



# Methodology Summary: Target Date Strategies Study

February 2023

ur analysts examined the performance of 11
T. Rowe Price Retirement Funds (RFs) to determine the value added for clients by the firm's target date design process and investment implementation, both at the RF level and in the management of the underlying strategies.

#### **The Study Universe**

The 11 RFs included in the study (Figure 1) were those that had at least 10-year performance histories as of December 31, 2022. Two RFs with relatively distant target dates (2060 and 2065) were excluded from the study because of their relatively short performance track records. The Retirement 2060 Fund incepted June 23, 2014, while the Retirement 2065 Fund incepted October 13, 2020. A separate set of target date funds using an alternative T. Rowe Price-designed glide path (the target glide path) also was excluded from the study because of their limited historical track records. (See Figure 2 for a list of these funds and their inception dates.) Additionally, a separate set of target date funds, the Retirement Blend Funds, were excluded from the study. These funds, which invest in an underlying mix of actively managed funds and passively managed index funds, incepted on July 26, 2021, and, thus, had extremely limited historical track records. The T. Rowe Price funds included in the study held nearly all (approximately 96%) of the RF assets managed by the firm as of December 31, 2022.

As of December 31, 2022, each RF invested its assets in a portfolio of up to 24 underlying T. Rowe Price funds covering the major global equity and fixed income sectors (Figure 3). Twenty-two of the 24 underlying T. Rowe Price funds were actively managed, while two—a large-cap U.S. stock allocation and a long-term U.S. Treasury allocation—used passive management to replicate the returns for their benchmarks (the S&P 500 Index and the Bloomberg U.S. Long Treasury Bond Index, respectively).

#### **Performance Periods**

The performance of each RF in the study was examined across 1-, 3-, 5-, and 10-year rolling periods (rolled monthly) since each RF's inception through December 31, 2022. Because these inception dates—and, thus, fund longevities—differed, the number of rolling performance periods also varied for each RF. The total rolling periods in each time frame for each RF are shown in Figure 4.

It should be noted that the number of rolling performance periods declined as the time frames were lengthened. The number of rolling 10-year periods was relatively small, especially for RFs with 2050 and 2055 target dates. Accordingly, the performance results shown for 10-year rolling periods for those funds may have relatively limited statistical significance.

Full performance results for each RF over 1-, 3-, 5-, and 10-year rolling periods can be found in Figures 5, 6, and 7.

#### **Performance Metrics**

Our analysis used two specific measures to quantify RF performance:

- Active success rates: the percentage of all rolling periods in each time frame (one, three, five, and 10 years) in which an RF either outperformed a specific benchmark or a component of T. Rowe Price's target date process made a positive contribution to RF returns (see Performance Benchmarks). A positive success rate for a fund was defined as achieving a higher return than the relevant benchmark in more than 50% of all periods included in the study.
- Excess returns: the actual margin of relative RF performance (either positive or negative) against its benchmark or the contribution (positive or negative) that a component of the T. Rowe Price target date process made to RF returns, each in basis points. Excess returns for rolling periods of more than one year were annualized. The excess returns shown in the various

tables in the study are the average results across all of the rolling time periods in each 1-, 3-, 5-, and 10-year time frame.

#### **Performance Benchmarks**

The objective of the study was to quantify the value added by tactical asset allocation and our management of the underlying strategies. Accordingly, active success rates and excess returns were calculated relative to:

 The appropriate vintages in a family of target date indexes created by Standard & Poor's, which reflect "consensus" strategic asset allocations and glide paths for the industry as a whole based on an annual survey of reported portfolio holdings.

- Hypothetical returns for the RFs based solely on their long-term strategic asset allocations and glide paths (in other words, excluding the effects of tactical allocation).
- The appropriate asset class, sector, and/or style benchmarks for the underlying T. Rowe Price funds in the RF portfolios. For each rolling period, the relative performances of the underlying funds were aggregated to determine if they collectively added to or detracted from RF active performance.

#### (Fig. 1) Retirement Funds Included in Our Performance Study

Sources: T. Rowe Price and Standard & Poor's (see Additional Disclosures).

#### (Fig. 2)

Not Included in the Performance Study

Source: T. Rowe Price.

#### T. Rowe Price Target Funds

Fund	Inception Date	
Target 2005 Fund	8/20/2013	
Target 2010 Fund	8/20/2013	
Target 2015 Fund	8/20/2013	
Target 2020 Fund	8/20/2013	
Target 2025 Fund	8/20/2013	
Target 2030 Fund	8/20/2013	
Target 2035 Fund	8/20/2013	
Target 2040 Fund	8/20/2013	
Target 2045 Fund	8/20/2013	
Target 2050 Fund	8/20/2013	
Target 2055 Fund	8/20/2013	
Target 2060 Fund	6/23/2014	
Target 2065 Fund	10/13/2020	

**Date Included** 

#### (Fig. 3)

**Fund** 

As of December 31, 2022 **Source:** T. Rowe Price.

<sup>1</sup> Not included: U.S. Treasury Money Fund.

<sup>2</sup> Prior to October 1, 2020, the name of the U.S. Treasury Long-Term Index Fund was the U.S. Treasury Long-Term Fund.

<sup>3</sup> From inception to 2006, our conservative fixed income allocation was a mix of the T. Rowe Price Short-Term Bond Fund and the T. Rowe Price Summit Cash Reserves Fund (renamed the Cash Reserves Fund on August 1, 2016). In 2006, the T. Rowe Price Short-Term Income Fund replaced these two funds. In May 2011, the name and investment objective of the T. Rowe Price Short-Term Income Fund changed to the T. Rowe Price Inflation Focused Bond Fund, which is now known as the T. Rowe Price Limited Duration Inflation Focused Bond Fund.

#### Underlying T. Rowe Price Funds in Retirement Fund Portfolios<sup>1</sup>

U.S. Equity	
Equity Index 500	9/30/2002
U.S. Large-Cap Core	5/4/2020
U.S. Equity Research	12/1/2021
Growth Stock	9/30/2002
Value	9/30/2002
Mid-Cap Growth	9/30/2002
Mid-Cap Value	2/1/2004
Small-Cap Stock	9/30/2002
New Horizons	11/1/2005
Small-Cap Value	11/1/2005
Non-U.S. Equity	
Overseas Stock	12/1/2006
International Stock	9/30/2002
International Value Equity	2/1/2004
Emerging Markets Stock	5/1/2007
Emerging Markets Discovery Stock	5/13/2020
Fixed Income	
New Income	9/30/2002
International Bond (USD Hedged)	10/1/2017
Dynamic Global Bond	10/1/2017
High Yield	9/30/2002
Floating Rate	10/1/2017
Emerging Market Bond	5/1/2008
U.S. Treasury Long-Term Index <sup>2</sup>	10/1/2017
Limited Duration Inflation Focused Bond <sup>3</sup>	9/30/2002
Other	
Real Assets	7/1/2010

#### **Rolling Periods in Each Time Frame**

Fund Inceptions Through December 31, 2022

Source: T. Rowe Price.

<sup>1</sup> The S&P Target Date 2050 Index incepted in June 2008, and rolling periods are shown beginning in the first period shared with the Retirement 2050 Fund.

<sup>2</sup> The S&P Target Date 2055 Index incepted in June 2009, and rolling periods are shown beginning in the first period shared with the Retirement 2055 Fund.

Fund	1-Year	3-Year	5-Year	10-Year
Retirement 2005 Fund	215	191	167	107
Retirement 2010 Fund	232	208	184	124
Retirement 2015 Fund	215	191	167	107
Retirement 2020 Fund	232	208	184	124
Retirement 2025 Fund	215	191	167	107
Retirement 2030 Fund	232	208	184	124
Retirement 2035 Fund	215	191	167	107
Retirement 2040 Fund	232	208	184	124
Retirement 2045 Fund	200	176	152	92
Retirement 2050 Fund <sup>1</sup>	164	140	116	56
Retirement 2055 Fund <sup>2</sup>	152	128	104	44

#### **Active Success Rates and Average Value Added by Tactical Allocation** (Fig. 5)

Fund Inceptions Through

December 31, 2022

**Active Success Rates** 

Average Annualized Value Added (Basis Points) Rolling Periods

	Rolling	Periods		
1-Year	3-Year	5-Year	10-Year	1-Ye
66%	79%	83%	100%	18
70	80	87	100	20
69	79	87	100	19
72	78	85	100	21
65	76	85	100	18
69	77	87	100	19
63	71	84	100	15
64	72	86	100	14
59	66	82	100	12
55	62	80	100	10
54	62	78	100	9

Tioning r crious									
1-Year	3-Year	5-Year	10-Year						
18	15	14	15						
20	17	16	16						
19	17	15	15						
21	18	16	16						
18	15	13	14						
19	16	14	14						
15	12	10	12						
14	12	10	11						
12	9	8	9						
10	9	8	8						
9	8	7	7						

Source: T. Rowe Price.

**Fund** 

Retirement 2005 Fund Retirement 2010 Fund Retirement 2015 Fund Retirement 2020 Fund Retirement 2025 Fund Retirement 2030 Fund Retirement 2035 Fund Retirement 2040 Fund Retirement 2045 Fund Retirement 2050 Fund Retirement 2055 Fund

#### **Active Success Rates and Average Value Added by Security Selection** (Fig. 6)

Fund Inceptions Through December 31, 2022

Active Success Rates Rolling Periods

Average Annualized Value Added (Basis Points) Rolling Periods

December 31, 2022
Fund
Retirement 2005 Fund
Retirement 2010 Fund
Retirement 2015 Fund
Retirement 2020 Fund
Retirement 2025 Fund
Retirement 2030 Fund
Retirement 2035 Fund
Retirement 2040 Fund
Retirement 2045 Fund
Retirement 2050 Fund
Retirement 2055 Fund

1-Year	3-Year	5-Year	10-Year
49%	40%	49%	64%
51	47	53	73
57	65	73	84
57	71	80	91
60	76	90	93
57	78	88	94
59	81	92	93
58	79	90	94
60	81	93	91
58	82	92	89
59	82	92	89

1-Year	3-Year	5-Year	10-Year
8	9	12	10
4	8	11	13
17	16	19	18
17	21	23	26
29	28	32	31
27	31	34	37
37	37	42	42
30	36	40	43
38	40	43	43
37	42	39	39
37	42	39	39

Sources: Bloomberg Finance L.P., MSCI, Standard & Poor's, Russell, J.P. Morgan, Credit Suisse (see Additional Disclosures), and T. Rowe Price. Data analysis by T. Rowe Price.

#### **Active Success Rates and Average Value Added by Total Implementation** (Fig. 7)

Fund Inceptions Through December 31, 2022

#### **Active Success Rates**

#### Average Annualized Value Added (Basis Points)

December 31, 2022		Rolling	Periods			Rolling	Periods	
Fund	1-Year	3-Year	5-Year	10-Year	1-Year	3-Year	5-Year	10-Year
Retirement 2005 Fund	67%	89%	97%	100%	143	114	112	120
Retirement 2010 Fund	70	87	93	100	138	107	93	101
Retirement 2015 Fund	67	86	95	100	122	92	91	98
Retirement 2020 Fund	70	87	93	100	144	113	99	107
Retirement 2025 Fund	71	86	94	100	132	102	100	108
Retirement 2030 Fund	73	89	95	100	140	117	105	114
Retirement 2035 Fund	71	92	98	100	124	104	105	112
Retirement 2040 Fund	69	94	97	100	112	106	100	109
Retirement 2045 Fund	68	94	100	100	107	105	106	103
Retirement 2050 Fund	74	96	100	100	117	99	89	88
Retirement 2055 Fund	69	88	99	100	62	69	61	65

100%

100%

Sources: Standard & Poor's (see Additional Disclosures) and T. Rowe Price. Data analysis by T. Rowe Price.

100%

100%

#### **Tactical Asset Allocation**

**Percent of Funds With Positive** 

**Active Success Rates** 

For each RF, the actual weights of the underlying funds in the RF were multiplied by their style-specific benchmark returns to generate positioning inclusive of tactical allocation changes. These positions were then subtracted from each underlying fund's fixed strategic asset allocation weights multiplied by the style-specific benchmark returns. The result was the difference between actual positioning, including tactical decisions and implementation, versus strategic asset allocation positioning. This comparison enabled us to isolate the contribution to performance made by tactical allocation decisions.

#### **Security Selection**

Historical returns, net of fees and other costs, for the underlying T. Rowe Price funds in the Retirement Fund portfolios were measured relative to their specific asset class, sector, or style benchmarks. Two of these underlying funds, the Equity Index 500 Fund and the U.S. Treasury Long-Term Index Fund, are passively managed funds with the investment objectives of tracking the performance of the S&P 500 Index and the Bloomberg U.S. Long Treasury Bond Index, respectively. The other funds are all actively managed investment vehicles.

The indexes used to calculate excess returns in this analysis were the style-appropriate benchmarks used by the T. Rowe Price Asset Allocation Committee to evaluate the performance of the underlying funds in the RF portfolios (see Figure 8). The RF performance numbers shown in our study represent the true after-cost results for investors. Returns were based on reported net asset values and SEC standardized returns for the underlying funds from which management fees and operating expenses were subtracted. In other words,

returns for the underlying funds were based on the after-cost performance of the Investor Class up to the inception date of the Z Class (March 16, 2020) and the after-cost performance results since that date of the Z Class for each underlying fund, which is the class invested in by the Retirement Funds.

Excess returns for the underlying funds were aggregated for each rolling period to show the total contribution (positive or negative) made to the performance of each RF by security selection. Active success rates for positive aggregate return contributions (i.e., value added) and average aggregate excess returns (annualized) were calculated for each 1-, 3-, 5-, and 10-year time frame for each RF. Returns on the underlying funds were included in these aggregate performance calculations as of the date of their addition to the RF portfolio (see Figure 3). Those calculations reflected the changing weights for the underlying funds as the RFs moved along their glide paths.

#### **Performance Averages**

To provide a high-level summary of the effectiveness of T. Rowe Price's target date process, we calculated performance averages for all 11 RFs in the study across all three of the metrics used in our analysis. Average performance over rolling 1-, 3-, 5-, and 10-year periods since RF inception can be found in Figures 9, 10, and 11. To account for the differing inception dates (and, thus, longevities) of each fund, these averages were time weighted—that is, the results were based on the percentage of the total performance periods in each time frame provided by each fund. Weights for each fund in each time frame are shown in Figure 12. Overall, time weighting had relatively little impact on average performance results.

#### **Data Sources**

Fund and benchmark return data were taken from T. Rowe Price's internal performance database, which is used by the firm to calculate returns for quarterly, semiannual, and

annual client reports; marketing materials; and regulatory disclosures. Benchmark returns in the T. Rowe Price database are collected from index managers. All results were based on total returns, including dividends reinvested.

#### (Fig. 8)

As of December 31, 2022

Sources: T. Rowe Price, Bloomberg Index Services Limited, MSCI, Standard & Poor's, S&P/LSTA, Russell, J.P. Morgan, Credit Suisse, and Wilshire. (See Additional Disclosures.) Data analysis by T. Rowe Price.

#### Benchmarks for Underlying T. Rowe Price Funds<sup>1</sup>

Fund	Benchmark
U.S. Equity	
Equity Index 500	S&P 500 Index
U.S. Large-Cap Core	S&P 500 Index
U.S. Equity Research	S&P 500 Index
Growth Stock	Russell 1000 Growth Index
Value	Russell 1000 Value Index
Mid-Cap Growth	Russell Midcap Growth Index
Mid-Cap Value	Russell Midcap Value Index
Small-Cap Stock	Russell 2000 Index
New Horizons	Russell 2000 Growth Index
Small-Cap Value	Russell 2000 Value Index
Non-U.S. Equity	
Overseas Stock	MSCI EAFE Index (Net)
International Stock	MSCI EAFE Growth Index (Net) <sup>2</sup>
International Value Equity	MSCI EAFE Value Index (Net) <sup>2</sup>
Emerging Markets Stock	MSCI Emerging Markets Index (Net)
Emerging Markets Discovery Stock	MSCI Emerging Markets Index (Net)
Fixed Income	
New Income	Bloomberg U.S. Aggregate Bond Index
International Bond (USD Hedged)	Bloomberg Global Agg. Ex-USD (USD Hedged)
Dynamic Global Bond	3MO LIBOR in USD
High Yield	Credit Suisse High Yield Index
Floating Rate	S&P/LSTA Performing Loan Index
Emerging Markets Bond	J.P. Morgan Emerging Markets Bond Index Global
U.S. Treasury Long-Term Index <sup>3</sup>	Bloomberg U.S. Long Treasury Bond Index
Limited Duration Inflation Focused Bond	Bloomberg U.S. 1-5 Year Treasury TIPS Index <sup>4</sup>
Other	
Real Assets	Combined Index Porfolio <sup>5</sup>

<sup>&</sup>lt;sup>1</sup> Not included: U.S. Treasury Money Fund.

<sup>&</sup>lt;sup>2</sup> The indexes shown here are the style-appropriate benchmarks used to calculate the active performance of the firm's target date portfolios. For the International Stock Fund (ISF) and the International Value Equity Fund (IVE), these benchmarks differ from the indexes used by the funds for their own performance reporting. The standard benchmark for the ISF is the MSCI All Country World Index ex USA (Net). The standard benchmark for the IVE is the MSCI EAFE Index (Net).

<sup>&</sup>lt;sup>3</sup> Prior to October 1, 2020, the name of the U.S. Treasury Long-Term Index Fund was the U.S. Treasury Long-Term Fund.

<sup>&</sup>lt;sup>4</sup> Effective May 1, 2011, the benchmark was changed to the Bloomberg U.S. 1–5 Year TIPS Index. For time periods prior to this date, returns were measured against a linked performance benchmark composed of 100% Citigroup 3-Month Treasury Bill Index.

<sup>&</sup>lt;sup>5</sup> As of December 31, 2022, the Real Assets Fund's combined index portfolio was composed of 30% MSCI World Select Natural Resources Net, 25% MSCI All Country World Index Metals and Mining Net, 20% FTSE NAREIT All Equity REITs Index, 20% EPRA/NAREIT Developed Real Estate Index Net, 4% MSCI All Country World Index IMI Gold Net, and 1% MSCI All Country World Index IMI Precious Metals Net.

### (Fig. 9)

Fund Inceptions Through December 31, 2022

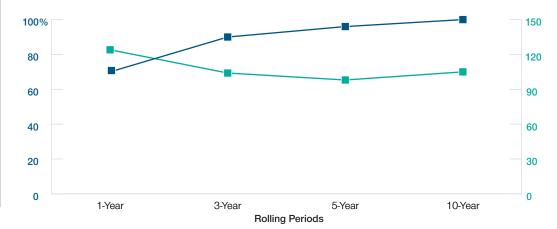
Sources: Standard & Poor's (see Additional Disclosures) and T. Rowe Price. Data analysis by T. Rowe Price.

Active Success Rate (Left Axis)

Value Added in

Basis Points
(Right Axis)

#### Time-Weighted Average Active Success Rates and Value Added by Total Implementation



#### (Fig. 10)

Fund Inceptions Through December 31, 2022

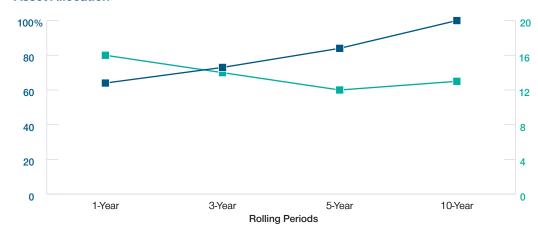
Source: T. Rowe Price.

Active Success Rate

Value Added in Basis Points
(Right Axis)

(Left Axis)

# Time-Weighted Average Active Success Rates and Value Added by Tactical Asset Allocation



#### (Fig. 11)

Fund Inceptions Through December 31, 2022

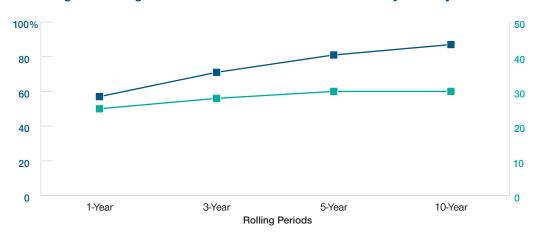
Sources: Bloomberg Index Services Limited, MSCI, Russell, J.P. Morgan, Credit Suisse (see Additional Disclosures), and T. Rowe Price. Data analysis by T. Rowe Price.

Active Success Rate (Left Axis)

Value Added in

Basis Points
(Right Axis)

#### Time-Weighted Average Active Success Rates and Value Added by Security Selection



(Fig. 12)

Percentage of Total Rolling Performance Periods

Source: T. Rowe Price.

## **Time Weights Used in Performance Averages**

Fund	1-Year	3-Year	5-Year	10-Year
Retirement 2005 Fund	9.33%	9.36%	9.40%	9.59%
Retirement 2010 Fund	10.07	10.20	10.36	11.11
Retirement 2015 Fund	9.33	9.36	9.40	9.59
Retirement 2020 Fund	10.07	10.20	10.36	11.11
Retirement 2025 Fund	9.33	9.36	9.40	9.59
Retirement 2030 Fund	10.07	10.20	10.36	11.11
Retirement 2035 Fund	9.33	9.36	9.40	9.59
Retirement 2040 Fund	10.07	10.20	10.36	11.11
Retirement 2045 Fund	8.68	8.63	8.56	8.24
Retirement 2050 Fund	7.12	6.86	6.53	5.02
Retirement 2055 Fund	6.60	6.27	5.86	3.94

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