. series is calculated daily Monday through Friday. The U.S. series is not calculated on U.S. market holidays.

A complete holiday schedule for the year is available on S&P Dow Jones Indices' Web site at www.spdji.com.

Unexpected Exchange Closures

For information on Unexpected Exchange Closures, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Recalculation Policy

For information on the recalculation policy, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

For information on Calculations and Pricing Disruptions, Expert Judgment and Data Hierarchy, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Contact Information

For questions regarding an index, please contact: index_services@spglobal.com.

Index Dissemination

Index levels are available through S&P Dow Jones Indices' Web site at www.spdji.com, major quote vendors (see codes below), numerous investment-oriented Web sites, and various print and electronic media.

Tickers

The table below lists headline indices covered by this document. All versions of the below indices that may exist are also covered by this document. Please refer to [S&P DJI's All Indices by Methodology Report](#) for a complete list of indices covered by this document.

Dow Jones Target Date Indices	Bloomberg	RIC
Global Series		
Dow Jones Target 2065 Index	DJTGT65	.DJTGT65
Dow Jones Target 2060 Index	DJTGT60	.DJTGT60
Dow Jones Target 2055 Index	DJTGT55	.DJTGT55
Dow Jones Target 2050 Index	DJTGT50	.DJTGT50
Dow Jones Target 2045 Index	DJTGT45	.DJTGT45
Dow Jones Target 2040 Index	DJTGT40	.DJTGT40
Dow Jones Target 2035 Index	DJTGT35	.DJTGT35
Dow Jones Target 2030 Index	DJTGT30	.DJTGT30
Dow Jones Target 2025 Index	DJTGT25	.DJTGT25
Dow Jones Target 2020 Index	DJTGT20	.DJTGT20
Dow Jones Target 2015 Index	DJTGT15	.DJTGT15
Dow Jones Target 2010 Index	DJTGT10	.DJTGT10
Dow Jones Target 2005 Index	DJTGT05	.DJTGT05
Dow Jones Target Today Index	DJTGT	.DJTGT
U.S. Series		
Dow Jones U.S. Target 2065 Index	DJUSTG65	.DJUSTG65
Dow Jones U.S. Target 2060 Index	DJUSTG60	.DJUSTG60
Dow Jones U.S. Target 2055 Index	DJUSTG55	.DJUSTG55
Dow Jones U.S. Target 2050 Index	DJUSTG50	.DJUSTG50
Dow Jones U.S. Target 2045 Index	DJUSTG45	.DJUSTG45
Dow Jones U.S. Target 2040 Index	DJUSTG40	.DJUSTG40
Dow Jones U.S. Target 2035 Index	DJUSTG35	.DJUSTG35
Dow Jones U.S. Target 2030 Index	DJUSTG30	.DJUSTG30
Dow Jones U.S. Target 2025 Index	DJUSTG25	.DJUSTG25
Dow Jones U.S. Target 2020 Index	DJUSTG20	.DJUSTG20
Dow Jones U.S. Target 2015 Index	DJUSTG15	.DJUSTG15
Dow Jones U.S. Target 2010 Index	DJUSTG10	.DJUSTG10
Dow Jones U.S. Target 2005 Index	DJUSTG05	.DJUSTG05
Dow Jones U.S. Target Today Index	DJUSTGT	.DJUSTGT

Index Data

Daily index levels and data are available via subscription.

For product information, please contact S&P Dow Jones Indices, www.spdji.com/contact-us.

Web site

For further information, please refer to S&P Dow Jones Indices' Web site at www.spdji.com.

Appendix A

Relative Equity Risk

Years to Retirement	Relative Equity Risk
35	90.00%
34	89.91%
33	89.66%
32	89.24%
31	88.64%
30	87.89%
29	86.97%
28	85.90%
27	84.68%
26	83.32%
25	81.81%
24	80.18%
23	78.42%
22	76.55%
21	74.57%
20	72.50%
19	70.34%
18	68.11%
17	65.82%
16	63.47%
15	61.08%
14	58.66%
13	56.22%

Years to Retirement	Relative Equity Risk
12	53.78%
11	51.34%
10	48.92%
9	46.53%
8	44.18%
7	41.89%
6	39.66%
5	37.50%
4	35.43%
3	33.45%
2	31.58%
1	29.82%
0	28.19%
-1	26.68%
-2	25.32%
-3	24.10%
-4	23.03%
-5	22.11%
-6	21.36%
-7	20.76%
-8	20.34%
-9	20.09%
-10	20.00%

Appendix B

Methodology Changes

Methodology changes since January 1, 2015 are as follows:

Change	Effective Date (After Close)	Previous	Methodology Updated
Fixed Income Component Indices	12/31/2017	<ul style="list-style-type: none"> • Barclays Government Bond Index • Barclays Corporate Bond Index • Barclays Mortgage Bond Index • Barclays Majors (ex U.S.) Index • Barclays 1-3 month T-bill index 	<ul style="list-style-type: none"> • S&P U.S. Government Bond Index • S&P U.S. Dollar Global Investment Grade Corporate Bond Index • S&P U.S. Mortgage-Backed Securities Index • Global Developed Sovereign Ex-U.S. Bond Index • S&P U.S. Treasury Bill 0-3 Month Index
Equity Component Index	07/31/2017	<ul style="list-style-type: none"> • Dow Jones Emerging Markets Large-Cap Total Stock Market Specialty Index 	<ul style="list-style-type: none"> • S&P Emerging LargeMidCap Index

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