

Choice architecture and participant investment decisions

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- Participant investment allocations in defined contribution (DC) plans are influenced by a complex set of choice and behavioral mechanisms, including default, streamlined choice, menu, and inertia effects, as shown by the dissemination of index target-date funds in Vanguard-administered plans.
- Since 2008, the percentage of participants holding index options in Vanguard-administered DC plans has risen sharply because of the growing prominence of index target-date funds. By 2017, the average participant had 65% of his or her account balance invested in index options. New plan entrants were allocating, either by default or choice, nearly all contributions to index target-date funds.
- Participants automatically enrolled in 2017 allocated nearly all contributions to index target-date funds. Voluntarily enrolled participants directed 81% of contributions toward index target-date funds, suggesting that the expected retirement date as a choice heuristic plays an important role in investment selection.
- While the index contribution allocation of new plan entrants rose from 59% to 85% over the ten-year period, the index contribution allocation of longer-tenured participants increased much more slowly, from 38% to 46%, because of inertia.
- Plan sponsors, as choice architects in DC plans, may exploit these findings in several ways. To reduce plan costs or active risk exposure, plan sponsors can add index target-date funds to the plan investment menu, designate these funds as the plan's default investment, or reenroll participants into index target-date strategies. Our findings underscore that the choice of target-date series is likely to strongly influence the cost and active risk exposure of an entire DC plan over time.

Introduction

In our prior paper on indexing in defined contribution (DC) plans, we examined the dissemination of indexing in Vanguard-administered DC plans at the plan level.¹ In this paper, we study index exposure at the participant level, particularly its sharp rise for the average participant in Vanguard-administered plans because of the expanded use of index target-date funds.

Our analysis is a case study of the dynamics of individual decision-making that influence the adoption of any investment strategy within a participant-directed plan. As we describe below, participant investment decisions result from a complex interplay of forces. Default effects are important because increasing numbers of new plan entrants are automatically enrolled in a default investment option, often a target-date series. At the same time, voluntary decision-making remains significant—many new plan entrants are not automatically enrolled. For participants making their own choices, investment selections may be influenced by a menu effect (the percentage of the menu devoted to a given strategy) and, in the case of target-date funds, a simplified choice heuristic, making it easier to choose a retirement portfolio.²

Meanwhile, many longer-tenured participants have a profound bias toward inertia, often adopting a “set it and forget it” approach, changing their initial investment allocation infrequently. It is important for sponsors to know these effects as they oversee investment choices in a participant-directed plan. Sponsors serve as choice architects, directly or indirectly influencing participant portfolio holdings and outcomes through the default, menu, and other design decisions they make.³

In this paper, we examine these effects over a ten-year period beginning in 2008. By 2017, our sample included approximately 1,900 DC plans covering 4.6 million participants. This study begins with a review of index exposure among participant account balances. After a review of the key choice and behavioral elements influencing decision-making, we examine these effects using contribution allocations, which provide a better measure of future intentions.

Indexing in participant accounts

We begin our analysis by examining the changing composition of participant account balances. Our analysis here is based on how each individual participant account balance is allocated among various investment options. It is calculated at the individual account level, and each individual is weighted equally. It does not reflect the value of account balances or aggregate asset values, which would be skewed by large account holders.

In 2008, for the average participant, 30% of assets were invested in active funds, 44% in index options, and the remainder allocated among “non-indexable” assets such as money market funds, stable value funds, and company stock (**Figure 1**). By 2017, the composition of index exposure had changed dramatically, with 65% of the average participant asset allocation being indexed. All the relative growth occurred through the expansion of index target-date fund holdings, which grew from an average of 18% of the typical participant’s account balances in 2008 to 55% by 2017. The indexing shift resulted in a notable decrease in the percentage of active and company stock funds as well as non-indexable assets in participant accounts.⁴

¹ See Pagliaro and Utkus, 2017.

² Some plans may use structured or tiered menu presentations. This approach may have a distinct effect as well. See Chism, McShane, and Utkus (2016) for further discussion of the tiered menu approach.

³ See Thaler and Sunstein (2008) for a broader discussion of choice architecture.

⁴ While the relative percentage in many categories fell over the period, the absolute dollars invested may have remained the same or risen. For example, from 2008 to 2017, plan contributions directed toward active stock funds in our sample increased by \$47 billion.

Figure 1. Average participant account balances 2008–2017

Average allocation in each asset class

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Money market/stable value	19%	17%	15%	14%	13%	11%	9%	8%	7%	6%
Company stock	7	7	6	6	6	5	5	4	4	3
Total money market, stable value, and company stock	26%	24%	21%	20%	19%	16%	14%	12%	11%	9%
Active stock	20%	20%	18%	15%	14%	14%	13%	12%	11%	12%
Active bond	3	3	2	2	2	2	2	1	2	2
Active target-date	0	0	0	0	0	0	4	5	6	7
Active balanced	7	7	6	6	5	5	5	4	5	5
Total active	30%	30%	26%	23%	21%	21%	24%	22%	24%	26%
Index stock	14%	14%	15%	14%	13%	13%	13%	13%	10%	9%
Index bond	4	4	4	4	4	3	3	3	2	1
Index target-date	18	22	28	33	37	41	45	49	52	55
Index target risk	7	6	5	5	5	5	1	1	1	0
Index other balanced	1	0	1	1	1	1	0	0	0	0
Total index	44%	46%	53%	57%	60%	63%	62%	66%	65%	65%
Grand Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: Vanguard, 2018.

These figures represent average effects. A more striking development is the shift of individual participant accounts from all-active to all-passive exposure. In 2008, 28% of plan participants were invested exclusively in actively managed funds (Figure 2, Panel A). By 2017, this percentage had dropped to 21%, a relative decline of 25%. By comparison, only 23% of participants were invested solely in index funds in 2008. By 2017, half of all participants held an all-passive portfolio. The shift to indexing is even more evident when non-indexable assets are removed from the calculation (Figure 2, Panel B).

Choice mechanisms and behavioral biases

The dissemination of any investment strategy within a participant-directed DC plan reflects the interplay of choice mechanisms and behavioral biases (Figure 3). These dynamics are at work in the extraordinary growth of target-date funds in DC plans, whether index, active, or some combination.

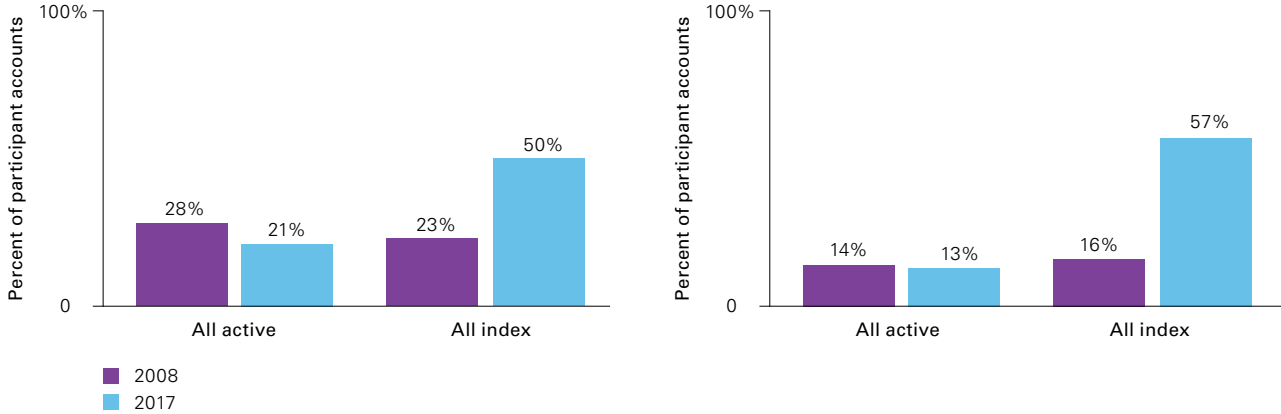
The first choice mechanism is the menu effect. The prominence of a given investment strategy—measured by the percentage of the total number of investment options that strategy represents—influences the odds that participants will invest in that strategy. For example, if a plan offers 26 options and 13 of them are target-date

Figure 2. Distribution of participant account balances 2008 versus 2017

Based on fraction of indexed assets in each participant DC account

a. All assets in participant account

b. Excluding money market, stable value, and company stock



Source: Vanguard, 2018.

Figure 3. Choice mechanisms and behavioral biases in DC investment decisions

Effect/Bias	Description	Groups Affected
Menu Effect	Participant allocations to a given strategy will be influenced by that strategy’s prominence in the menu (as measured by the fraction of the total numbers of options offered).	<ul style="list-style-type: none"> • All participants
Simplified Choice Heuristic	Participants lacking firm convictions about portfolio construction are likely to rely on simplified decision-making heuristics (short-cuts), such as selecting a portfolio based on age of retirement.	<ul style="list-style-type: none"> • New entrants in voluntary enrollment plans
Default Effect	Participants defaulted to a given strategy are likely to remain in that strategy, absent any strong influence to the contrary, due to inertia and inattention.	<ul style="list-style-type: none"> • New entrants in autoenrollment plans • Existing “swept” participants in autoenrollment plans • Reenrolled participants
Inertia Effect	Having chosen a strategy, participants are likely to make few if any changes to that allocation over time due to inertia and inattention.	<ul style="list-style-type: none"> • Existing participants

Source: Vanguard, 2018.

options, then 50% of the menu is in target-date options. Over time, all things being equal, participant contributions directed toward those options will approach 50%.

Two other choice mechanisms are quite important, particularly for new entrants into a DC plan. For participants who make their own investment choices, target-date funds may be appealing because of a simplified choice heuristic. When target-date options are offered, participants can choose a single diversified portfolio based on the expected year of retirement—rather than a more time-consuming, complex process of evaluating all the plan’s investment options and attempting to construct a diversified portfolio on their

own. For participants who are automatically enrolled, or longer-tenured participants who are reenrolled, the choice of target-date funds as a default option will contribute to widespread adoption through a default effect.⁵

Finally, longer-tenured employees are subject to a particularly prominent behavioral bias: an inertia effect. Any menu change will have an effect on longer-tenured participants, but it will be mitigated by the powerful effect of inertia and inattention. Longer-tenured participants make few changes to their portfolios in response to any external change, including a change in the composition of the plan menu, because of inertia.

5 See Clark and Young (2018) for a broader discussion on the power of defaults.

Contribution allocations and indexing

To examine these choice and behavioral effects in detail, we shift our focus from participant account balances to participant contribution allocations (including both employee and employer contributions). Contribution allocations better reflect future intentions, and are unaffected by fluctuations in balances due to investment performance.

As with account balances, there has been a marked shift toward indexing in participant contribution allocations over the ten-year period (Figure 4). From 2008 to 2017, index options rose from 49% to 70% of contributions for

the average participant, while active options declined from 30% to 23% of contributions. The increase in contributions to index funds was driven exclusively by the increase in average contributions in index target-date funds, which rose from 22% in 2008 to 60% in 2017.

It is interesting to note that while the contribution percentage allocated to active options declined over the ten-year period, it has risen slightly since 2013 because of the increase of custom target-date usage among a small number of large plan sponsors.

Figure 4. Average contribution allocation 2008–2017

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Money market/stable value	15%	15%	13%	11%	10%	9%	7%	7%	6%	5%
Company stock	6	5	5	5	6	5	4	3	2	2
Total money market, stable value, and company stock	21%	20%	18%	16%	16%	14%	11%	10%	8%	7%
Active stock	21%	18%	17%	15%	13%	12%	11%	11%	9%	10%
Active bond	2	2	2	2	2	2	1	1	2	1
Active target-date	0	0	0	0	0	0	5	5	6	7
Active balanced	7	7	6	5	5	5	4	4	5	5
Total active	30%	27%	25%	22%	20%	19%	21%	21%	22%	23%
Index stock	15%	14%	14%	13%	12%	12%	12%	12%	10%	8%
Index bond	3	4	4	3	3	3	3	3	2	2
Index target-date	22	27	32	39	43	46	51	54	57	60
Index target risk	8	7	7	6	5	5	2	0	1	0
Index other balanced	1	1	0	1	1	1	0	0	0	0
Total index	49%	53%	57%	62%	64%	67%	68%	69%	70%	70%
Grand Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: Vanguard, 2018.

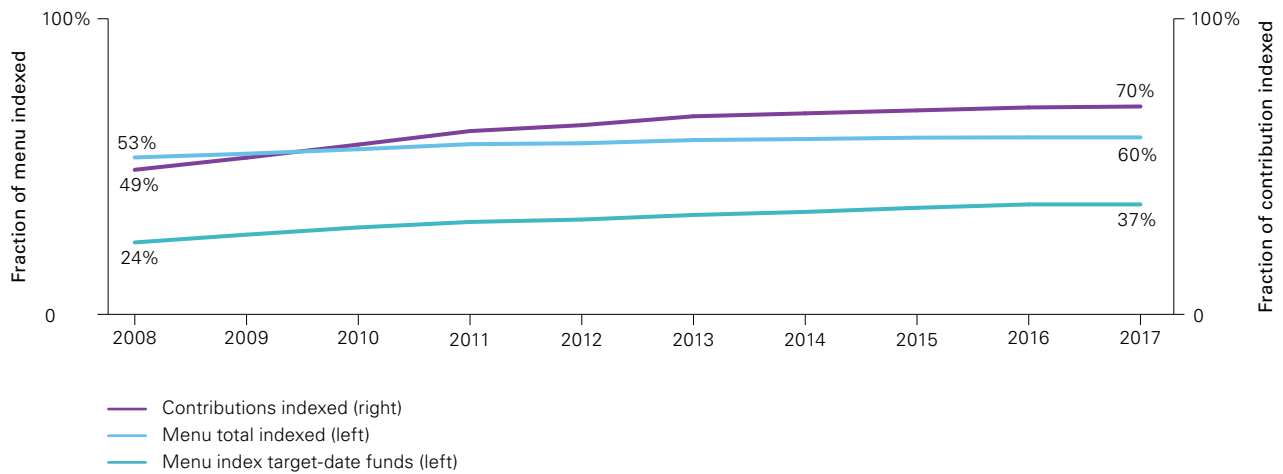
The menu effect

Prior research has shown that both the number and type of funds offered in a menu can have a meaningful effect on how participants allocate plan contributions.⁶ In our sample, between 2008 and 2017, the composition of a typical plan menu shifted from 53% in index options to 60% (Figure 5).⁷ As stated earlier, average participant contributions to index options have also shifted,

increasing from 49% to 70% of the average contribution allocation. Driving this change has been the growth of index target-date funds in the menu, which rose from 24% to 37% over the period. This shift in contributions actually occurred at a faster pace than the growth of index target-date menu selections, suggesting that factors other than the menu effect influenced the trend toward indexing in Vanguard-administered plans.

Figure 5. Menu effect and indexing

Vanguard recordkept plans and participants



Source: Vanguard, 2018.

6 Benartzi and Thaler (2001) and Brown, Liang, and Weisbenner (2007).

7 In this measure, each fund in a target-date series is counted as a distinct option because we are measuring the prominence of the options from the perspective of participants reviewing the menu.

Default and simplified choice effects

The growth of index target-date funds is also influenced by default effects for those automatically enrolled and by the simplified choice effects for those making their own investment decisions. In 2017, 63% of new plan entrants at Vanguard were enrolled in their DC plans using automatic enrollment and 37% voluntarily enrolled in their DC plans.⁸ To study how the dissemination of indexing and index target-date funds differs between these two groups, we analyzed participants in plans offering target-date funds, thus eliminating the impact of these funds' adoption rate by plan sponsors.

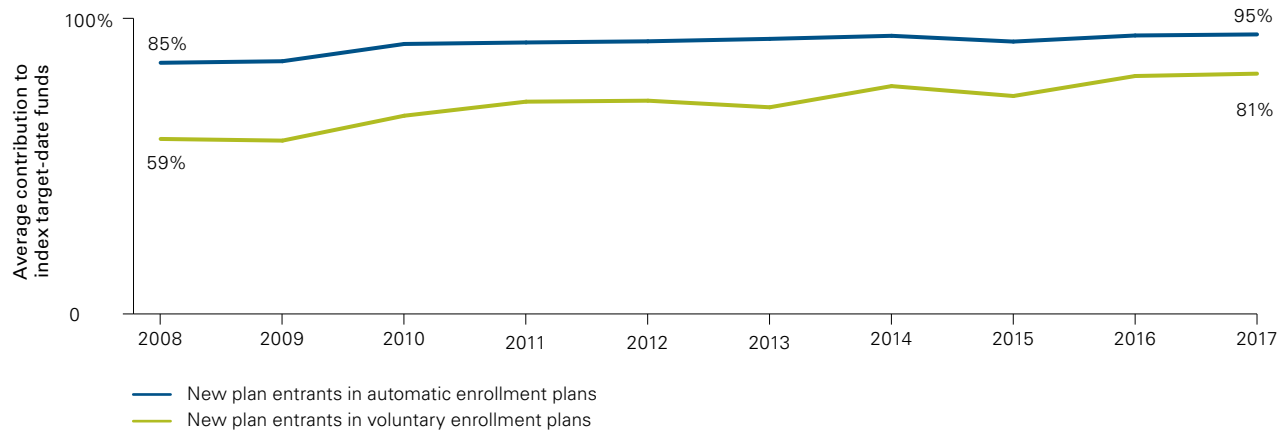
Among automatically enrolled participants, the average percentage of contributions devoted to index target-date funds increased from 85% in 2008 to 95% in 2017 (Figure 6). Furthermore, 86% of autoenrolled participants

directed 100% of their contributions to index target-date funds in 2017. These statistics demonstrate the well-known default effect.

Among those who make voluntary investment choices, the change was still substantial but less so than for auto-enrolled participants. Among those choosing options on their own, the average percentage of contributions to index target-date funds rose from 59% in 2008 to 81% in 2017. This reflects a combination of the menu effect (greater prominence of the target-date series in the menu, given the size of the series, as target-date funds were added over the period) and the simplified choice effect (the ease of selecting an option based on retirement age). But in total, these two effects, influencing those making their own choices, were less substantial than the default effect influencing autoenrolled participants.

Figure 6. Default and simplified choice effects

Average contribution to index target-date funds in plans offering target-date funds



Source: Vanguard, 2018.

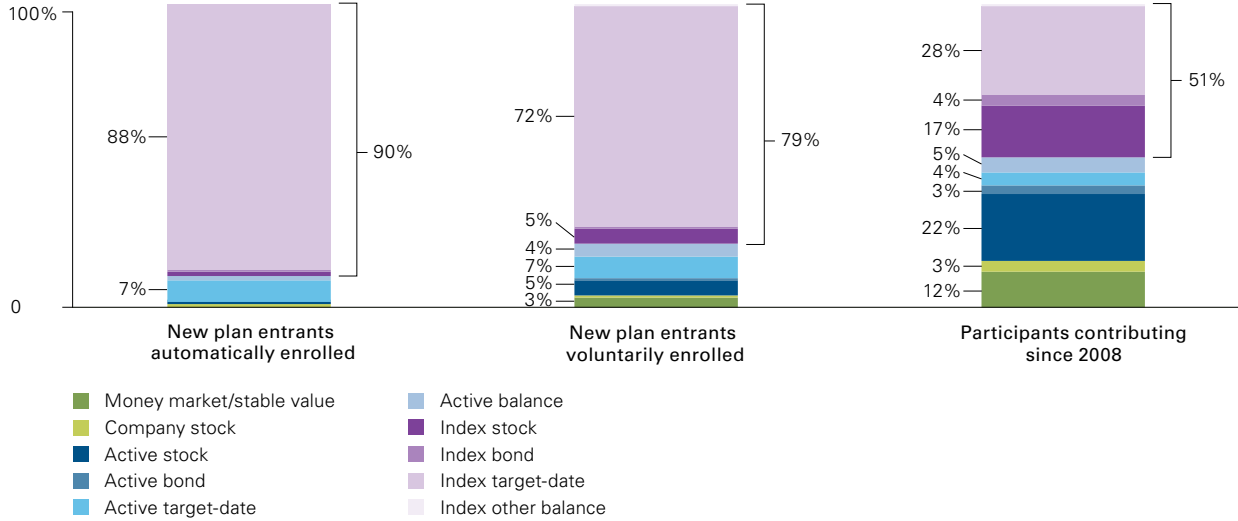
These varying effects can be seen in average contribution allocations in 2017. Here we compare three groups: (1) new plan entrants who were automatically enrolled in 2017; (2) new plan entrants making their own investment choices in 2017; and (3) a sample of longer-tenured participants who continuously contributed to their plans from 2008 to 2017. The results demonstrate the differential impact of default, simplified choice, and inertia effects (Figure 7). For autoenrolled participants, 90% of contributions were allocated to index funds—with 88% directed to index target-date funds, the predominant default option among Vanguard recordkeeping plans.⁹ For voluntarily enrolled participants,

the percentage allocated to any index options was slightly lower, at 79% of contributions—with 72% directed to index target-date funds.

The behavior of longer-tenured participants (in their plans since 2008) was sharply different. While most new plan entrants contribute to index funds, just half (51%) of the contributions made by longer-tenured participants are directed to index funds. We attribute this difference to the impact of inertia on decision-making. At the same time, just over 1 in 4 dollars contributed by these participants is directed to target-date funds, suggesting a slow adaptive movement toward new menu options.

Figure 7. Default, simplified choice, and inertia effects

Average contribution allocation in each asset class in 2017



Note: Index segments 2% or less are not labeled.

Source: Vanguard, 2018.

⁹ In 2017, 97% of plans using automatic enrollment elected target-date funds as the plan’s qualified default investment alternative, and these were almost exclusively index target-date series.

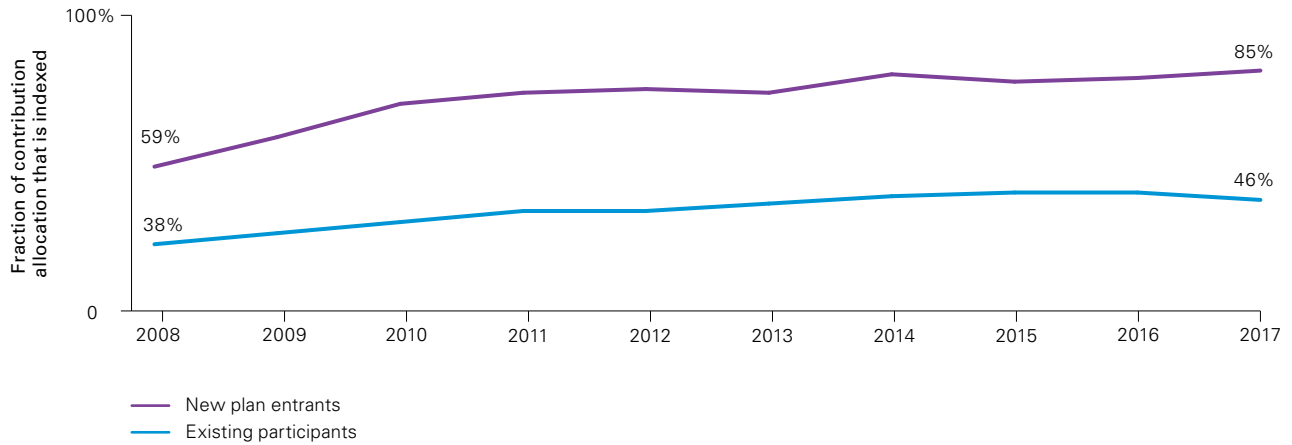
Inertia effect

The inertia effect among longer-tenured participants is profound. Between 2008 and 2017, the percentage of contributions to index options rose from 59% to 85% of contributions among new plan entrants (Figure 8). This again reflects a combination of default, simplified choice, and menu effects. Among longer-tenured participants, the percentage rose only from 38% to 46%.

Of course, while this inertia effect means that longer-tenured participants make few changes to their portfolios when menus change, it also means that they trade less frequently. For example, in 2017, only 8% of participants exchanged existing assets from one investment option into another.

Figure 8. Inertia effect among existing participants

Vanguard recordkept plans and participants



Note: Existing participants are participants who have been contributing to their plans since 2008.

Source: Vanguard, 2018.

Implications

The dissemination of index target-date funds in Vanguard-administered DC plans demonstrates several of the choice and behavioral dynamics that influence the addition of any investment option within a member-directed retirement program. These include menu and default effects, the simplified choice heuristic associated with target-date funds, and the effect of inertia on longer-tenured participants' investment choices.

Sponsors seeking to reduce investment costs and participant exposure to active (idiosyncratic) risk may take advantage of these effects by adopting plan design changes that will influence participant investment allocations. Choosing low-cost index target-date options as the plan's default will reshape participants' risk and cost exposure over time, as new hires subject to automatic enrollment enter the plan. Offering index target-date options in voluntary plans will increase the use of these options through a menu effect and simplified choice heuristic among new entrants. Sponsors seeking to change behaviors of longer-tenured participants may wish to consider reenrollment into a low-cost default option, as that is one way to counteract the profound inertia influencing longer-tenured participants' investment holdings.

More broadly, our results highlight the important effect that the sponsor's decision—regarding the composition of the default fund or target-date series—will have on the cost and risk exposure of individual participant portfolios and the aggregate plan. Because of the behavioral effects we highlight, it is likely that the sponsor's decision, and not the participants', will have the most profound influence on these plan investment metrics.

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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 target-date funds is not guaranteed at any time, including on or after the target date.

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