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# A different kind of target-date investor

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## Executive summary

- Though considered a sufficient all-in-one investment solution for many participants, target-date funds can be a strategic component of a broader retirement portfolio. "Mixed" target-date investors combine a target-date fund with other plan investment options either by choice or plan sponsor action.

- **Growth of mixed investors.** Since the inception of target-date funds, the percentage of target-date investors has continued to grow. As of 2015, 7 in 10 participants in defined contribution (DC) plans recordkept at Vanguard and offering target-date funds held a position in a target-date fund, either through voluntary choice or default election. Mixed investors make up more than one-third of this group and tend to be older, wealthier, and more engaged decision-makers.

- **Plan sponsor-directed effects.** Forty-five percent of mixed investing cases stem from sponsor actions, including employer contributions in company stock, nonelective contributions to the plan's default fund, and other sponsor-directed activities.

- **Participant-directed effects.** Fifty-five percent of mixed investors intentionally choose to construct a portfolio of both target-date and non-target-date strategies. These investors fall into five distinct groups: core/satellite investors, two groups of risk-averse investors, aggressive equity investors, and excessively diversified investors.

- **Implications.** The prevalence of mixed target-date investors has raised concerns about misuse of target-date funds, which have generally been promoted as an "all-in-one" portfolio approach. To the contrary, our findings suggest that mixed investor behavior arises either through sponsor actions or as a result of generally reasonable participant portfolio choices. Some participants who have chosen to become mixed investors may be at risk of overdiversifying their portfolios even when including a target-date fund. Sponsors seeking to promote better portfolio diversification may pursue a variety of strategies, including greater use of default investing, managed account advisory services, or reenrollment.

## Introduction

The use of target-date funds as an investment strategy in DC plans continues its rapid growth. In 2015, 90% of DC plans at Vanguard offered a target-date fund and 7 in 10 participants used them when they were offered. Since 2012, the percentage of target-date investors has outpaced non-target-date investors in DC plans. In 2012, 57% of participants were considered target-date investors. By 2015, this percentage increased to 69%.[1]

Target-date investors can be classified into two groups. "Pure" target-date investors are those holding only a single target-date fund; "mixed" target-date investors are those combining a target-date fund with other plan options. Most mixed target-date investors hold one target-date option plus other options; less than 10% hold multiple target-date funds, with or without other options. Today, slightly more than one-third of target-date participants are mixed investors.[2]

Target-date strategies, while appropriate for a large group of participants, particularly younger workers or those who do not have the skill or inclination to construct their own investment portfolios, are designed as a broad investment instrument to address the needs of the "average" retirement investor. As a result, these funds will not meet the varied needs of each individual. We will demonstrate that most mixed investors who choose these funds as a part of a broader portfolio appear to customize their target-date experience to suit their specific needs.[3]

In this report, we consider the reasons participants become mixed investors. We consider how plan sponsor decisions can cause participants to become mixed target-date investors. We also utilize a statistical clustering method to understand how participants choose to become mixed investors. Our analysis is based on Vanguard recordkeeping data drawn from 3.8 million plan participants in nearly 1,700 DC plans offering target-date funds as an investment option. Appendix I describes our data set in more detail.

This research updates our prior work on mixed investors published in September 2010. We apply the same methodology to understand the attributes and behavior of a more current set of target-date investors. Key similarities and differences between the two studies are discussed at the end of the paper.

## Types of investors

Since 2012, the percentage of target-date investors in DC plans offering a target-date strategy has continued to grow, increasing from 57% of participants to 70% of participants (**Figure 1**). In 2012, target-date investors began to outnumber non-target-date investors in plans offering target-date funds (57% versus 42% of participants). This shift reflects the impact of automatic enrollment, the use of target-date funds as a plan investment default, and the appeal of such funds to participants seeking a simplified portfolio solution.

In 2015, 62% of target-date investors were pure investors, holding a single fund, while 38% were mixed investors, combining a target-date fund or funds with other fund options (**Figure 2**). During 2012–2015, the percentage of pure investors increased and mixed investors decreased. These trends are likely as a result of the growing use of automatic enrollment and the greater use of a single target-date fund by new plan participants in voluntary enrollment plans.

There are three types of mixed target-date investors: those who hold a single target-date fund and other plan options; those who hold multiple target-date funds only; and those who hold multiple target-date funds and one or more non-target-date options (**Figure 3**). As of 2015, mixed investors holding a single target-date fund and other plan options accounted for 31% of all target-date investors. The other two groups represented much smaller fractions of target-date investors.

Investments in target-date funds are subject to the risks of their underlying funds. The year in the fund name refers to the approximate year (the target date) when an investor in the fund would retire and leave the workforce. The fund will gradually shift its emphasis from more aggressive investments to more conservative ones based on its target date. An investment in the target-date fund is not guaranteed at any time, including on or after the target date.

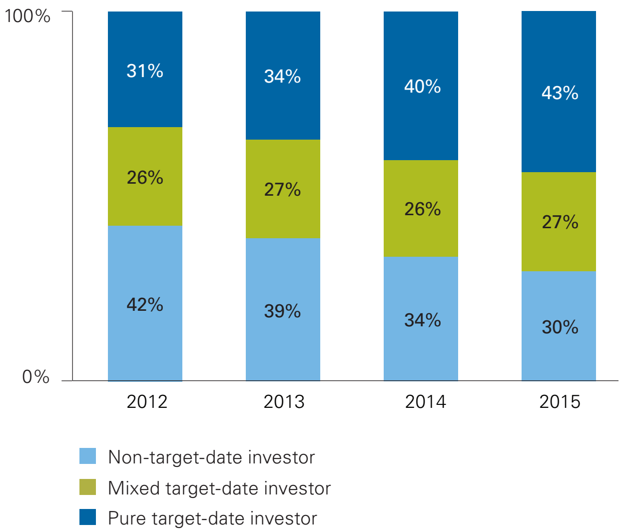
1 For target-date adoption statistics among Vanguard-recordkept plans, see Lamancusa and Young, 2016.

2 See *How America Saves 2016*.

3 Other studies, such as Financial Engines (2016), argue that mixed investors are misusing target-date funds.

**Figure 1. Types of plan participants**

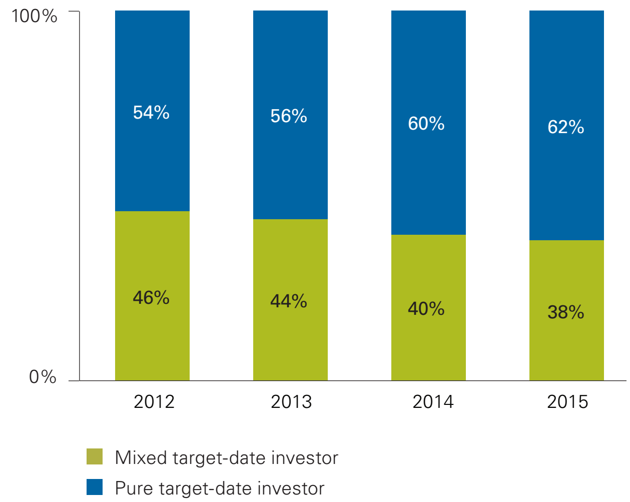
In DC plans offering target-date funds




Source: Vanguard, 2016.

**Figure 2. Types of target-date investors**

In DC plans offering target-date funds




Source: Vanguard, 2016.

**Figure 3. Types of mixed versus pure target-date investors**

In DC plans offering target-date funds

| | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| Pure investors | 54% | 56% | 60% | 62% |
| Mixed investors | | | | |
| Single target-date plus other options | 38% | 36% | 33% | 31% |
| Multiple target-date options only | 2 | 2 | 2 | 2 |
| Multiple target-date and one or more non-target-date options | 6 | 6 | 5 | 5 |
| Subtotal mixed investors | 46 | 44 | 40 | 38 |
| Total | 100% | 100% | 100% | 100% |

Source: Vanguard, 2016.

## Target-date investor characteristics

How do target-date investors compare with non-target-date investors? In general, target-date investors are younger and have shorter tenure and lower 401(k) account balances than other investors (Figure 4).

Target-date investors, on average, have higher levels of equity investments compared with non-target-date investors, reflecting the younger ages of most target-date investors, and the resulting higher equity allocations of their target-date funds. Also, a small but significant percentage of non-target-date investors have all of their assets in money market or stable value investments.[4] These are likely to be participants who were previously defaulted into conservative investment options by plan design or sought out low-risk investments on their own.

The differences are more striking when pure investors are compared with non-target-date investors. Pure investors are much younger and shorter-tenured than other groups, with much smaller DC account balances (Figure 4, third column). These statistics likely reflect the fact that many pure investors are new plan enrollees who have chosen the funds for their simplicity in decision-making, or who were defaulted into the funds by plan design, usually as part of automatic enrollment.

Mixed target-date investors appear more like non-target-date investors in terms of their demographic and portfolio characteristics (Figure 4, first and fourth columns). On average, they have 44% of their account balance invested in a target-date strategy. Indeed, 21% of mixed investors have 10% or less of their portfolios in a target-date strategy, and 63% of mixed investors have 50% or less in the strategy (Figure 5). As we describe below, these small positions can often arise from sponsor-related changes to the plan. Some participants also choose to use target-date funds in a supplemental way rather than as a core holding.

4 Twenty-four percent of non-target-date investors hold a single fund. Of this group, 50% have all of their assets in money market or stable value investments.

**Figure 4. Investor characteristics in 2015**

In DC plans offering target-date funds

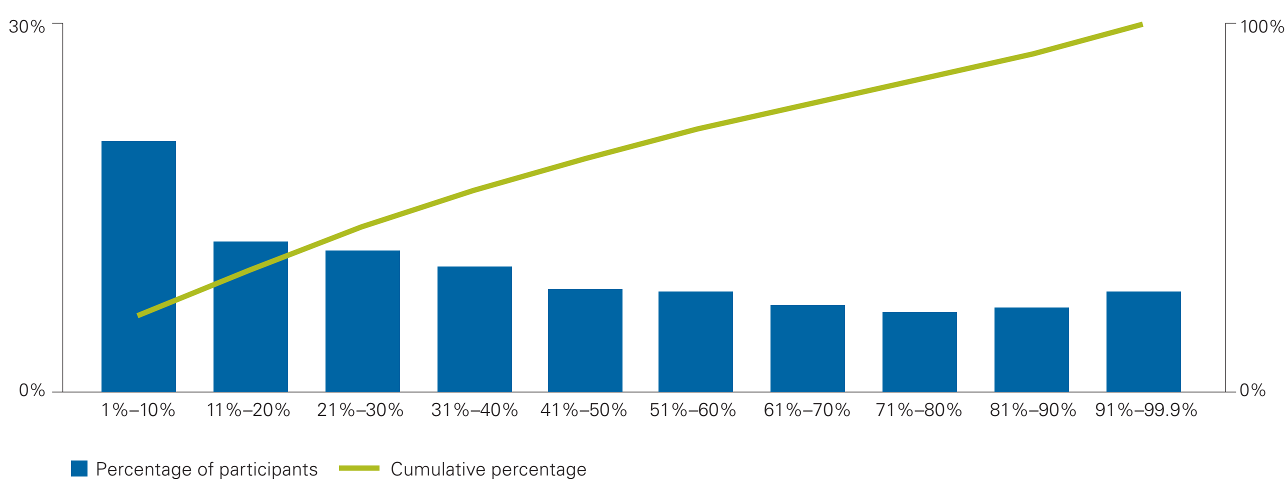
| | All non-target-date investors | All target-date investors | Target-date investors | |
|---|---|---|---|---|
| | | | Pure investors | Mixed investors |
| **Demographics** | | | | |
| Percentage male | 61% | 58% | 55% | 62% |
| Age (average) | 50.7 | 43.2 | 41.1 | 46.6 |
| Age (median) | 51.4 | 42.5 | 39.3 | 46.9 |
| Tenure (average) | 15.1 | 7.4 | 5.2 | 11.1 |
| Tenure (median) | 14.0 | 5.0 | 3.0 | 9.0 |
| **401(k) account features** | | | | |
| Balance (average) | $159,020 | $70,024 | $29,071 | $136,965 |
| Balance (median) | $70,518 | $16,754 | $7,733 | $57,888 |
| Percentage balance in target-date funds | 0% | 78% | 100% | 44% |
| Average equity allocation | 59% | 75% | 77% | 72% |
| Number of funds held (average) | 3.8 | 2.4 | 1.0 | 4.7 |
| Number of funds held (median) | 3.0 | 1.0 | 1.0 | 4.0 |

Source: Vanguard, 2016.

**Figure 5. Mixed investor holdings of target-date funds**

In DC plans offering target-date funds

Percentage of portfolio in target-date funds among mixed target-date investors




Source: Vanguard, 2016.

## Dynamics of mixed investor behavior

Participants become mixed target-date investors in a number of ways:

- **At enrollment.** A new plan enrollee may choose an investment strategy that includes both target-date and other funds.
- **By choice.** An existing participant may add a target-date fund to an existing portfolio of non-target-date funds. Alternatively, a pure target-date investor may add non-target-date options.
- **Through plan sponsor action.** A plan sponsor may add target-date or other investments to a participant's portfolio through employer contributions, recordkeeping administration adjustments, or investment menu changes.

Given these varying dynamics, we sought to understand whether mixed behavior arose because of the sponsor's decision exclusively or whether participants played a role. We studied investors in 2015 who became mixed investors over the three-year calendar period 2013–2015.

We analyzed the factors influencing participant accounts in the following way:

- **Plan sponsor-directed.** If a participant became a mixed investor solely because of sponsor action, we classified the mixed investor as sponsor-directed.
- **Participant-directed.** If a participant became a mixed investor because of his or her own action, or a combination of the participant's own choices and sponsor choices, we classified the mixed investor as participant-directed.

During 2013–2015, 60% of target-date investors were pure investors, 18% were sponsor-directed mixed investors, and 22% were participant-directed mixed investors (**Figure 6**). In other words, of the 40% who were mixed investors, nearly half the cases were caused by sponsor decisions; slightly more than half arose from participant direction.

**Figure 6. Dynamics of target-date investors, 2013–2015**

In DC plans offering target-date funds

| | 2013 | 2014 | 2015 | 2013–2015 |
|---|---|---|---|---|
| Pure investors | **56%** | **60%** | **62%** | **60%** |
| Mixed investors—plan sponsor-directed | | | | |
| • Company stock contribution | 9% | 8% | 14% | 9% |
| • Other employer contribution | 3% | 2% | 4% | 2% |
| • Miscellaneous adjustments | 3% | 3% | 1% | 3% |
| • Other employer transactions (e.g., menu changes) | 5% | 5% | 4% | 4% |
| Subtotal—sponsor-directed mixed investors | **20%** | **18%** | **23%** | **18%** |
| Mixed investors—participant-directed | | | | |
| • Core/satellite | 7% | 7% | 5% | 7% |
| • Conservative—cash | 2% | 1% | 1% | 2% |
| • Conservative—bonds | 2% | 2% | 1% | 1% |
| • Aggressive—equities | 8% | 8% | 4% | 8% |
| • Excessively diversified | 5% | 4% | 4% | 4% |
| Subtotal—participant-directed mixed investors | **24%** | **22%** | **15%** | **22%** |
| **Total** | **100%** | **100%** | **100%** | **100%** |

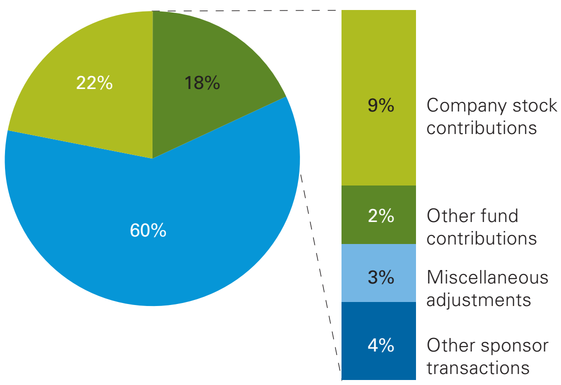
Source: Vanguard, 2016.

## Plan sponsor-directed mixed investors

Sponsors can create mixed target-date portfolios in several ways (**Figure 7**). The most frequent mechanism is by making company stock contributions (whether matching or nonelective contributions) to the account of an existing pure target-date investor. A second mechanism is by making other types of employer nonelective contributions.

**Figure 7. Plan sponsor-directed mixed investors in 2015**

Estimate based on new mixed investors over 2013–2015 period




Source: Vanguard, 2016.

Miscellaneous account adjustments account for nearly a fifth of sponsor-directed mixed investors. Typically, any recordkeeping corrections are made to the plan's default fund, which can be a target-date fund or non-target-date fund. These adjustments can result in many small positions in target-date funds posted to participant accounts.

Finally, sponsor transactions at the plan level can cause participant portfolios to become mixed. One common transaction is an investment option change. In these cases, the existing balances in the investment option being eliminated are typically shifted to a different fund—often a QDIA such as a target-date series. As a result, participants who previously held an investment in a non-target-date option may have those assets transferred to a target-date option.

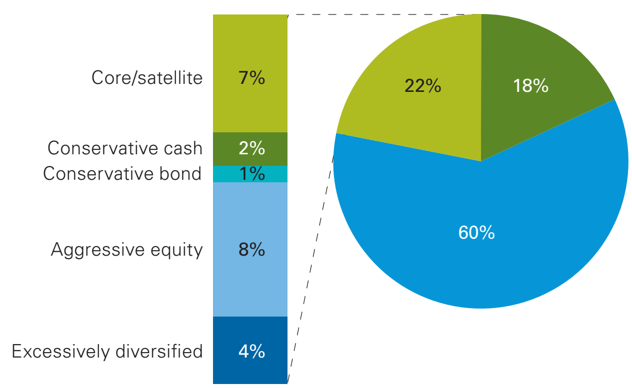
Because of these various sponsor actions, participants can find themselves with mixed target-date portfolios. Despite sponsor notification of these changes, few participants undo these actions, mostly because of the effect of inertia and possibly because of the *de minimus* amounts involved in many cases. Though these actions result in mixed target-date portfolios for participants, sponsors have legitimate fiduciary reasons for undertaking these actions.

## Participant-directed mixed investors

Participants can also create mixed target-date portfolios in several ways (**Figure 8**). We sought to understand these patterns of participant investment behavior using a statistical technique called cluster analysis. Eight portfolio variables—including number of funds, portfolio asset allocations, and the allocation to the target-date fund—were used to group participants based on similar characteristics.[5]

**Figure 8. Participant-directed mixed investors in 2015**

Estimate based on new mixed investors over 2013–2015 period




Source: Vanguard, 2016.

5 Cluster analysis is a statistical technique used to group items based on a measure of commonality among various factors. Eight portfolio-related variables were used for the analysis: number of funds as a measure of portfolio complexity; percent of portfolio in target-date assets; the stock, bond and cash allocations of the portfolio; and three difference measures, capturing the difference in equity, bond, and cash allocation from the allocation in the target-date fund in the portfolio. The analysis was performed on all participant-directed mixed investors from 2013 to 2015.

The result is five distinct segments or clusters of participant-directed mixed investor behavior.[6] Based on their characteristics, we describe these five segments as core/satellite investors, conservative cash investors, conservative bond investors, aggressive equity investors, and excessively diversified investors. We summarize these five groups using two portfolio characteristics: the average number of funds and the average allocation to equity funds (Figure 9). Each of these five segments has distinct average demographic characteristics (Figure 10, page 11).

### Core/satellite investors

Core/satellite investors account for 31% of all participant-directed mixed investors. On average, about 78% of their portfolio is invested in equities, and they hold about 3.3 funds. The target-date fund accounts for 75% of their entire portfolio, and hence they appear to be using target-date funds as a core holding, with other fund options as satellite strategies. Core/satellite investors tend to be younger and less tenured and have lower balances.

### Conservative cash investors

Conservative cash investors account for 7% of all participant-directed mixed investors. They hold only 22% of their portfolio in equities and have 3.4 fund options on average. They hold only 21% of their assets in target-date funds. Their dominant holding, accounting for 69% of their portfolio, is cash assets, including money market and stable value investments. It is not surprising to find that this group is the oldest (50 years) and longest tenured (13.3 years) of the five. They have high average 401(k) account balances, reflecting their longer period of savings and compounding.

### Conservative bond investors

The third group of participant-directed mixed investors, 5% of all participant-directed mixed investors, also holds a generally conservative strategy. However, their dominant portfolio holding is bonds, accounting for 61% of portfolio assets. Like the conservative cash group, conservative bond investors hold a small position in target-date funds—in this case, 30% of total assets.

### Aggressive equity investors

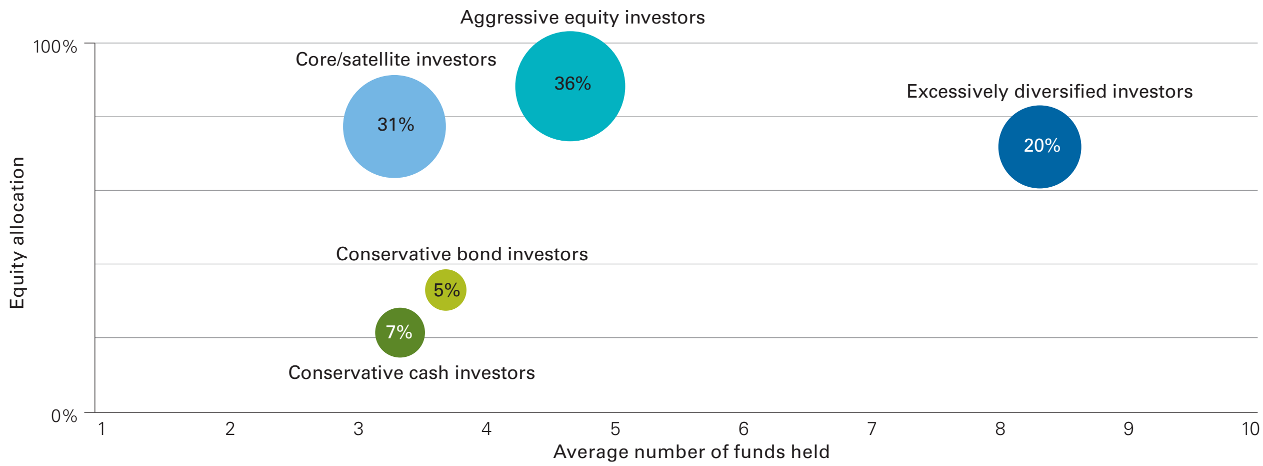
The aggressive equity group accounts for 36% of all participant-directed mixed investors and is the largest of the five groups. Their portfolio allocation is 89% equities. Target-date strategies account for only 27% of assets. On average, they hold almost 3 equity funds in their portfolio, and 4.7 options in total.

6 In undertaking the cluster analysis, we eliminated <1% of participants who had extreme levels of fund holdings—i.e., more than 20 funds in their portfolios. Outliers tend to distort the results of any cluster analysis and are typically excluded from analysis.

**Figure 9. Five types of participant-directed mixed investors**

Estimate based on cluster analysis of new mixed investors over 2013–2015 period

Percentage of participant-directed mixed investors by two portfolio characteristics




Source: Vanguard, 2016.

### Excessively diversified investors

Members of the last group, accounting for 20% of all participant-directed mixed investors (4% of target-date investors), can also be viewed as equity-oriented investors. Their average equity allocation is 72%. Yet they hold more than eight funds on average. While it is possible to diversify a portfolio with eight carefully selected options, this group is at greatest risk of overdiversification—holding so many funds that they run the risk of having duplicate and unnecessary holdings and engaging in "closet indexing."[7] An average of eight funds is high when one of the holdings is a target-date fund, which is typically a compilation of four or five other funds.

Excessively diversified investors hold nearly three times as many funds as a core/satellite investor. One other notable feature of this group is that they hold 29% of the fund options offered by their plan sponsor—much higher than the other group.

When interpreting the results of cluster analysis, it is important to recognize that each cluster represents an important central tendency of the data, but that individual participants may deviate from these averages. For example, in the aggressive equity category, participants, on average, own 4.7 funds. But within this cluster participant fund holdings may range from 2 funds at a minimum to 10 or more funds at the maximum. Hence, within each group there may be a minority who are at risk of overdiversification on the one hand, and on the other, a minority who hold simpler portfolios than the average.

## Becoming a mixed investor

One interesting feature of participant-directed mixed investors is how they chose to become a mixed investor (Figure 10).

- **At enrollment.** Half of all mixed participants adopted a mixed portfolio at the time of enrollment. In other words, they entered their employer's plan as mixed investors. Interestingly, half of this group were automatically enrolled, suggesting an active decision to modify the default choice.
- **Existing participants.** A third of participants were existing non-target-date investors who, at some point, added a target-date fund to their portfolio. The remaining 10% were the exact opposite—they had a target-date fund and then added a non-target-date option to their portfolio.

Aggressive investors were equally likely to add target-date options to an existing portfolio of non-target-date funds. Conservative investors were more likely to add target-date funds to an existing non-target-date portfolio. Core/satellite investors were slightly more likely to enroll as mixed investors.

Further research is needed to understand the choice mechanisms and their influences that drive existing investors to create a mixed portfolio. Changes in fund offerings play a role, but so do the influences of participant education campaigns and the general popularity of target-date funds as a retirement investment strategy.

7 When participants hold an excessive number of funds, it can be more difficult to have a coherent level of diversification in a portfolio. Also, if participants combine many active funds together, they end up with index-like exposure with active management fees—also known as closet indexing.

Figure 10. Characteristics of participant-directed mixed investors

Estimate based on cluster analysis of new mixed investors over 2013–2015 period

| | Core/satellite investors | Conservative—cash investors | Conservative—bond investors | Aggressive equity investors | Excessively diversified investors |
|---|---|---|---|---|---|
| **Portfolio characteristics** | | | | | |
| Average number of funds held | 3.3 | 3.4 | 3.7 | 4.7 | 8.3 |
| Assets in target-date funds | 75% | 21% | 30% | 27% | 23% |
| Percentage of fund menu in portfolio | 12% | 12% | 13% | 17% | 29% |
| Portfolio allocations | | | | | |
| Equities | 78% | 22% | 34% | 89% | 72% |
| Bonds | 19% | 9% | 61% | 10% | 22% |
| Cash (stable value, money market funds) | 3% | 69% | 5% | 1% | 5% |
| Average number of additional funds | | | | | |
| Equity | 1.42 | 0.90 | 0.84 | 2.94 | 4.72 |
| Balanced | 0.15 | 0.12 | 0.26 | 0.21 | 0.43 |
| Bond | 0.31 | 0.20 | 1.16 | 0.33 | 1.18 |
| Cash | 0.27 | 1.05 | 0.29 | 0.12 | 0.49 |
| **Demographics** | | | | | |
| Male | 62% | 62% | 58% | 62% | 61% |
| Average age | 42.5 | 50.3 | 45.9 | 43.3 | 46.5 |
| Average tenure | 7.0 | 13.3 | 9.8 | 8.2 | 10.1 |
| Average DC account balance | $69,004 | $153,925 | $99,226 | $103,697 | $163,715 |
| Median DC account balance | $16,773 | $71,576 | $33,496 | $28,261 | $55,583 |
| **Mixed investor behavior** | | | | | |
| Enrolled initially as mixed investor | 59% | 42% | 55% | 54% | 51% |
| Added target-date fund(s) to portfolio | 16% | 44% | 32% | 24% | 35% |
| Added non-target-date funds(s) to portfolio | 25% | 13% | 12% | 22% | 13% |

Source: Vanguard, 2016.

## Comparison with prior work

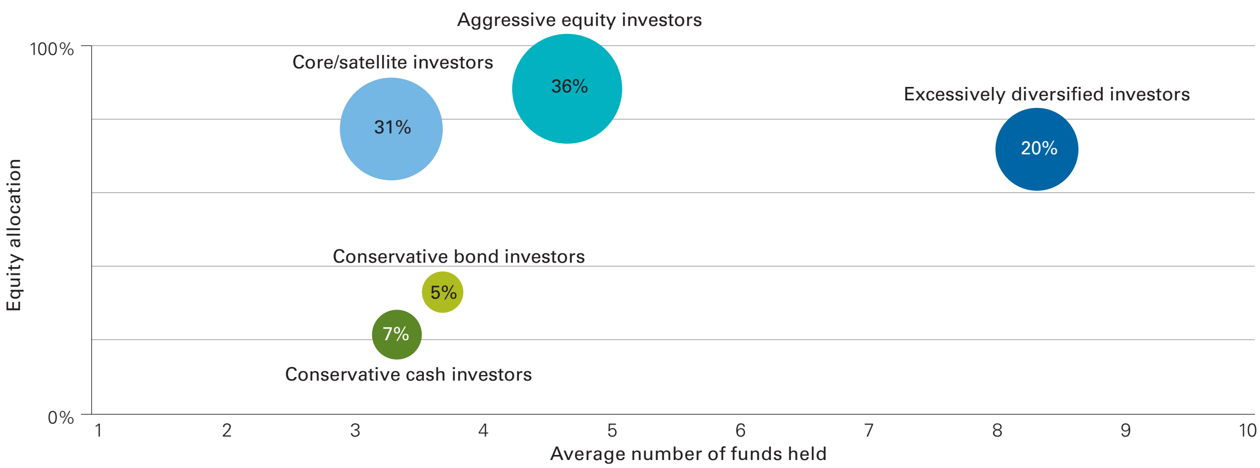
As we hypothesized in 2010, the percentage of mixed investors has declined over time. In 2010, roughly half of all target-date investors were mixed. In 2016, slightly more than a third are mixed. One factor that may have contributed to this shift was the continued rise of automatic enrollment over the period of study. It will be interesting to see if this trend continues. While automatic enrollment remains a popular strategy, adoption among plan sponsors has appeared to slow in recent years.

Other factors may include changes to the mechanisms by which participants become mixed investors. While the mechanisms remain consistent, the level at which they occur has changed. Fewer mixed investors are created due to menu changes, a more common occurrence when target-date strategies were being added to plan menus.

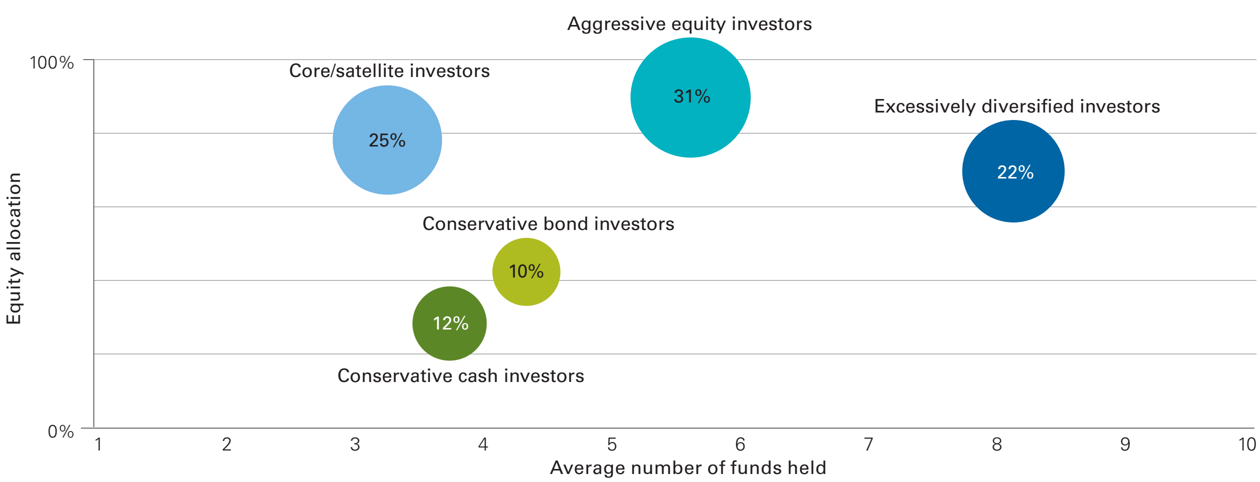
**Figure 11. Comparing mixed investors: 2010 versus 2016**

Percentage of participant-directed mixed investors by two portfolio characteristics

Panel A: Mixed investors 2013–2015




Panel B: Mixed investors 2007–2009




Source: Vanguard, 2016.

The investment strategies employed by participants who choose to be mixed investors are remarkably similar (Figure 11, panels A and B). Interestingly, the size of the "conservative" mixed investor groups has decreased by 50%. This change most likely reflects improved market conditions and reduced participant risk aversion during the 2013–2015 period. It is a reminder that, for certain participants making active choices, current market conditions play a major role in decision-making.

## Implications

The prevalence of mixed target-date investors has raised concerns about potential misuse of target-date funds by plan participants. To the contrary, we find that, first, nearly half of all mixed investor portfolios arise from legitimate plan sponsor actions. These include sponsor decisions with respect to matching or nonelective contributions, investment menu changes, or recordkeeping corrections.

Second, the cases of mixed investing that arise from participant choices largely follow a reasonable set of diversification strategies. These include construction of core/satellite portfolios, lower-risk portfolios, and aggressive equity portfolios.

At the margin, there still remains the risk that some participants will overdiversify their holdings when constructing complex portfolios using target-date funds. There is a chance that these participants may be at risk of overlapping investments or concentrated sector risk. One small group of target-date investors—the excessively diversified group, accounting for only 4% of target-date investors—appears to fall into this category. It is difficult to construct a well-diversified portfolio that includes a target-date fund without assuming some of these risks.

To mitigate the risk of excessive diversification, plan sponsors can consider several strategies. Sponsors can offer a managed account advisory service to participants; this service, typically for an additional fee, can oversee the task of constructing a complex, customized portfolio. The use of automatic enrollment, whereby participants are automatically enrolled into a single target-date fund, will also lead to more pure target-date investing in a given plan. Finally, reenrollment of the entire plan will lead to more participants holding a single position in the plan's investment default and a lower level of mixed investing.[8]

In evaluating mixed target-date investing in DC plans, it remains important to take a broad view. Employers play an important role in creating mixed investors because of legitimate plan actions, whether relating to contributions, menu changes, or administrative corrections. Many mixed investor participants are pursuing what appear to be reasonable diversification strategies with target-date funds, although they do not fit within the all-in-one portfolio approach of the target-date concept.

Finally, virtually all participants, even pure target-date investors in a given employer plan, are mixed investors in the broadest sense. Over a working career, they are likely to have multiple individual or household retirement accounts, whether in tax-deferred or taxable arrangements. In this sense, focusing on diversification patterns within the current employer plan account, while useful, provides only a partial view of how well a household's retirement portfolio is diversified.

8 See Pagliaro and Utkus, February 2016. *Reshaping participant outcomes through reenrollment.*

## Appendix I. Methodology

Our data set includes 3.8 million participants in approximately 1,650 plans offering target-date funds as an investment option during the 2012-through-2015 period. The year-end 2015 statistics throughout the paper are based on participant plan account balances held at that time. Investors are classified as pure versus mixed investors based on their fund holdings and using the definitions noted in the body of the report.

For assessing sponsor- versus participant-directed mixed investors, we analyzed all participants in our data set who became mixed investors during calendar years 2013–2015. We wanted to compare the most current 3-year period for which data was available to the 3-year period in our original study. Our findings are consistent with those documented in our original work published in 2010.

The relegation of a mixed investor to the sponsor- or participant-directed category was based on an analysis of contribution and exchange patterns over the period. As noted in the body of the report, sponsor-directed mixed investing arises exclusively from sponsor decisions relating to contributions, administrative adjustments, or menu changes, along with other miscellaneous sponsor actions. Participant-directed mixed investing arises from participant choices but may also include sponsor changes.

## References

Financial Engines, March 2016. *Not so simple: Why target-date funds are widely misused by retirement investors.* financialengines.com

Lamancusa, John A. and Jean A. Young, 2016. *Target-date fund adoption in 2015.* Vanguard Center for Investor Research. institutional.vanguard.com

Pagliaro, Cynthia A. and Stephen P. Utkus, February 2016. *Reshaping participant outcomes through reenrollment.* Vanguard Center for Investor Research. institutional.vanguard.com

Vanguard, 2016. *How America Saves 2016.* Valley Forge, Pa.: Vanguard Center for Investor Research. institutional.vanguard.com

Vanguard, 2010. *Mixed target-date investors in defined contribution plans.* Vanguard Center for Investor Research.

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