# T. Rowe Price®
## INVEST WITH CONFIDENCE

Target Date Strategies

# THE BENEFITS OF THE T. ROWE PRICE STRATEGIC INVESTING APPROACH

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- We believe T. Rowe Price's strategic investing approach, underpinned by the rigor of our independent research and the decision-making of our experienced portfolio managers, has created long-term value for our clients.

- While all target date managers make active decisions related to glide-path design and diversification, the underlying portfolio implementation of these designs can be done passively, actively, or through a combination of the two. Some managers take a passive approach, adhering to their long-term asset allocations and indexing the underlying portfolios. Others, like T. Rowe Price, use a strategic investing approach that includes both tactical asset allocation and active management of the underlying portfolios.

- T. Rowe Price conducted a rigorous study to evaluate whether our strategic investing approach has outperformed passively managed alternatives. We compared the performance of our Retirement Funds (RFs) that had at least a 10-year track record with combined index benchmarks in order to quantify the value added by our implementation, including tactical allocation and excess returns on the underlying T. Rowe Price funds.

- Our study found that the RFs studied outperformed their combined index benchmarks in at least 85% of rolling five-year periods and 100% of rolling 10-year periods from inception through December 31, 2017, net of fees. RF outperformance was primarily driven by positive contributions from tactical asset allocation and security selection.

- For all 11 RFs, tactical allocation added value in 96% or more of all rolling five-year periods and in 100% of rolling 10-year periods since inception. For nine of the 11 RFs, security selection added value in at least 78% of all rolling five-year periods. All 11 RFs posted positive contributions from security selection over every rolling 10-year period since inception.

See the appendix (page 11) for additional information on the performance study methodology.

**Figure 1**

Source: T. Rowe Price.

| Value Added by Tactical Allocation | **+** | Value Added by Security Selection | ▶ | Total Value Added by T. Rowe Price Implementation |

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**Active success rates**

The active success rate records the percentage of times a fund beat its designated benchmark, net of fees and trading costs, over a specified time period (e.g., 10 years). Think of this as a measure of how often a client might look at his or her monthly statement and find that a fund has outperformed for that time period.

To demonstrate that T. Rowe Price's target date process historically has created value for our clients by outperforming purely passive strategies, we examined the performance of all of our Retirement Funds (RFs) that had at least 10-year track records as of December 31, 2017 (Figure 12, page 9). These 11 RFs held virtually all (99.9%) of the Retirement Fund assets managed by the firm as of that date.[1]

We examined relative returns for three different metrics:

- To quantify the total value added by T. Rowe Price's target date implementation, RF returns in each rolling period were compared with combined index benchmarks created by T. Rowe Price that closely mirror the strategic allocations of each RF as it moves along its glide path.

- To quantify the value added by T. Rowe Price's tactical allocation process, RF returns calculated using each fund's fixed strategic asset allocation were compared with the returns based on actual allocation weights.

- To quantify the value added by security selection, excess returns—net of fees and other costs—were calculated for the underlying funds in each RF (these funds are shown in Figure A2, page 12). Returns were calculated relative to each underlying fund's asset class, sector, or style benchmark. Returns were then aggregated to show the total excess returns for each RF.

As can be seen, the first metric—the total value added by T. Rowe Price's implementation—is primarily composed of the second two metrics: the additional returns achieved through tactical asset allocation and the excess returns contributed by security selection in the underlying funds. This relationship is illustrated in Figure 1, above.[2]

For all three metrics in our analysis, two performance measures were calculated:

- Active success rates: The percentage of the total rolling periods in each time frame in which the RF outperformed its combined index benchmark or in which tactical allocation or underlying portfolio management made a positive contribution to RF returns.

- Excess returns: The annualized return for each RF relative to its combined index benchmark, or the return contribution (either positive or negative) made by tactical asset allocation or by security selection in the underlying funds. Excess returns were calculated for each rolling period and then averaged across all the periods in each time frame.

Our study examined RF performance over both short- and long-term rolling time periods. However, we feel strongly that longer time horizons provide the most meaningful measures of target date implementation, as they smooth out the effects of shorter-term market fluctuations that can produce a distorted picture of relative performance. Accordingly, our analysis was focused primarily on performance over rolling five-year and rolling 10-year periods, rolled monthly.[3]

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[1] One Retirement Fund with a relatively distant target date (2060) was excluded from the study because of its short performance track record. A list of the Target Funds and their inception dates can be found in Figure A1 (page 12) in the appendix.

[2] Certain asset sectors—such as high yield bonds, international bonds, and emerging market bonds, as well as a "real asset" allocations of natural resources and real estate stocks—are not represented in T. Rowe Price's combined index benchmarks. These out-of-benchmark allocations may materially affect RF excess returns relative to the combined index benchmarks. Excess returns attributable to out-of-benchmark assets are included in the relative performance results shown in this paper but are not broken out separately. A table showing out-of-benchmark contributions to excess returns (positive or negative) can be found in Figure A7 in the appendix on page 14.
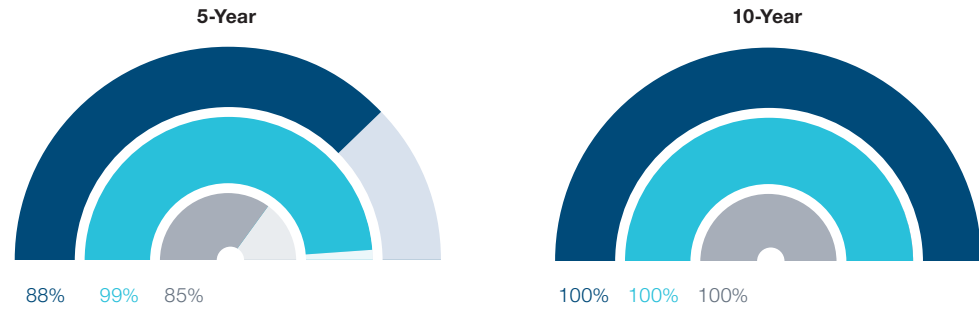
[3] Shorter-term results (for rolling 1- and 3-year periods) are displayed in Figures A4, A5, and A6 in the appendix on pages 13 and 14.

**Time-Weighted Average Active Success Rates for T. Rowe Price Retirement Funds**

Total Implementation ■
Tactical Asset Allocation ■
Security Selection ■

**5-Year**

**10-Year**

88%    99%    85%

100%    100%    100%

**Time-Weighted Average Annualized Value Added (in Basis Points) for T. Rowe Price Retirement Funds**

**5-Year**

49
17
34

**10-Year**

44
17
31

## Study Results

Overall, we found that relative performance for the 11 RFs in our study was strongly positive for all three metrics across both 5- and 10-year time frames since fund inception (Figures 2 and 3, above). In other words, in far more rolling periods than not, T. Rowe Price's Retirement Funds added value for investors at each stage of target date implementation.[4]

- Tactical asset allocation: The performance contribution from tactical allocation was positive in every 10-year rolling period for every fund since inception (i.e., a 100% active success rate). Active success rates also were overwhelmingly positive across five-year rolling periods (averaging 99%). Value added was positive and relatively consistent across all time frames (Figure 4, page 4).

- Security selection: Excess returns also were positive in every 10-year rolling period for every RF since inception and strongly positive (averaging 85%) across five-year rolling periods. Excess returns were positive across all time frames for all funds (Figure 5, page 4).

- Total implementation: Active success rates were positive in every 10-year rolling period for every RF and averaged 88% across five-year rolling time periods for all RFs. Annualized excess returns were consistently positive across all time frames for all funds (Figure 6, page 4).
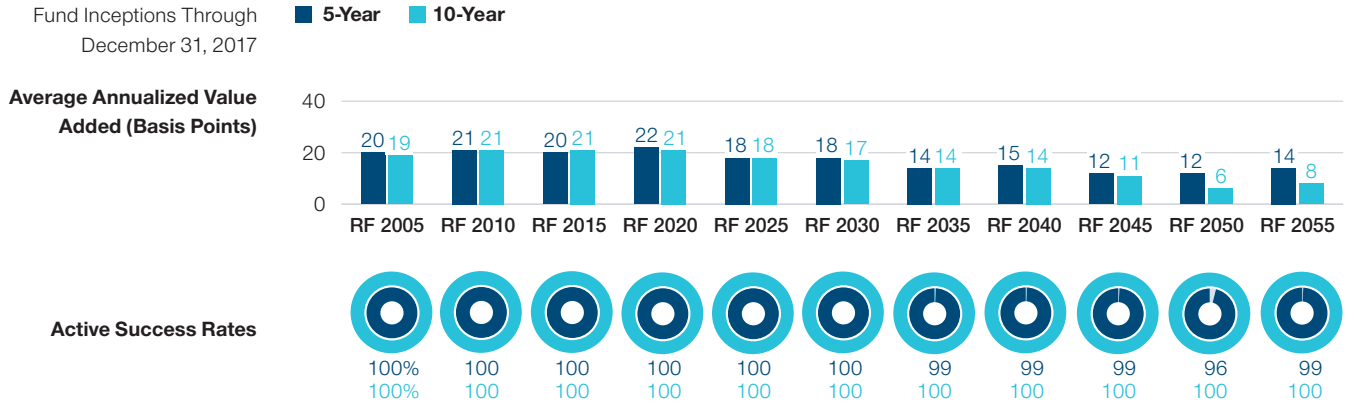
### Positive Shorter-Term Results

Although the primary focus of our study was on longer-term relative performance, we also examined relative returns and active success rates over shorter time horizons—rolling one-year and three-year periods. Among our findings:

- Tactical asset allocation: Active success rates for tactical allocation were positive across the vast majority of rolling three-year time periods (85% average) for all RFs and across most rolling one-year periods (71% average). Value added was positive, on average, for all RFs across both one-year and three-year periods (Figure A4, page 13).

- Security selection: Relative performance was generally positive (average 73%) across rolling three-year periods and also positive (average 59%) across rolling one-year periods for nine of the 11 funds. While one-year and three-year active success rates were slightly negative (i.e., just below 50%) for two funds, excess returns from security selection were positive, on average, for all 11 funds across all time periods (Figure A5, page 13).

- Total implementation: Active success rates for all RFs were firmly positive, averaging 83% across three-year rolling periods and 63% across one-year rolling periods. Again, the total value added by T. Rowe Price's implementation process was positive across all time periods for all RFs (Figure A6, page 14).

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**Past performance is not a reliable indicator of future performance. See page 10 for standardized performance.**
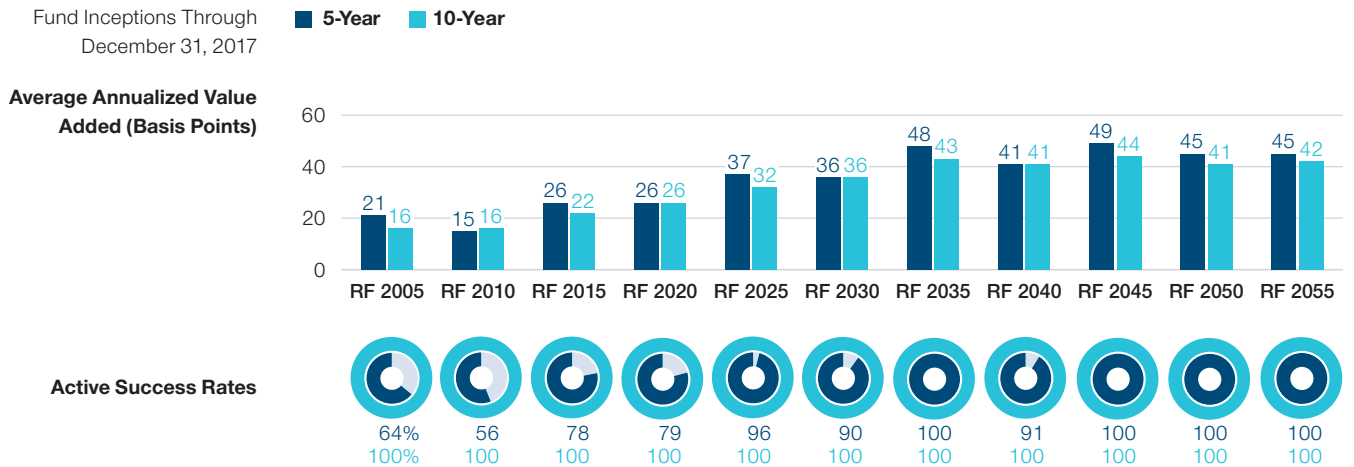
[4] Performance averages were calculated for all 11 RFs within each time frame. These averages were time weighted to reflect their differing inception dates. The weights for each fund in each time frame can be found in Figure A12 in the appendix on page 17.

## Figure 4

Fund Inceptions Through December 31, 2017

**Active Success Rates and Value Added by Tactical Allocation**

■ **5-Year**  ■ **10-Year**

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

| | RF 2005 | RF 2010 | RF 2015 | RF 2020 | RF 2025 | RF 2030 | RF 2035 | RF 2040 | RF 2045 | RF 2050 | RF 2055 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5-Year | 20 | 21 | 20 | 22 | 18 | 18 | 14 | 15 | 12 | 12 | 14 |
| 10-Year | 19 | 21 | 21 | 21 | 18 | 17 | 14 | 14 | 11 | 6 | 8 |

**Active Success Rates**

| | RF 2005 | RF 2010 | RF 2015 | RF 2020 | RF 2025 | RF 2030 | RF 2035 | RF 2040 | RF 2045 | RF 2050 | RF 2055 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5-Year | 100% | 100 | 100 | 100 | 100 | 100 | 99 | 99 | 99 | 96 | 99 |
| 10-Year | 100% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

**Sources:** Bloomberg Barclays, MSCI, Russell, and T. Rowe Price; data analysis by T. Rowe Price.

## Figure 5

Fund Inceptions Through December 31, 2017

**Active Success Rates and Value Added by Security Selection**

■ **5-Year**  ■ **10-Year**

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

| | RF 2005 | RF 2010 | RF 2015 | RF 2020 | RF 2025 | RF 2030 | RF 2035 | RF 2040 | RF 2045 | RF 2050 | RF 2055 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5-Year | 21 | 15 | 26 | 26 | 37 | 36 | 48 | 41 | 49 | 45 | 45 |
| 10-Year | 16 | 16 | 22 | 26 | 32 | 36 | 43 | 41 | 44 | 41 | 42 |

**Active Success Rates**

| | RF 2005 | RF 2010 | RF 2015 | RF 2020 | RF 2025 | RF 2030 | RF 2035 | RF 2040 | RF 2045 | RF 2050 | RF 2055 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5-Year | 64% | 56 | 78 | 79 | 96 | 90 | 100 | 91 | 100 | 100 | 100 |
| 10-Year | 100% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

**Sources:** Bloomberg Barclays, Credit Suisse, J.P. Morgan, MSCI, Russell, Standard & Poor's, and T. Rowe Price; data analysis by T. Rowe Price.

## Figure 6

Fund Inceptions Through December 31, 2017

**Active Success Rates and Value Added by Total Implementation**

■ **5-Year**  ■ **10-Year**

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

| | RF 2005 | RF 2010 | RF 2015 | RF 2020 | RF 2025 | RF 2030 | RF 2035 | RF 2040 | RF 2045 | RF 2050 | RF 2055 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5-Year | 52 | 43 | 49 | 49 | 50 | 49 | 51 | 49 | 52 | 47 | 48 |
| 10-Year | 43 | 43 | 41 | 48 | 42 | 49 | 43 | 49 | 39 | 35 | 34 |

**Active Success Rates**

| | RF 2005 | RF 2010 | RF 2015 | RF 2020 | RF 2025 | RF 2030 | RF 2035 | RF 2040 | RF 2045 | RF 2050 | RF 2055 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5-Year | 86% | 85 | 87 | 86 | 89 | 90 | 91 | 90 | 91 | 89 | 89 |
| 10-Year | 100% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

**Sources:** Bloomberg Barclays, MSCI, Russell, and T. Rowe Price; data analysis by T. Rowe Price.

| Combined Index Benchmark |
|---|
| Security selection |
| Tactical allocation |

**Benchmarking Target Date Strategies**

Target date design is inherently an "active" process in that managers must make independent judgments about desired retirement objectives and expected market conditions.

Because glide-path effects—such as the level of equity exposure—can dominate fund performance relative to common target date indexes (such as those maintained by Standard & Poor's), T. Rowe Price has created its own combined index benchmarks for the Retirement Funds. These benchmarks are constructed from four indexes that reflect the broad asset classes in the underlying RF portfolios:

■ U.S. Equity: The Russell 3000 Index.

■ Non-U.S. Equity: The MSCI All Country World Index ex USA.

■ Fixed Income: The Bloomberg Barclays U.S. Aggregate Bond Index.

■ Inflation Focused Fixed Income: The Bloomberg Barclays U.S. 1–5 Year Treasury TIPS Index.

The combined benchmarks mirror the strategic allocations for each fund as they move along their glide paths but do not include tactical adjustments.

The combined index benchmarks allow us to measure the value added or detracted by T. Rowe Price via tactical allocation and security selection.

## Background

The features that have made target date funds such popular retirement investment vehicles, especially in 401(k) and other defined contribution plans, also require investors to delegate a number of key decisions to their target date managers. These include:

■ Glide-path design: How quickly allocations to growth-oriented asset classes, such as equities, are reduced as the strategy approaches and then passes through its target date.

■ Glide-path diversification: How target date portfolios are allocated among the various asset classes, sectors, or investment styles. Asset allocation is a complex discipline that requires careful analysis of expected long-term performance characteristics.

■ Tactical asset allocation: Whether the strategy's managers adhere to their long-term strategic portfolio mix or try to enhance returns and/or reduce risk by adjusting

the asset allocation to take advantage of valuation anomalies or other shorter-term market opportunities.

■ Underlying portfolio management: Whether the managers of the underlying portfolios simply seek to replicate the performance of asset class benchmarks or attempt to enhance returns through security selection or other techniques.

Each of these decisions may affect long-term investment performance—and thus influence retirement outcomes. The glide path and the diversification mix can be thought of as setting the long-term strategic design for a target date strategy, while tactical asset allocation and management of the underlying portfolios reflect the ongoing implementation of the strategic design. Target date managers tend to take very different approaches to both strategic design and the implementation process, which will generate performance differences across managers.

**Figure 7**

September 30, 2002, Through December 31, 2017

**TRP Retirement 2020 Fund** ■

**Combined Index Benchmark** ■

**Example of the Benefits of T. Rowe Price's Target Date Implementation**
**Portfolio Growth Potential Relative to T. Rowe Price Combined Index Benchmark**



$364,510
$338,540

TRP = T. Rowe Price

**Sources:** Russell, MSCI, Bloomberg Barclays, and T. Rowe Price; data analysis by T. Rowe Price.
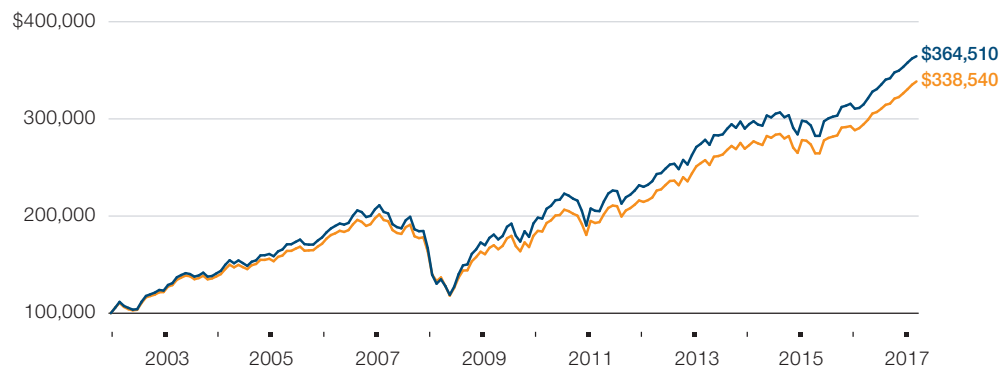
**15.74%, 9.09%, and 6.04% were the fund's 1-, 5-, and 10-year average annual total returns as of 12/31/2017. Current performance may be higher or lower than the quoted past performance, which cannot guarantee future results. Share price, principal value, and return will vary, and you may have a gain or loss when you sell your shares. Average annual total return figures include changes in principal value, reinvested dividends, and capital gain distributions. To obtain the most recent month-end performance, please visit our website or contact a T. Rowe Price representative at 1-800-225-5132. The fund's expense ratio is 0.66% as of its most recent fiscal year ended 5/31/2017.**

The strategic designs of target date funds should be informed by their investment objectives. These objectives can vary across target date providers, leading to varying design choices—both in the glide path and in the underlying portfolios—that reflect the relative importance different providers attach to different goals.

Some examples:

- A glide-path design that emphasizes protection against retirees outliving their assets might include a higher allocation to equities. On the other hand, a glide path designed to reduce the risk of large capital losses near retirement might seek a lower level of return volatility.

- A manager who believes there is little room to improve on market returns might construct target date portfolios using only passive allocations, while one who sees opportunities to enhance returns with security selection might include actively managed allocations.

As a result of these differences, target date performance needs to be interpreted carefully. Strategic design decisions and prevailing market conditions both can have significant effects on relative performance. Therefore, the specific objectives incorporated in the strategic design should be a key consideration when evaluating performance.

For this reason, we believe each level of the target date process should be examined separately as well as collectively. Underperformance at the strategic level—in glide-path design, for example—may obscure outperformance in the implementation process, such as the management of the underlying assets. While the strategic design of the glide path and the underlying diversification require target date managers to make active decisions, most investors focus on implementation when evaluating whether their managers are adding value.

## Benefits for Investors

From its inception on September 30, 2002, through December 31, 2017, the T. Rowe Price Retirement 2020 Fund outperformed its combined index benchmark by 53 basis points, annualized. In other words, if an investor had invested $100,000 in a hypothetical portfolio that earned the same return as the combined benchmark, his or her portfolio could have been worth just over $338,540 by the end of 2017. The same amount invested in the T. Rowe Price

Retirement 2020 Fund, meanwhile, could have grown to $364,510, net of fees and costs—an increase of almost $26,000 in ending portfolio value (Figure 7, page 5).

Even a $26,000 difference in ending portfolio values can be quite meaningful to retirement outcomes. For example, assuming no further portfolio growth, an individual retiring with a portfolio worth $364,510 would be able to withdraw $18,226 a year over a 20-year retirement, while an individual with just $338,540 would only be able to withdraw $16,927 a year. For some retirees, that $1,299 difference could have a meaningful impact on living standards.

Additional key highlights of our study findings are summarized below.

### Tactical Asset Allocation

- All 11 RFs saw a positive contribution from tactical allocation in 96% or more of all rolling five-year periods, and all 11 RFs saw positive tactical allocation results in every rolling 10-year period since inception (Figure 4, page 4).

- The value added through tactical allocation (Figure 4) was also positive and relatively consistent across all time frames.

### Security Selection

- Security selection added value in at least 78% of all rolling five-year periods for all but two of the 11 RFs, while once again, all 11 RFs showed positive excess returns over every rolling 10-year period since inception (Figure 5, page 4).

- Excess returns ranged from 8 to 58 basis points of outperformance and were typically larger for longer-dated funds, primarily reflecting their higher equity allocations and more intensive use of security selection.[5]

### Total Implementation

- Ten of the 11 RFs outperformed their T. Rowe Price combined index benchmark in at least 86% of all rolling five-year periods (Figure 6, page 4).

- All 11 RFs outperformed their combined benchmark in every 10-year rolling period since inception.

- Annualized excess returns (Figure 6) were consistently positive.

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[5] The Retirement Funds include allocations to a passive core large-cap equity strategy that seeks to track the returns on the S&P 500 Index. These passive allocations increase as the RFs approach their target dates. As a result, longer-dated RFs have greater exposure to active large-cap growth and value funds, while those at or past their target dates are more heavily invested in the passive core large-cap allocation.
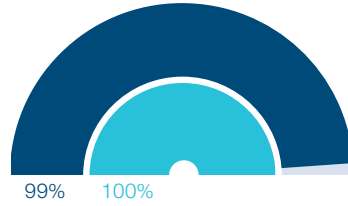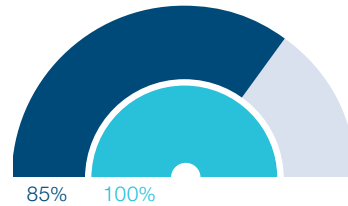
**Figure 8**

Fund Inceptions Through
December 31, 2017

**5-Year** ■
**10-Year** ■

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

**Active Success Rates**



99%    100%

**Value Added in Basis Points**

17

17

**Sources:** Russell, MSCI, Bloomberg Barclays, and T. Rowe Price; data analysis by T. Rowe Price.

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**Figure 9**

Fund Inceptions Through
December 31, 2017

**5-Year** ■
**10-Year** ■

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

**Active Success Rates**



85%    100%

**Value Added in Basis Points**

34

31

**Sources:** Standard & Poor's, Russell, MSCI, Bloomberg Barclays, J.P. Morgan, Credit Suisse, and T. Rowe Price; data analysis by T. Rowe Price.

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**Figure 10**

Fund Inceptions Through
December 31, 2017

**5-Year** ■
**10-Year** ■

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

**Active Success Rates**



88%    100%

**Value Added in Basis Points**

49

44
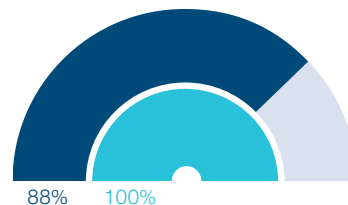
**Sources:** Russell, MSCI, Bloomberg Barclays, and T. Rowe Price; data analysis by T. Rowe Price.

## Performance Averages

To provide a high-level summary of the relative effectiveness of T. Rowe Price's target date process, we also calculated performance averages for all 11 Retirement Funds across all three metrics in our analysis. To account for the differing inception dates (and thus, longevity) of each RF, these averages were time weighted—that is, the results are based on the percentage of the total performance periods in each time frame provided by each RF.

These time-weighted averages reflect the same patterns shown for the individual Retirement Funds: Positive contributions to returns from tactical asset allocation and security selection both were relatively stable across time frames (Figures 8 and 9, at left). Active success rates improved steadily over longer time periods for all three metrics, and value added versus T. Rowe Price combined index benchmarks was positive over all time frames (Figure 10, at left).

The time-weighted averages also highlight another beneficial aspect of the T. Rowe Price process: the relative consistency of RF performance over time. Not only were active success rates and excess returns positive, on average, across the various time frames studied, but the data also show that positive excess returns were typically larger than negative excess returns.

This pattern is displayed in Figure 11 (page 8), which compares time-weighted average returns across the three metrics used in the study (total implementation, tactical allocation, and security selection). The top row of each table shows average excess returns in the larger number of rolling periods in which funds showed positive relative performance, while the bottom row of each table shows average excess returns in the smaller number of periods with negative relative performance. As can be seen, positive returns were larger than negative returns across all time frames of all three metrics.

## Our Approach to Strategic Investing

T. Rowe Price's target date process seeks to improve outcomes for our clients at multiple levels—via glide-path design, long-term diversification, tactical asset allocation, and our strategic investing approach. We believe the value added by our target date implementation can meaningfully enhance retirement outcomes for investors.

Bottom-up fundamental research is at the core of how we manage the underlying strategies in our target date funds. That means that over 350 of our investment professionals go beyond the numbers by visiting senior corporate executives in their offices, touring their companies, and checking reality on the ground with suppliers and customers.[6] This enables them to ask the right questions to get a deeper

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[6]Investment staff as of 12/31/2017. Includes 104 portfolio managers, 24 associate portfolio managers, 148 investment analysts, 47 associate analysts, 10 multi-asset specialists, 3 specialty analysts, 2 strategists, and 17 senior managers.

understanding of where a company stands and where they think it could go in the future.

Our target date managers, backed by our committee of asset allocation experts from across multi-asset, equity, and fixed income, seek to get ahead of change by identifying attractive near-term asset valuations and using prudent tactical allocation adjustments to take advantage of potential opportunities.

Experience has been a critical component of our success as well. Our skilled portfolio managers have deep experience—an average of 21 years in the industry and 16 years with T. Rowe Price.[7] Significantly, many of our analysts go on to become portfolio managers, which we believe creates a strong foundation on behalf of our clients.

**Figure 11**

Fund Inceptions Through December 31, 2017

**Time-Weighted Average Excess Returns in Positive and Negative Rolling Periods**

**Value Added by Total Implementation**

Rolling periods

| Basis Points | 1-Year | 3-Year | 5-Year | 10-Year |
|---|---|---|---|---|
| Average Positive Excess Return | 151 | 65 | 58 | 46 |
| Average Negative Excess Return | -87 | -45 | -17 | N/A |

**Value Added by Tactical Allocation**

Rolling periods

| Basis Points | 1-Year | 3-Year | 5-Year | 10-Year |
|---|---|---|---|---|
| Average Positive Excess Return | 29 | 21 | 17 | 18 |
| Average Negative Excess Return | -13 | -5 | -2 | N/A |

**Value Added by Security Selection**

Rolling periods

| Basis Points | 1-Year | 3-Year | 5-Year | 10-Year |
|---|---|---|---|---|
| Average Positive Excess Return | 102 | 52 | 42 | 30 |
| Average Negative Excess Return | -62 | -21 | -13 | N/A |

N/A = No negative rolling periods

**Sources:** Standard & Poor's, Russell, MSCI, Bloomberg Barclays, J.P. Morgan, Credit Suisse, and T. Rowe Price; data analysis by T. Rowe Price.

[7]As of 12/31/2017.

**Figure 12        Retirement Funds Included in Our Performance Study**

| Fund | Inception Date | Combined Index Portfolio* |
|---|---|---|
| Retirement 2005 Fund | 2/27/2004 | Blended benchmark composed of 37.5% stocks (26.25% Russell 3000 Index and 11.25% MSCI All Country World Index ex USA) and 62.5% bonds (44.0% Bloomberg Barclays U.S. Aggregate Bond Index and 18.5% Bloomberg Barclays U.S. 1–5 Year Treasury Inflation Protected Securities (TIPS) Index). The percentages will vary over time and the indices may vary over time. |
| Retirement 2010 Fund | 9/30/2002 | Blended benchmark composed of 43.0% stocks (30.1% Russell 3000 Index and 12.9% MSCI All Country World Index ex USA) and 57.0% bonds (41.0% Bloomberg Barclays U.S. Aggregate Bond Index and 16.0% Bloomberg Barclays U.S. 1–5 Year Treasury Inflation Protected Securities (TIPS) Index). The percentages will vary over time and the indices may vary over time. |
| Retirement 2015 Fund | 2/27/2004 | Blended benchmark composed of 50.5% stocks (35.35% Russell 3000 Index and 15.15% MSCI All Country World Index ex USA) and 49.5% bonds (37.0% Bloomberg Barclays U.S. Aggregate Bond Index and 12.5% Bloomberg Barclays U.S. 1–5 Year Treasury Inflation Protected Securities (TIPS) Index). The percentages will vary over time and the indices may vary over time. |
| Retirement 2020 Fund | 9/30/2002 | Blended benchmark composed of 60.5% stocks (42.35% Russell 3000 Index and 18.15% MSCI All Country World Index ex USA) and 39.5% bonds (32.0% Bloomberg Barclays U.S. Aggregate Bond Index and 7.5% Bloomberg Barclays U.S. 1–5 Year Treasury Inflation Protected Securities (TIPS) Index). The percentages will vary over time and the indices may vary over time. |
| Retirement 2025 Fund | 2/27/2004 | Blended benchmark composed of 68.5% stocks (47.95% Russell 3000 Index and 20.55% MSCI All Country World Index ex USA) and 31.5% bonds (27.5% Bloomberg Barclays U.S. Aggregate Bond Index and 4.0% Bloomberg Barclays U.S. 1–5 Year Treasury Inflation Protected Securities (TIPS) Index). The percentages will vary over time and the indices may vary over time. |
| Retirement 2030 Fund | 9/30/2002 | Blended benchmark composed of 76.5% stocks (53.55% Russell 3000 Index and 22.95% MSCI All Country World Index ex USA) and 23.5% bonds (22.0% Bloomberg Barclays U.S. Aggregate Bond Index and 1.5% Bloomberg Barclays U.S. 1–5 Year Treasury Inflation Protected Securities (TIPS) Index). The percentages will vary over time and the indices may vary over time. |
| Retirement 2035 Fund | 2/27/2004 | Blended benchmark composed of 82.5% stocks (57.75% Russell 3000 Index and 24.75% MSCI All Country World Index ex USA) and 17.5% bonds (Bloomberg Barclays U.S. Aggregate Bond Index). The percentages will vary over time and the indices may vary over time. |
| Retirement 2040 Fund | 9/30/2002 | Blended benchmark composed of 87.5% stocks (61.25% Russell 3000 Index and 26.25% MSCI All Country World Index ex USA) and 12.5% bonds (Bloomberg Barclays U.S. Aggregate Bond Index). The percentages will vary over time and the indices may vary over time. |
| Retirement 2045 Fund | 5/31/2005 | Blended benchmark composed of 90.0% stocks (63.0% Russell 3000 Index and 27.0% MSCI All Country World ex USA Index) and 10.0% bonds (Bloomberg Barclays U.S. Aggregate Bond Index). The percentages will vary over time and the indices may vary over time. |
| Retirement 2050 Fund | 12/29/2006 | Blended benchmark composed of 90.0% stocks (63.0% Russell 3000 Index and 27.0% MSCI All Country World ex USA Index) and 10.0% bonds (Bloomberg Barclays U.S. Aggregate Bond Index). The percentages will vary over time and the indices may vary over time. |
| Retirement 2055 Fund | 12/29/2006 | Blended benchmark composed of 90.0% stocks (63.0% Russell 3000 Index and 27.0% MSCI All Country World ex USA Index) and 10.0% bonds (Bloomberg Barclays U.S. Aggregate Bond Index). The percentages will vary over time and the indices may vary over time. |

*Benchmark weightings as of 12/31/2017. Each index is weighted at the appropriate strategic neutral allocation of its respective asset class, which is predetermined and changes over time. The combined index portfolio is a blended benchmark.

**Source:** T. Rowe Price.

# Important Information
## STANDARDIZED PERFORMANCE

**Annualized total returns for periods ended December 31, 2017.**

| Fund (Inception Date) | Gross Expense Ratio† | 1-Year | 3-Year | 5-Year | 10-Year |
|---|---|---|---|---|---|
| Retirement 2005 Fund (NAV) (2/27/2004) | 0.60% | 10.67% | 5.44% | 6.14% | 5.09% |
| Retirement 2005 Combined Index Portfolio* | | 10.10 | 5.21 | 6.18 | 4.66 |
| Retirement 2010 Fund (NAV) (9/30/2002) | 0.59 | 11.66 | 5.88 | 6.88 | 5.24 |
| Retirement 2010 Combined Index Portfolio* | | 11.21 | 5.67 | 6.93 | 4.89 |
| Retirement 2015 Fund (NAV) (2/27/2004) | 0.62 | 13.34 | 6.54 | 7.97 | 5.67 |
| Retirement 2015 Combined Index Portfolio* | | 12.87 | 6.36 | 8.02 | 5.32 |
| Retirement 2020 Fund (NAV) (9/30/2002) | 0.66 | 15.74 | 7.41 | 9.09 | 6.04 |
| Retirement 2020 Combined Index Portfolio* | | 14.96 | 7.20 | 9.09 | 5.68 |
| Retirement 2025 Fund (NAV) (2/27/2004) | 0.69 | 17.68 | 8.11 | 10.06 | 6.34 |
| Retirement 2025 Combined Index Portfolio* | | 16.66 | 7.88 | 10.03 | 5.99 |
| Retirement 2030 Fund (NAV) (9/30/2002) | 0.72 | 19.45 | 8.75 | 10.92 | 6.63 |
| Retirement 2030 Combined Index Portfolio* | | 18.28 | 8.50 | 10.85 | 6.26 |
| Retirement 2035 Fund (NAV) (2/27/2004) | 0.74 | 20.88 | 9.22 | 11.53 | 6.83 |
| Retirement 2035 Combined Index Portfolio* | | 19.58 | 8.99 | 11.46 | 6.49 |
| Retirement 2040 Fund (NAV) (9/30/2002) | 0.76 | 22.02 | 9.57 | 11.96 | 7.06 |
| Retirement 2040 Combined Index Portfolio* | | 20.61 | 9.38 | 11.89 | 6.70 |
| Retirement 2045 Fund (NAV) (5/31/2005) | 0.76 | 22.41 | 9.71 | 12.03 | 7.10 |
| Retirement 2045 Combined Index Portfolio* | | 21.03 | 9.56 | 12.00 | 6.75 |
| Retirement 2050 Fund (NAV) (12/29/2006) | 0.76 | 22.38 | 9.71 | 12.04 | 7.10 |
| Retirement 2050 Combined Index Portfolio* | | 21.03 | 9.56 | 12.00 | 6.75 |
| Retirement 2055 Fund (NAV) (12/29/2006) | 0.76 | 22.33 | 9.70 | 12.02 | 7.08 |
| Retirement 2055 Combined Index Portfolio* | | 21.03 | 9.56 | 12.00 | 6.75 |

As of fiscal quarter that ended on 12/31/2017.

†Expense ratios are as of the most recent prospectus.

*The combined index portfolio, which is the broad-weighted benchmark for each fund, is an unmanaged portfolio composed of the Russell 3000 Index, MSCI All Country World Index ex USA, Bloomberg Barclays U.S. Aggregate Bond Index, and Bloomberg Barclays U.S. 1–5 Year Treasury TIPS Index.

**Source:** T. Rowe Price.

**Current performance may be higher or lower than the quoted past performance, which cannot guarantee future results. Share price, principal value, and return will vary, and you may have a gain or loss when you sell your shares. Average annual total return figures include changes in principal value, reinvested dividends, and capital gain distributions. To obtain the most recent month-end performance, please visit our website or contact a T. Rowe Price representative at 1-800-225-5132.**

# Appendix
## STUDY METHODOLOGY

We 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 12, page 9) were those that had at least 10-year performance histories as of December 31, 2017. One RF with a relatively distant target date (2060) was excluded from the study because of its short performance track record. The Retirement 2060 Fund incepted June 23, 2014. 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 the funds' extremely limited historical track records. See Figure A1 (page 12) for a list of these funds and their inception dates.

As of December 31, 2017, each RF invested its assets in a portfolio of up to 18 underlying T. Rowe Price funds covering the major global equity and fixed income sectors (Figure A2, page 12). Seventeen of the 18 underlying T. Rowe Price funds were actively managed, while one—a core large-cap U.S. stock allocation—used passive management to replicate the returns on the S&P 500 Index.

### Performance Periods

The performance of each Retirement Fund in the study was examined across 1-, 3-, 5-, and 10-year rolling periods (rolled monthly) since each RF's inception through December 31, 2017. 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 A3 (page 13).

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 particularly small, especially for Retirement Funds with 2045, 2050, and 2055 target dates. Accordingly, the performance results shown for 10-year rolling periods may have relatively limited statistical significance, particularly for the Retirement 2050 and Retirement 2055 Funds, both of which had only one 10-year rolling performance period as of December 31, 2017.

Full performance results for each RF over 1-, 3-, 5-, and 10-year rolling periods can be found in Figures A4, A5, and A6 on pages 13 and 14.

### 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," below).

- Excess returns: the actual margin of relative RF performance (either positive or negative) against a specific 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:

- Combined index benchmarks created by T. Rowe Price for each RF.

- 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 18 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 performance.

**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 |

**Figure A2**

As of December 31, 2017

**Source:** T. Rowe Price.

*Not included: Cash
Reserves Fund.

**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***

| Fund | Date Included |
|------|---------------|
| **U.S. Equity** | |
| Equity Index 500 | 9/30/2002 |
| 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 |
| **Fixed Income** | |
| New Income | 9/30/02 |
| International Bond (U.S. Dollar Hedged) | 10/1/17 |
| Dynamic Global Bond | 10/1/17 |
| High Yield | 9/30/02 |
| Floating Rate | 10/1/17 |
| Emerging Markets Bond | 5/1/08 |
| U.S. Treasury Long-Term | 10/1/17 |
| Limited Duration Inflation Focused Bond** | 9/30/02 |
| **Other** | |
| Real Assets | 7/1/2010 |

**Figure A3**

Fund Inceptions Through December 31, 2017

**Source:** T. Rowe Price.

### Rolling Periods in Each Time Frame

| | Time frames | | | |
|---|---|---|---|---|
| **Fund** | **1-Year** | **3-Year** | **5-Year** | **10-Year** |
| Retirement 2005 Fund | 155 | 131 | 107 | 47 |
| Retirement 2010 Fund | 172 | 148 | 124 | 64 |
| Retirement 2015 Fund | 155 | 131 | 107 | 47 |
| Retirement 2020 Fund | 172 | 148 | 124 | 64 |
| Retirement 2025 Fund | 155 | 131 | 107 | 47 |
| Retirement 2030 Fund | 172 | 148 | 124 | 64 |
| Retirement 2035 Fund | 155 | 131 | 107 | 47 |
| Retirement 2040 Fund | 172 | 148 | 124 | 64 |
| Retirement 2045 Fund | 140 | 116 | 92 | 32 |
| Retirement 2050 Fund | 121 | 97 | 73 | 13 |
| Retirement 2055 Fund | 121 | 97 | 73 | 13 |

**Figure A4**

Fund Inceptions Through December 31, 2017

### Active Success Rates and Value Added by Tactical Allocation

| | Active Success Rates | | | | Average Annualized Value Added (Basis Points) | | | |
|---|---|---|---|---|---|---|---|---|
| | Rolling periods | | | | Rolling periods | | | |
| **Fund** | **1-Year** | **3-Year** | **5-Year** | **10-Year** | **1-Year** | **3-Year** | **5-Year** | **10-Year** |
| Retirement 2005 Fund | 71% | 93% | 100% | 100% | 19 | 19 | 20 | 19 |
| Retirement 2010 Fund | 76 | 94 | 100 | 100 | 22 | 21 | 21 | 21 |
| Retirement 2015 Fund | 75 | 92 | 100 | 100 | 20 | 20 | 20 | 21 |
| Retirement 2020 Fund | 77 | 91 | 100 | 100 | 21 | 21 | 22 | 21 |
| Retirement 2025 Fund | 70 | 88 | 100 | 100 | 18 | 18 | 18 | 18 |
| Retirement 2030 Fund | 75 | 88 | 100 | 100 | 19 | 18 | 18 | 17 |
| Retirement 2035 Fund | 72 | 80 | 99 | 100 | 15 | 14 | 14 | 14 |
| Retirement 2040 Fund | 72 | 82 | 99 | 100 | 16 | 15 | 15 | 14 |
| Retirement 2045 Fund | 67 | 73 | 99 | 100 | 13 | 11 | 12 | 11 |
| Retirement 2050 Fund | 61 | 68 | 96 | 100 | 9 | 9 | 12 | 6 |
| Retirement 2055 Fund | 62 | 71 | 99 | 100 | 10 | 11 | 14 | 8 |

**Sources:** Bloomberg Barclays, MSCI, Russell, and T. Rowe Price; data analysis by T. Rowe Price.

**Figure A5**

Fund Inceptions Through December 31, 2017

### Active Success Rates and Value Added by Security Selection

| | Active Success Rates | | | | Average Annualized Value Added (Basis Points) | | | |
|---|---|---|---|---|---|---|---|---|
| | Rolling periods | | | | Rolling periods | | | |
| **Fund** | **1-Year** | **3-Year** | **5-Year** | **10-Year** | **1-Year** | **3-Year** | **5-Year** | **10-Year** |
| Retirement 2005 Fund | 48% | 41% | 64% | 100% | 15 | 14 | 21 | 16 |
| Retirement 2010 Fund | 46 | 41 | 56 | 100 | 8 | 11 | 15 | 16 |
| Retirement 2015 Fund | 59 | 66 | 78 | 100 | 24 | 21 | 26 | 22 |
| Retirement 2020 Fund | 59 | 74 | 79 | 100 | 22 | 23 | 26 | 26 |
| Retirement 2025 Fund | 63 | 82 | 96 | 100 | 38 | 32 | 37 | 32 |
| Retirement 2030 Fund | 62 | 81 | 90 | 100 | 34 | 33 | 36 | 36 |
| Retirement 2035 Fund | 65 | 85 | 100 | 100 | 49 | 42 | 48 | 43 |
| Retirement 2040 Fund | 61 | 82 | 91 | 100 | 40 | 39 | 41 | 41 |
| Retirement 2045 Fund | 64 | 85 | 100 | 100 | 55 | 46 | 49 | 44 |
| Retirement 2050 Fund | 64 | 89 | 100 | 100 | 57 | 52 | 45 | 41 |
| Retirement 2055 Fund | 64 | 89 | 100 | 100 | 58 | 52 | 45 | 42 |

**Sources:** Standard & Poor's, Russell, MSCI, Bloomberg Barclays, J.P. Morgan, Credit Suisse, and T. Rowe Price; data analysis by T. Rowe Price.

**Active Success Rates and Value Added by Total Implementation**

| Fund | Active Success Rates — Rolling periods | | | | Average Annualized Value Added (Basis Points) — Rolling periods | | | |
|---|---|---|---|---|---|---|---|---|
| | 1-Year | 3-Year | 5-Year | 10-Year | 1-Year | 3-Year | 5-Year | 10-Year |
| Retirement 2005 Fund | 64% | 73% | 86% | 100% | 53 | 41 | 52 | 43 |
| Retirement 2010 Fund | 67 | 74 | 85 | 100 | 57 | 41 | 43 | 43 |
| Retirement 2015 Fund | 65 | 77 | 87 | 100 | 58 | 41 | 49 | 41 |
| Retirement 2020 Fund | 65 | 82 | 86 | 100 | 67 | 49 | 49 | 48 |
| Retirement 2025 Fund | 61 | 85 | 89 | 100 | 64 | 43 | 50 | 42 |
| Retirement 2030 Fund | 66 | 89 | 90 | 100 | 67 | 50 | 49 | 49 |
| Retirement 2035 Fund | 63 | 87 | 91 | 100 | 65 | 45 | 51 | 43 |
| Retirement 2040 Fund | 65 | 87 | 90 | 100 | 66 | 51 | 49 | 49 |
| Retirement 2045 Fund | 56 | 84 | 91 | 100 | 62 | 43 | 52 | 39 |
| Retirement 2050 Fund | 55 | 89 | 89 | 100 | 61 | 54 | 47 | 35 |
| Retirement 2055 Fund | 55 | 90 | 89 | 100 | 61 | 54 | 48 | 34 |

**Sources:** Bloomberg Barclays, MSCI, Russell, and T. Rowe Price; data analysis by T. Rowe Price.

**Figure A7**

Fund Inceptions Through
December 31, 2017

**Sources:** Bloomberg Barclays, Credit
Suisse, J.P. Morgan, MSCI, Russell,
and T. Rowe Price; data analysis by
T. Rowe Price.

**Excess Returns Contributed by Out-of-Benchmark Allocations (Basis Points)**
Rolling periods

| Fund | 1-Year | 3-Year | 5-Year | 10-Year |
|---|---|---|---|---|
| Retirement 2005 Fund | 13 | 1 | 5 | 0 |
| Retirement 2010 Fund | 25 | 7 | 5 | 4 |
| Retirement 2015 Fund | 13 | -2 | 1 | -4 |
| Retirement 2020 Fund | 25 | 5 | 1 | 1 |
| Retirement 2025 Fund | 9 | -7 | -4 | -8 |
| Retirement 2030 Fund | 15 | 0 | -3 | -3 |
| Retirement 2035 Fund | 4 | -9 | -6 | -9 |
| Retirement 2040 Fund | 11 | -2 | -5 | -5 |
| Retirement 2045 Fund | -4 | -12 | -7 | -14 |
| Retirement 2050 Fund | -5 | -6 | -8 | -12 |
| Retirement 2055 Fund | -5 | -7 | -9 | -13 |

## T. Rowe Price Combined Index Benchmarks

Because glide-path effects—such as the level of equity exposure—can heavily influence relative performance versus third-party indexes, T. Rowe Price has created combined index performance benchmarks for its Retirement Funds. These benchmarks are constructed from four indexes that reflect the broad asset classes in the underlying RF portfolios:

- U.S. Equity: Russell 3000 Index.

- Non-U.S. Equity: MSCI All Country World Index ex USA.

- Fixed Income: Bloomberg Barclays U.S. Aggregate Bond Index.

- Inflation Focused Fixed Income: Bloomberg Barclays 1–5 Year TIPS Index.

The relative weights of these asset class indexes in the T. Rowe Price combined index benchmarks reflect where each RF stands on its glide path. Comparing RF performance with the performance of the combined index benchmarks enables us to quantify the total contribution to RF performance from T. Rowe Price implementation, including both tactical asset allocation at the RF level and excess returns achieved by the underlying funds.

The real assets component within equities and the international bond (U.S. dollar hedged and unhedged), dynamic global bond, high yield, floating rate, emerging markets bond, and long-term U.S. Treasury components within fixed income are not represented in the indexes used to create the T. Rowe Price combined index benchmarks. These out-of-benchmark allocations may materially affect RF excess returns relative to the combined index benchmarks. Excess returns attributable to out-of-benchmark assets

were included in Figure 6 on page 4 but were not broken out separately. A table showing the aggregate contribution of out-of-benchmark assets (positive or negative) to RF performance can be found in Figure A7, page 14.

## Tactical Asset Allocation

Actual returns for the 18 underlying T. Rowe Price funds in the RF portfolios, net of fees and costs, were used to calculate returns for each RF based on the strategic allocation weights in the RF glide path. These returns were then compared with actual RF returns, which reflected tactical allocation changes designed to take advantage of shorter-term valuation anomalies and other market opportunities. This comparison enabled us to isolate the contribution to performance made by the tactical allocation decisions.

## Security Selection

Historical returns, net of fees and other costs, for the 18 underlying T. Rowe Price funds in the Retirement Fund portfolios were measured relative to their specific asset class, sector, or style benchmarks. One of these underlying funds, the Equity Index 500 Fund, is a passively managed U.S. large-cap fund with an investment objective of tracking the performance of the S&P 500 Index. The other 17 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 A8, page 16). Because T. Rowe Price does not charge an overlay fee on its target date funds, and excess returns for the underlying portfolio funds are based on daily net asset values (i.e., net of costs), all of 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 for each underlying fund (which has the lowest expenses among the share classes for that fund and is the class invested in by the Retirement Funds).

Excess returns for the 18 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 A2, page 12). 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 A9, A10, and A11 on pages 16 and 17. 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 A12, page 17. 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.

## Benchmarks for Underlying T. Rowe Price Funds*

| Fund | Benchmark |
| --- | --- |
| **U.S. Equity** | |
| Equity Index 500 | 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 |
| International Stock | MSCI EAFE Growth Index** |
| International Value Equity | MSCI EAFE Value Index** |
| Emerging Markets Stock | MSCI Emerging Markets Index |
| **Fixed Income** | |
| New Income | Bloomberg Barclays U.S. Aggregate Bond Index |
| International Bond (U.S. Dollar Hedged) | Bloomberg Barclays Global Agg Ex-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 | Bloomberg Barclays U.S. Long Treasury Bond Index |
| Limited Duration Inflation Focused Bond | Bloomberg Barclays U.S. 1–5 Year Treasury TIPS Index*** |
| **Other** | |
| Real Assets | Combined Index Portfolio**** |

*Not included: Cash Reserves Fund.

**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. The standard benchmark for the IVE is the MSCI EAFE Index.

***Effective May 1, 2011, the benchmark was changed to the Bloomberg Barclays U.S. 1–5 Year Treasury TIPS Index. For time periods prior to this date, returns are measured against a linked performance benchmark composed of 100% Citigroup 3-Month Treasury Bill Index.

****As of December 31, 2017, the Real Assets Fund's combined index portfolio was composed of 25% MSCI All Country World Index Metals & Mining, 20% Wilshire RESI, 20% FTSE EPRA/NAREIT Developed Real Estate Index, 19.5% MSCI All Country World Index Energy, 10.5% MSCI All Country World Index Materials, 4% MSCI All Country World Index IMI Gold, and 1% MSCI All Country World Index IMI Precious Metals and Minerals. Prior to December 1, 2013, the Real Assets Fund's combined index portfolio was composed of 25% MSCI All Country World Index Metals & Mining, 20% Wilshire RESI, 20% FTSE EPRA/NAREIT Developed Real Estate Index, 16.25% MSCI All Country World Index Energy, 8.75% MSCI All Country World Index Materials, 5% UBS World Infrastructure and Utilities Index, 4% MSCI All Country World Index IMI Gold, and 1% MSCI All Country World Index IMI Precious Metals and Minerals.
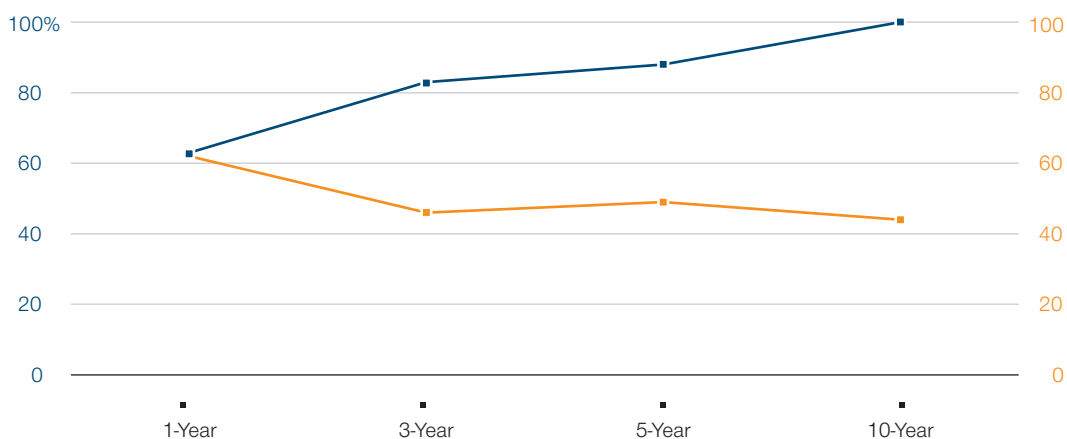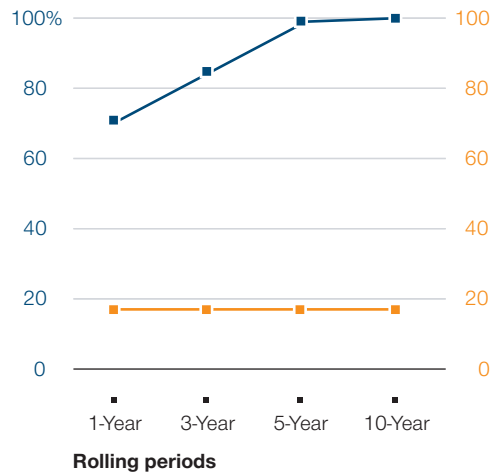
**Figure A9**

Fund Inceptions Through December 31, 2017

**Sources:** Bloomberg Barclays, MSCI, Russell, and T. Rowe Price; data analysis by T. Rowe Price.

**Active Success Rates** ■ (Left Axis)

**Value Added** ■ (Right Axis)

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

Fund Inceptions Through
December 31, 2017

**Sources:** Bloomberg Barclays,
MSCI, Russell, and T. Rowe Price;
data analysis by T. Rowe Price.

**Active Success Rates** ■
(Left Axis)

**Value Added** ■
(Right Axis)

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



**Figure A11**

Fund Inceptions Through
December 31, 2017

**Sources:** Bloomberg Barclays,
Credit Suisse, J.P. Morgan, MSCI,
Russell, Standard & Poor's, and
T. Rowe Price; data analysis by
T. Rowe Price.

**Active Success Rates** ■
(Left Axis)

**Valued Added** ■
(Right Axis)

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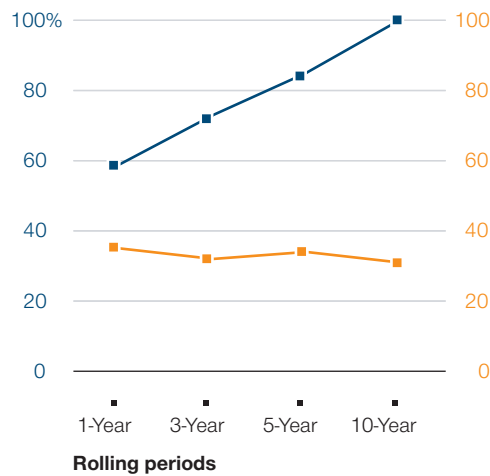


**Figure A12**

**Source:** T. Rowe Price.

**Time Weights Used in Performance Averages**

Percentage of total rolling performance periods

| Fund | 1-Year | 3-Year | 5-Year | 10-Year |
|---|---|---|---|---|
| Retirement 2005 Fund | 9.17% | 9.19% | 9.21% | 9.36% |
| Retirement 2010 Fund | 10.18 | 10.38 | 10.67 | 12.75 |
| Retirement 2015 Fund | 9.17 | 9.19 | 9.21 | 9.36 |
| Retirement 2020 Fund | 10.18 | 10.38 | 10.67 | 12.75 |
| Retirement 2025 Fund | 9.17 | 9.19 | 9.21 | 9.36 |
| Retirement 2030 Fund | 10.18 | 10.38 | 10.67 | 12.75 |
| Retirement 2035 Fund | 9.17 | 9.19 | 9.21 | 9.36 |
| Retirement 2040 Fund | 10.18 | 10.38 | 10.67 | 12.75 |
| Retirement 2045 Fund | 8.28 | 8.13 | 7.92 | 6.37 |
| Retirement 2050 Fund | 7.16 | 6.80 | 6.28 | 2.59 |
| Retirement 2055 Fund | 7.16 | 6.80 | 6.28 | 2.59 |

**Important Information**

*Call 1-800-225-5132 to request a prospectus, which includes investment objectives, risks, fees, expenses, and other information that you should read and consider carefully before investing.*

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