How America Saves 2023

Vanguard®

Contents

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As your partner, we owe it to you to serve up data, trends, and pertinent information that allow you to make the best decisions you can in your role. So I'm thrilled to introduce the 22nd edition of *How America Saves*—our annual deep dive into the saving behaviors of nearly 5 million DC plan participants across Vanguard's business. Our research is leveraged year round across industries to influence plan design and ultimately improve outcomes.

Our findings are encouraging. To date, many of our plan sponsors and consultants have taken tangible steps to improve plan design with features such as automatic enrollment and automatic escalation. And many are starting to make their plan a destination by introducing financial wellness features to their benefits packages.

We saw record highs in participation, deferral rates, and the use of professionally managed allocations in 2022. This is a credit to many of our sponsors, who strategically improved plan design and introduced new features despite a volatile economy. But we still have work to do. We believe participants should be saving at least 12% to 15% of their pay to meet their retirement goals. We're not there yet—but we're close. Twenty percent of participants need a boost of just 1% to 3% to hit their target saving rate. Together, we can help make that happen.

20% of participants need a boost of just 1% to 3% to hit their target saving rate. Together, we can help make that happen.

We hope our research helps to identify at least one action you can take to build a stronger plan—and thus a stronger retirement for your plan participants. We welcome the opportunity to discuss our research, how your plan compares with our findings, and how we can partner together for a brighter 2023.

Sincerely,

John

Figure 1. Highlights at a glance

Vanguard recordkeeping statistics	2018	2019	2020	2021	2022
Number of participant accounts (millions)	5.0	5.0	4.7	4.7	4.9
Number of plans (thousands)	1.9	1.8	1.7	1.7	1.7
Median participant age	44	44	44	44	43
Median participant tenure	7	6	7	7	7
Percentage male	57%	57%	56%	57%	56%
Median eligible employee income (thousands)	$61	$64	$64	$71	$74*
Median participant income (thousands)	$70	$72	$73	$78	$82*
Median nonparticipant income (thousands)	$34	$34	$34	$39	$42*

1. Accumulating

Vanguard recordkeeping statistics	*How America Saves 2023* reference	2018	2019	2020	2021	2022
Plan design—page 18						
Plans offering immediate eligibility for employee contributions	**Figure 3**	69%	69%	71%	72%	72%*
Plans requiring one year of service for matching contributions	**Figure 3**	23%	22%	20%	18%	18%*
Plans providing an employer contribution	**Figure 6**	96%	96%	96%	95%	95%*
Plans with automatic enrollment	**Figure 18**	48%	50%	54%	56%	58%
Plans with automatic enrollment with automatic annual increases	**Figure 19**	66%	68%	69%	69%	69%
Plans offering Roth contributions	**Figure 44**	71%	74%	74%	77%	80%
Plans offering after-tax contributions	**Figure 45**	18%	19%	19%	21%	22%
Participation rates—page 32						
Plan-weighted participation rate	**Figure 25**	82%	83%	85%	84%	85%*
Participant-weighted participation rate	**Figure 25**	77%	78%	81%	82%	83%*
Voluntary enrollment participant-weighted participation rate	**Figure 32**	60%	60%	65%	64%	70%*
Automatic enrollment participant-weighted participation rate	**Figure 32**	92%	92%	92%	93%	93%*
Participants using catch-up contributions (when offered)	**Figure 43**	14%	15%	16%	15%	16%*
Participants using Roth (when offered)	**Figure 44**	11%	12%	15%	15%	17%*
Participants using after-tax (when offered)	**Figure 45**	8%	8%	10%	11%	10%*
Employee deferrals—page 38						
Average participant deferral rate	**Figure 34**	7.0%	7.1%	7.3%	7.4%	7.4%*
Median participant deferral rate	**Figure 34**	6.0%	6.0%	6.1%	6.4%	6.4%*
Percentage of participants deferring more than 10%	**Figure 35**	21%	22%	25%	23%	24%*
Participants reaching 402(g) limit ($20,500 in 2022)	**Figure 42**	12%	12%	14%	14%	15%*
Average total contribution rate (participant and employer)	**Figure 47**	10.7%	11.3%	11.3%	11.6%	11.3%*
Median total contribution rate (participant and employer)	**Figure 47**	9.9%	10.5%	10.5%	10.8%	10.6%*
Account balances—page 50						
Average balance	**Figure 52**	$92,148	$106,478	$129,157	$141,542	$112,572
Median balance	**Figure 52**	$22,217	$25,775	$33,472	$35,345	$27,376

* These figures are estimated for 2022, as the data required to compute them will not be available until December 2023.

(Continued)

2. Managing

	How America Saves 2023 reference	2018	2019	2020	2021	2022
Asset and contribution allocations—page 56						
Average plan asset allocation to equities	**Figure 58**	71%	73%	72%	74%	72%
Average plan contribution allocation to equities	**Figure 59**	76%	77%	77%	77%	78%
Average plan asset allocation to target-date funds	**Figure 58**	35%	37%	37%	38%	40%
Average plan contribution allocation to target-date funds	**Figure 59**	57%	59%	60%	61%	63%
Participants with balanced strategies	**Figure 88**	75%	76%	76%	78%	79%
Extreme participant asset allocations (100% fixed income or equity)	**Figure 85**	9%	8%	8%	8%	7%
Plan investment options—page 60						
Average number of funds offered	**Figure 62**	17.7	17.4	17.5	17.5	17.4
Average number of funds used	**Figure 62**	2.5	2.4	2.5	2.4	2.4
Percentage of plans designating a QDIA	**Figure 69**	84%	86%	87%	88%	88%
Among plans designating a QDIA, percentage target-date fund	**Figure 69**	97%	97%	97%	97%	98%
Plans offering target-date funds	**Figure 73**	93%	94%	95%	95%	96%
Participants using target-date funds (when offered)	**Figure 73**	79%	80%	80%	82%	83%
Plans offering managed account program	**Figure 73**	32%	37%	39%	41%	41%
Participants offered managed account program	**Figure 73**	57%	63%	71%	74%	77%
Participants with professionally managed allocations	**Figure 76**	59%	62%	62%	64%	66%
Participants using a single target-date fund	**Figure 76**	52%	54%	54%	56%	59%
Participants using a single risk-based balanced fund	**Figure 76**	3%	3%	1%	1%	<1%
Participants using a managed account program	**Figure 76**	4%	5%	7%	7%	7%
Plans offering company stock	**Figure 92**	8%	8%	8%	8%	8%
Participants using company stock	**Figure 77**	9%	9%	9%	8%	8%
Participants with >20% company stock	**Figure 88**	4%	4%	3%	3%	3%
Investment returns—page 86						
Average 1-year participant total return rate	**Figure 93**	(5.3%)	22.4%	15.1%	14.6%	(15.8%)
Average 1-year participant personal return rate	**Figure 93**	(7.0%)	21.2%	16.5%	13.6%	(15.9%)
Trading activity—page 91						
Participant-directed trading	**Figure 97**	8%	7%	10%	8%	6%
Recordkeeping assets exchanged to equities (fixed income)	**Figure 97**	(1.1%)	(1.3%)	(3.0%)	(0.3%)	(0.9%)

(Continued)

3. Accessing

	How America Saves 2023 reference	2018	2019	2020	2021	2022
Plan loans—page 97						
Plans offering loans	**Figure 103**	78%	78%	79%	81%	82%
Participants with an outstanding loan (when offered)	**Figure 104**	13%	13%	13%	13%	12%
Plan withdrawals—page 101						
Plans offering hardship withdrawals	**Figure 109**	85%	88%	95%	94%	95%
Participants using hardship withdrawals (when offered)	**Figure 110**	1.9%	2.3 %	1.7%	2.1%	2.8%
Participants using nonhardship withdrawals (when offered)	**Figure 110**	3.4%	3.3%	3.4%	4.0%	3.6%
Plan distributions and rollovers—page 103						
Terminated participants preserving assets	**Figure 120**	81%	80%	83%	83%	81%
Assets preserved that were available for distribution	**Figure 120**	96%	96%	98%	98%	97%
Participant access methods—page 111						
Participants registered for website account access	**Figure 124**	73%	76%	79%	79%	79%
Participant account transactions processed via the web/mobile	**Figure 126**	90%	91%	91%	92%	91%

Source: Vanguard 2023.

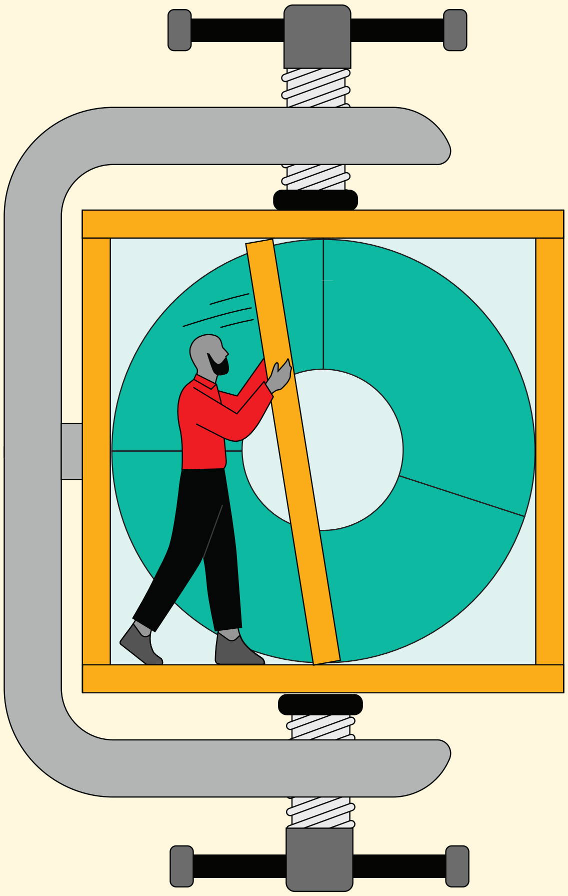
Executive summary

Over the past decade, retirement plan sponsors have increasingly turned to automatic solutions to help employees save more for retirement. As a result, plan participation rates have increased, automatic enrollment designs have become stronger, and participant portfolio construction has continued to improve with more age-appropriate asset mixes and less extreme equity allocations.

While certain aspects of the COVID-19 pandemic appear to be behind us, it created several ongoing economic challenges:

- ☑ **Inflation**, which reached its highest point in 40 years, remained a concern for policymakers and American households in 2022. Central banks responded by aggressively increasing interest rates, creating multiple economic challenges.
- ☑ **Rising interest rates** and anticipation of additional rate hikes.
- ☑ **Significant declines in both the U.S. equity and bond markets.**
- ☑ **Mortgage rates reached a 20-year high**, and relatively strong household and corporate balance sheets, created by increased savings during the pandemic, started to feel the stress of rising prices and interest rates.

But despite this significant uncertainty, our data highlights that participants generally remained resilient in 2022. While there were a few areas that signaled a possible uptick in financial stress, overall, participants' behavior in retirement plans remained in line with previous years, and most continue to maintain a long-term view.

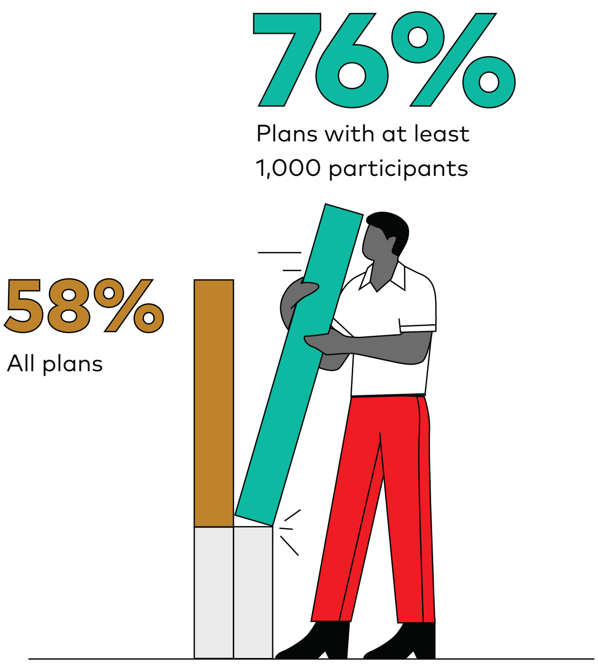


1 Accumulating assets

Growth of automatic savings features

The adoption of automatic enrollment has more than tripled since year-end 2007, the first year after the Pension Protection Act (PPA) of 2006 took effect. At year-end 2022, 58% of Vanguard plans had adopted automatic enrollment, including 76% of plans with at least 1,000 participants.

Record-breaking autoenrollment adoption



See automatic enrollment trends on page 28.

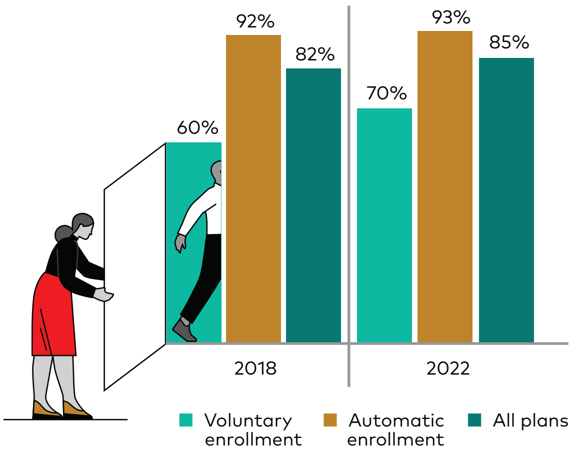
Two-thirds of automatic enrollment plans have implemented automatic annual deferral rate increases. Additionally, automatic enrollment defaults have increased over the past decade. Fifty-nine percent of plans now default employees at a deferral rate of 4% or higher, compared with 35% of plans in 2013. **See automatic enrollment default trend chart on page 31.**

Ninety-nine percent of all plans with automatic enrollment defaulted participants into a balanced investment strategy in 2022—with 98% choosing a target-date fund as the default.

Participation rates

There are two measures of participation rate. The most common measure of participation rate is calculated by taking the average of rates among a group of plans. We refer to this as the plan-weighted participation rate. In 2022, Vanguard's plan-weighted participation rate was 85%. It has risen by 7 percentage points since 2013.

How employees join



A second measure of participation rate considers all employees in Vanguard-administered plans as if they were in a single plan. We refer to this as the participant-weighted participation rate. Across the universe of Vanguard participants, 83% of eligible employees were enrolled in their employer's voluntary savings program in 2022. Since 2013, this measure has increased by 8 percentage points.

Plans with automatic enrollment had a 93% participation rate, compared with a participation rate of 70% for plans with voluntary enrollment.

Saving rates

The average deferral rate was 7.4% in 2022, up modestly from 7.0% in 2013. The median deferral rate was 6.4% in 2022. These statistics reflect the level of employee-elective deferrals. Most Vanguard plans also make employer contributions. Including both employee and employer contributions, the average total participant contribution rate in 2022 was 11.3%, and the median was 10.6%. These rates have remained mostly stable for the past 5 years.

When including nonparticipants, employees hired under automatic enrollment plans saved an average of 11%, considering both employee and employer contributions. Employees hired under a voluntary enrollment design saved an average of 8% due to significantly lower participation. **See more automatic versus voluntary enrollment comparisons on page 49.**

Plan eligibility

In 2022, 72% of Vanguard plans allowed employees to make voluntary contributions immediately after they joined their employer, up from 61% of plans in 2013.

Roth

At year-end 2022, a Roth feature was offered by 80% of Vanguard plans, up from 68% in 2017. Among larger plans, 94% offered the feature. At year-end 2022, 17% of participants within these plans had elected the option, up from 11% in 2017. **See more Roth data starting on page 45**.

Employer contributions

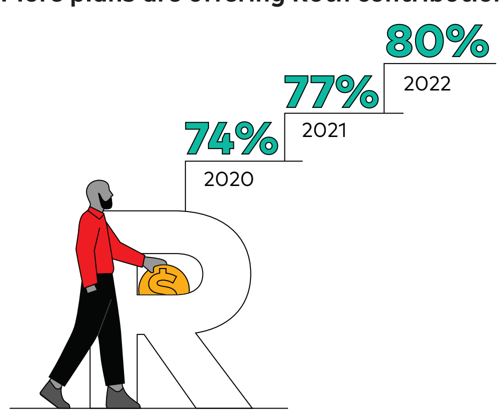
Nearly half of Vanguard plans provided only a matching contribution in 2022, and 36% of plans provided both a matching and a nonmatching employer contribution. Ten percent of plans provided only a nonmatching employer contribution.

The average value of the promised match was 4.5% of pay; the median value, 4.0%. Among plans with a nonmatching employer contribution, the average contribution was equivalent to 5.1% of pay; the median contribution, 4.1% of pay. **See more data on employer contributions starting on page 21.**

Account balances

In 2022, the average account balance for Vanguard participants was $112,572; the median balance was $27,376. Vanguard participants' average account balances decreased by 20% since year-end 2021, driven primarily by the decrease in equity and bond markets over the year.

More plans are offering Roth contributions



2 Managing assets

Advice

To address participant needs for assistance with investing and planning decisions, plan sponsors are increasingly offering managed account advice services. Forty-one percent of all Vanguard DC plans offered managed account advice in 2022, and 8 in 10 larger plans offered the service. When plans offered managed account advice, 9% of participants used the service in 2022, up from 7% in 2017.

Target-date funds

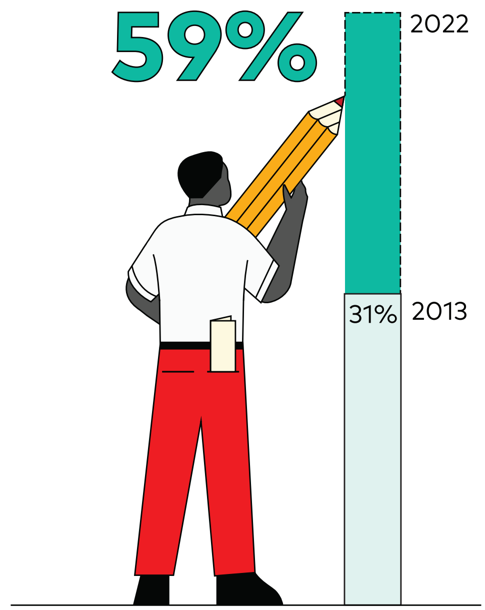
Ninety-six percent of plans offered target-date funds at year-end 2022. An important factor driving the use of target-date funds is their role as an automatic or default investment strategy. The qualified default investment alternative (QDIA) regulations promulgated under the PPA continue to influence adoption of target-date funds. Among plans choosing a QDIA, 98% of designated QDIAs were target-date funds, and 2% were balanced funds.

Eighty-three percent of all participants used target-date funds, and 71% of them had their entire account invested in a single target-date fund in 2022.

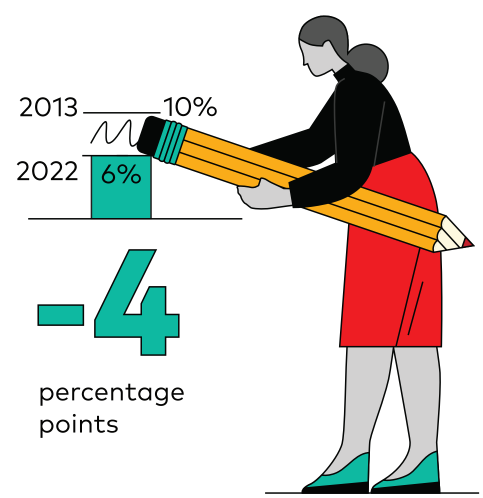
Note: Investments in target-date funds are subject to the risks of their underlying funds. The year in the fund name refers to the approximate year (the target date) when an investor in the fund would retire and leave the workforce. The fund will gradually shift its emphasis from more aggressive investments 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.

Over the last 10 years

The percentage of participants in a single target-date investment **nearly doubled . . .**



. . . while participant-directed trading declined.



Professionally managed allocations

The rising prominence of professionally managed allocations has been essential to improvements in portfolio construction. Participants with professionally managed allocations have their entire account balance invested in a single target-date or balanced fund or in a managed account advisory service.

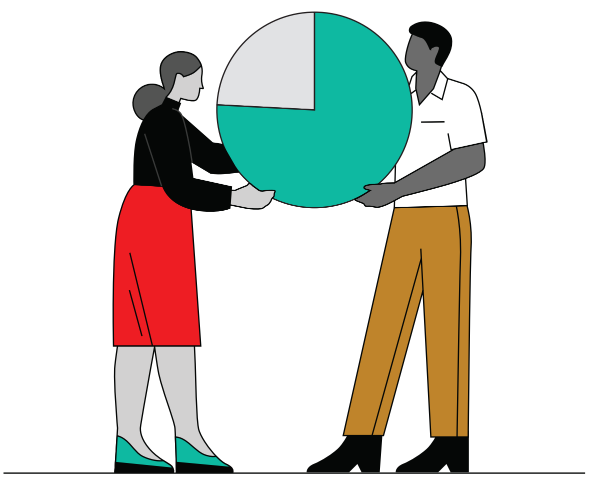
Participants are turning over account management to professionals

2018

59%

2022

66%



See the growth of professionally managed allocations on page 71.

At year-end 2022, 66% of all Vanguard participants were in an automatic investment program—compared with 7% at the end of 2004 and 40% at year-end 2013. Fifty-nine percent were invested in a single target-date fund, and 7% used a managed account program. These diversified, professionally managed investment portfolios dramatically improve diversification compared with the portfolios of participants who make their own choices.

Participant portfolio construction

Participant portfolio construction has improved dramatically over the past 15 years, with 79% of participants having a balanced strategy in 2022, compared with 39% in 2005. Three percent of participants held no equities, and 3% had more than 20% allocated to company stock in 2022. In 2005, 13% of participants had no equities, and 18% held a concentration in company stock.

Participant trading muted

During 2022, 6% of DC plan participants traded within their accounts, while 94% did not initiate any exchanges. On a net basis, there was a shift of 1% of assets to fixed income during the year, with most traders making small changes to their portfolios.

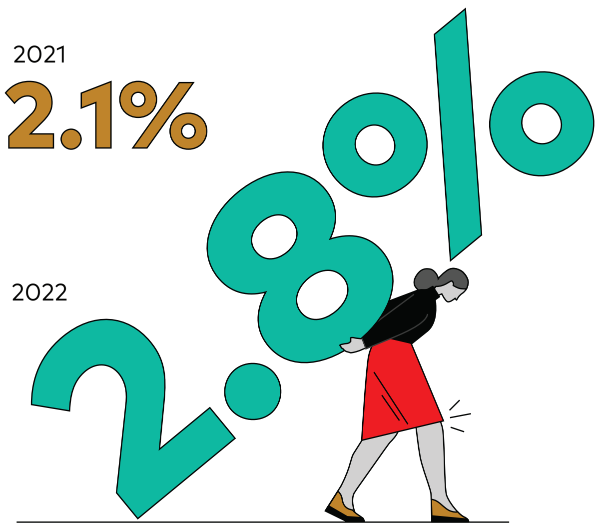
Over the past 15 years, we have generally observed a decline in participant trading. This is partially attributable to participants' increased adoption of target-date funds. Only 2% of participants holding a single target-date fund traded in 2022. **See more trading activity details on page 92.**

3 Accessing assets

Loan activity

During 2022, loan use increased slightly from 2021; however, it remained below the typical use rates of the years before COVID-19. Twelve percent of participants had a loan outstanding in 2022, compared with 15% in 2017. The average loan balance was about $10,500.

Hardship withdrawals on the rise—for some



In 2022, more than 97% did *not* take a hardship withdrawal.

Plan withdrawals

Overall, in-service withdrawal activity increased modestly in 2022 compared with 2021. Nonhardship withdrawal activity was generally in line with 2021 activity, while hardship withdrawal activity increased over the year. Throughout 2022, 2.8% of participants initiated a hardship withdrawal, up from 2.1% in 2021. **See the historical hardship withdrawal trends starting on page 102.**

Most assets preserved for retirement

Participants separating from service mostly preserved their assets for retirement. During 2022, about one-quarter of all participants could have taken a distribution because they had separated from service in the current year or prior years. Most of these participants (81%) continued to preserve their plan assets for retirement by either remaining in their employer's plan or rolling over their savings to an IRA or new employer plan. In terms of assets, 97% of all plan assets available for distribution were preserved, and only 3% were taken in cash.

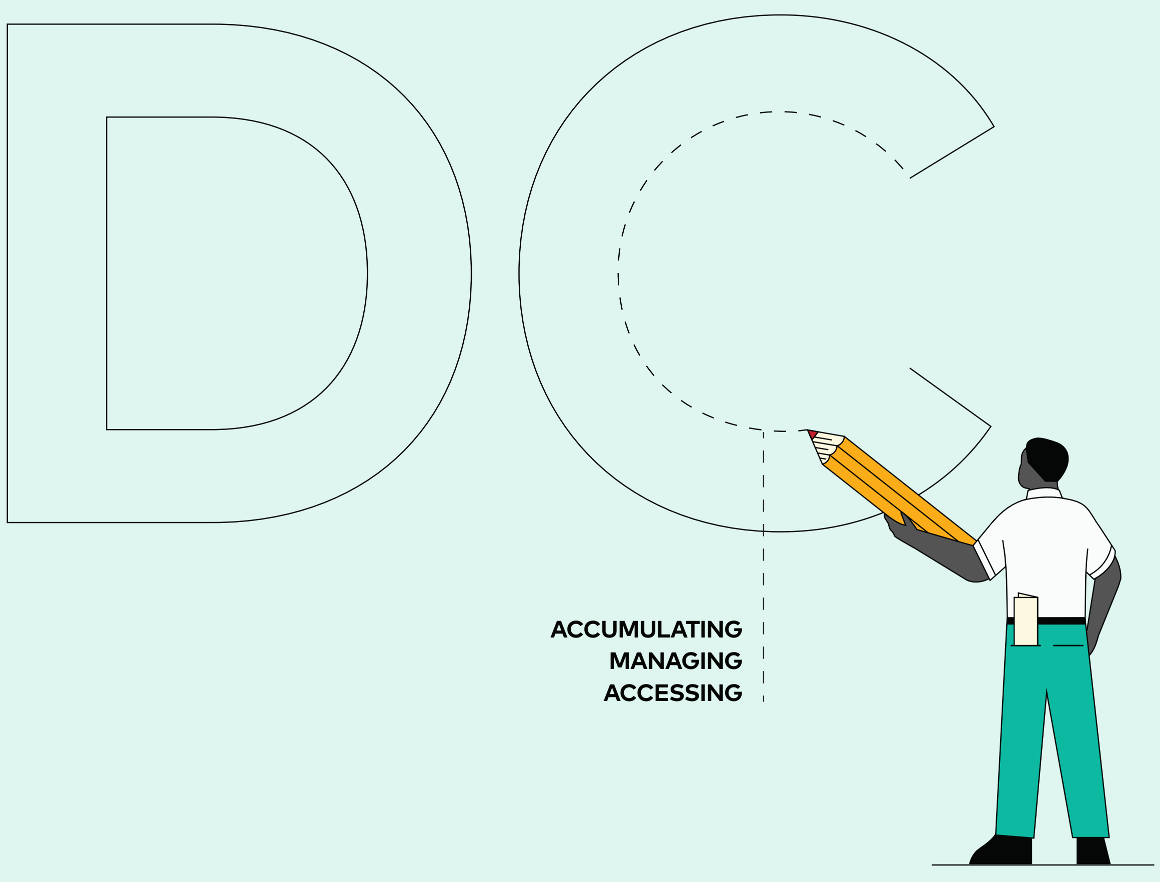
Distribution options

Plan sponsors are continually looking for ways to help retirees within the plan. In 2022, 65% of plans allowed retirees to take installments, and 39% of plans allowed for partial withdrawals, up from 24% in 2017.

DC retirement plans

DC plans are the dominant type of retirement plan sponsored by private-sector employers in the United States, covering nearly half of all private-sector workers. Although there is still a significant minority of individuals eligible for such plans who fail to participate in them, DC plans have nonetheless enabled millions of American workers to accumulate savings for retirement.

The performance of DC plans can be measured in several ways:



Accumulating plan assets

Plan contributions are essential to retirement savings adequacy. Employee participation rates, participant deferral rates, and the value of employer contributions all affect plan contributions. Participant deferral behavior is increasingly influenced by employers' automatic enrollment and automatic escalation default designations. Overall, retirement plan design varies substantially across employers—and variation in the level of employer contributions does affect the employee contributions needed to accumulate sufficient retirement savings.

Managing participant accounts

After participants decide to contribute to a retirement savings plan, their most important decision is how to allocate their holdings among the major asset classes.

As with deferral decisions, many investment decisions are increasingly influenced by employer-established defaults. The growing use of all-in-one portfolio strategies such as target-date funds and managed account programs also plays a role. These investment decisions—including the types of investment options offered by the plan and the choices participants or employers make from among those options—have a direct impact on account performance over time. Thus, investment choices, in conjunction with the level of plan contributions, ultimately influence participants' level of retirement readiness.

Accessing plan assets

Participants may be able to take a loan or an in-service withdrawal to access their savings while working. When changing jobs or retiring, they typically have the option of remaining in the plan, rolling over to another plan or IRA, or taking a cash lump sum.

Defined contribution (DC) retirement plans are the centerpiece of the private-sector retirement system in the United States. More than 100 million Americans are covered by DC plan accounts, with $9 trillion in assets.[1]

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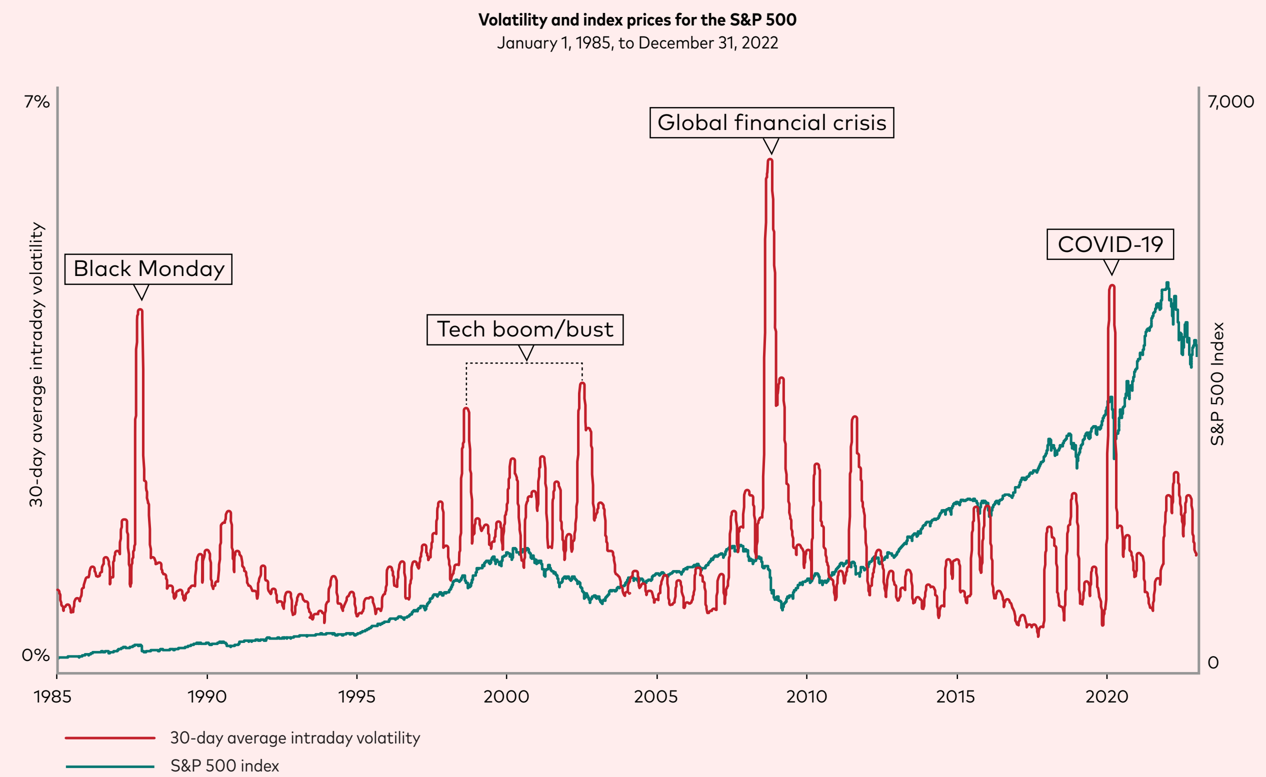
1 Sources: U.S. Department of Labor, ***Private Pension Plan Bulletin Historical Tables and Graphs 1975–2020***, October 2022; and Investment Company Institute, *Quarterly Retirement Market Data, Third Quarter 2022*, December 2022.

Market overview

Stock prices decreased by 20% in 2022 (**Figure 2**). Volatility increased compared with 2021, with 48% of trading days seeing a change in stock prices of +/–1%, compared with 21% of trading days in 2021. In addition, 5% of trading days experienced a change of +/–3%.

During the past 10 years, 4 years saw no trading days with a change in stock prices of greater than +/–3% (2013, 2014, 2017, and 2021), and only 2 years had less than 1% of trading days with high levels of volatility (2016 and 2019).

Figure 2. S&P 500 daily volatility and close



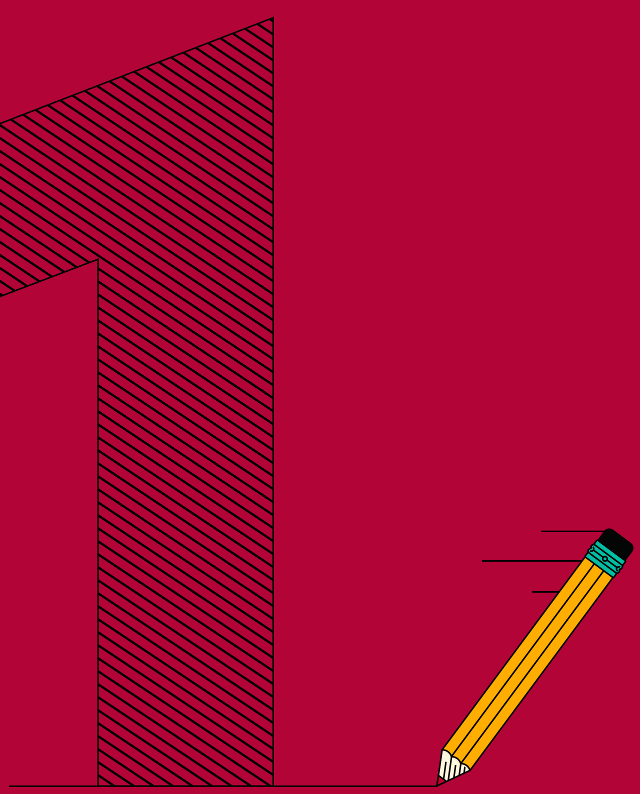
Note: Intraday volatility is calculated as daily range of trading prices [(high-low)/opening price] for the S&P 500 Index.

Source: Vanguard calculations, using data from Bloomberg.

Past performance is no guarantee of future results. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Section 1: Accumulating plan assets

Historically, employees have had to decide whether to participate in their employer's plan and at what rate to save. Employers are now increasingly making these decisions for employees through automatic enrollment.



Plan design

Nine in 10 Vanguard-administered DC plans permitted pre-tax elective deferrals by eligible employees in 2022. Employee deferral decisions are shaped by the design of their employer-sponsored DC plan.

DC plans with employee-elective deferrals can be grouped into four categories based on the type of employer contributions made to the plan: (1) plans with matching contributions; (2) plans with nonmatching employer contributions; (3) plans with both matching and nonmatching contributions; and (4) plans with no employer contributions. Nonmatching contributions are typically structured as a variable or fixed profit-sharing contribution, or less frequently as an employee stock ownership plan (ESOP) contribution.

In employee-contributory DC plans, employer contributions are typically a secondary source of plan funding. Both the type and size of employer contributions vary substantially across plans.

Eligibility

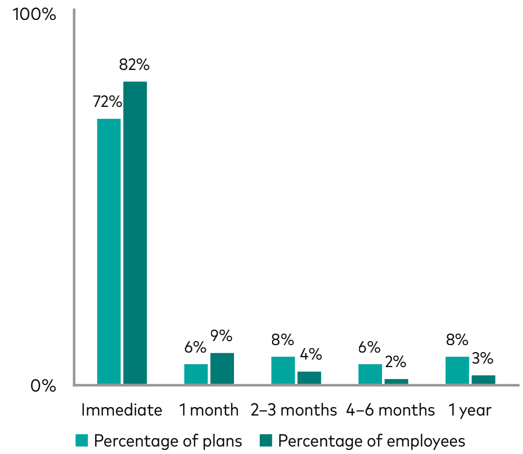
In 2022, nearly 3 in 4 Vanguard plans allowed employees to make voluntary contributions immediately after they joined their employer **(Figure 3)**. Larger plans were more likely than smaller plans to offer immediate eligibility. As a result, nearly 8 in 10 employees qualified for immediate eligibility (**estimated; see the Methodology section on page 114**).

At the other extreme, 8% of plan sponsors required one year of service from eligible employees before allowing employee-elective contributions to the plan. Smaller plans were more likely to impose the one-year wait. As a result, only 3% of total eligible employees were subject to this restriction.

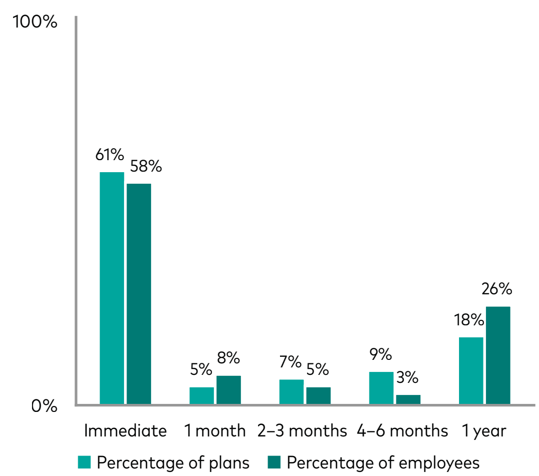
Figure 3. Eligibility, 2022 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

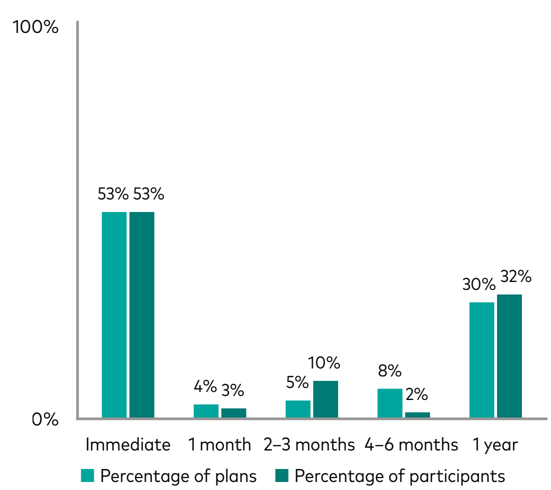
Employee-elective contributions



Employer matching contributions



Other employer contributions



Source: Vanguard 2023.

Eligibility rules are more restrictive for employer contributions, including matching and other contribution types such as profit-sharing plans or ESOPs. A one-year eligibility rule is more common for employer contributions, presumably because employers want to minimize compensation costs for short-tenured employees.

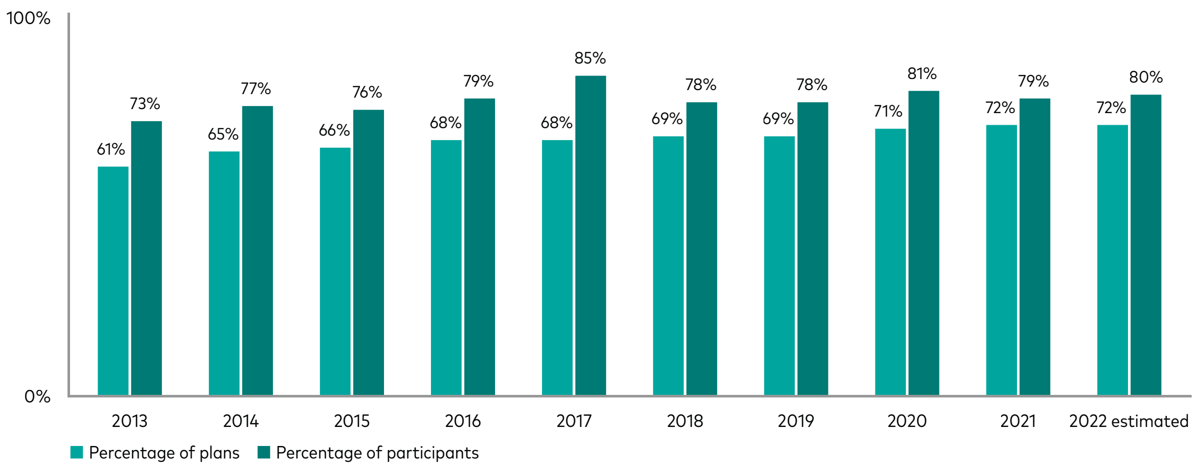
The proportion of plans permitting immediate eligibility for employee-elective contributions has risen over the past 10 years **(Figure 4)**.

In 2013, 61% of plans offered immediate eligibility; in 2022, 72% did. Because larger plans are more likely to offer immediate eligibility for employee-elective contributions, 80% of participants were in plans offering immediate eligibility in 2022. Similar trends are observed for both employer matching contributions and other employer contributions.

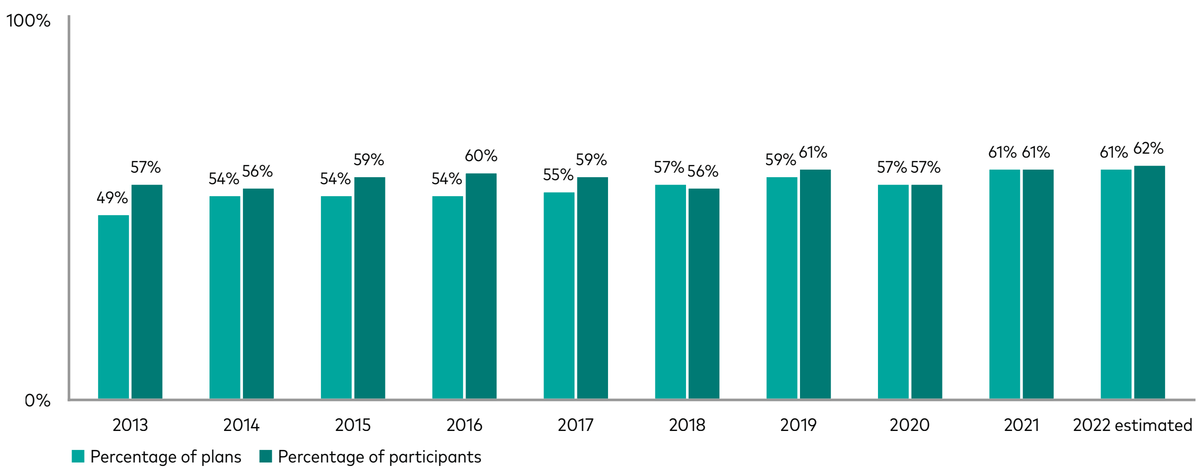
Figure 4. Immediate plan eligibility trend

Vanguard defined contribution plans permitting employee-elective deferrals

Employee-elective contributions



Employer matching contributions



Source: Vanguard 2023.

Vesting

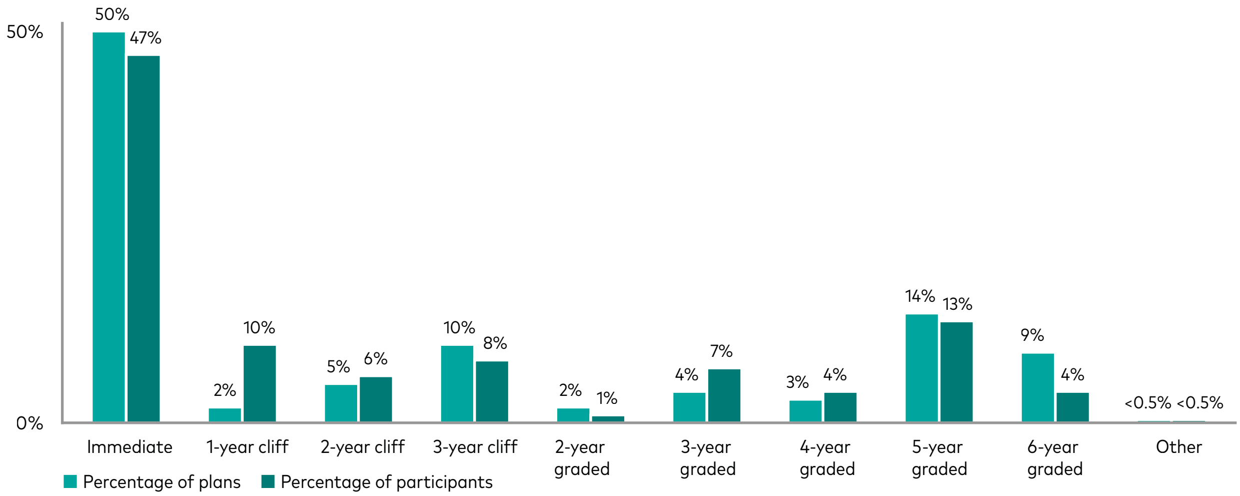
One-half of plans immediately vested participants in employer matching contributions in 2022, and 47% of participants were enrolled in these plans **(Figure 5)**. One in 4 plans with employer matching contributions used a 5- or 6-year graded vesting schedule, and 1 in 6 participants with employer matching contributions were in such a plan.

Forty-three percent of plans immediately vested participants for other employer contributions, such as profit-sharing or ESOPs. On the other hand, 34% of plans with other employer contributions were using a 5- or 6-year graded vesting schedule, and 1 in 4 participants receiving other employer contributions were in plans with these longer vesting schedules.

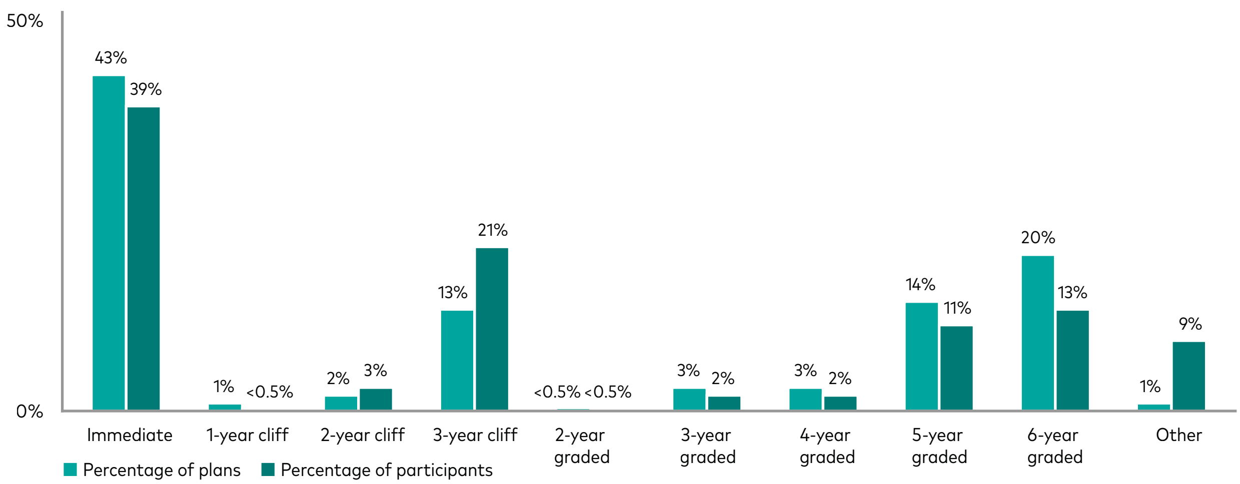
Figure 5. Vesting, 2022

Vanguard defined contribution plans with employer contributions

Employer matching contributions



Other employer contributions



Source: Vanguard 2023.

Employer contributions

Nearly half of Vanguard plans provided only a matching contribution in 2022, and 49% of participants were in such a plan **(Figure 6)**.

Thirty-six percent of plans, covering 47% of participants, provided both a matching and a nonmatching employer contribution. Ten percent of plans provided only a nonmatching employer contribution, and 2% of participants were in this type of design. Finally, 5% of plans made no employer contributions of any kind in 2022, and 2% of participants were in such a plan.

This data summarizes the incidence of employer contributions to a DC plan that accepts employee deferrals. It does not necessarily reflect the entire retirement benefits program funded by certain employers. Some employers may offer a companion employer-funded plan—such as a defined benefit (DB) plan, a stand-alone profit-sharing plan, an ESOP, or a money-purchase DC plan—in addition to an employee-contributory DC plan.

Figure 6. Types of employer contributions, 2022 estimated
Vanguard defined contribution plans permitting employee-elective deferrals

Type of employer contribution	Percentage of plans	Percentage of participants
Matching contribution only	49%	49%
Nonmatching contribution only	10%	2%
Both matching and nonmatching contribution	36%	47%
Subtotal	95%	98%
No employer contribution	5%	2%

Source: Vanguard 2023.

Matching contributions

The wide variation in employer contributions is most evident in the design of employer matching formulas. In 2022, Vanguard administered more than 100 distinct match formulas for plans offering an employer match. Among those plans, 70% (covering 61% of participants) provided a single-tier match formula, such as $0.50 per dollar on the first 6% of pay **(Figure 7)**. Less common, used by 23% of plans (covering 28% of participants), were multitier match formulas, such as $1.00 per dollar on the first 3% of pay and $0.50 per dollar on the next 2% of pay.

Another 6% of plans (covering 9% of participants) had a single- or multitier formula but imposed a maximum dollar cap, such as $2,000, on the employer contribution. Finally, a very small percentage of plans used a match formula that varied by age, tenure, or similar variables.

Figure 7. Types of matching contributions, 2022 estimated

Vanguard defined contribution plans with matching contributions

Match type	Example	Percentage of plans	Percentage of participants
Single-tier formula	$0.50 per dollar on 6% of pay	70%	61%
Multitier formula	$1.00 per dollar on first 3% of pay; $0.50 per dollar on next 2% of pay	23%	28%
Dollar cap	Single- or multitier formula with $2,000 maximum	6%	9%
Other	Variable formulas based on age, tenure, or similar variables	1%	2%

Source: Vanguard 2023.

The matching formula most cited as a typical employer match is 50% on the first 6% of pay, which is the match most frequently offered by Vanguard DC plans and thus most frequently received by Vanguard DC plan participants. Among plans offering a match, about 1 in 7 provided exactly this match formula in 2022 **(Figure 8)**.

Figure 8. Most frequently used match formulas

Vanguard defined contribution plans with matching contributions

Match formula	Percentage of plans
50% on first 6% of pay	15%
100% on first 6% of pay	10%
100% on first 3% of pay, 50% on next 2% of pay	10%
100% on first 4% of pay	7%
100% on first 5% of pay	7%

Source: Vanguard 2023.

With so many match formulas, one way to summarize matching contributions is to calculate the maximum value of the match promised by the employer. For example, a match of $0.50 per dollar on the first 6% of pay promises the same matching contribution—3% of pay—as a formula of $1.00 per dollar on the first 3% of pay.

The promised value of matching contributions varied substantially from plan to plan. Among plans with single- or multitier match formulas, most promised a match of between 3.00% and 6.99% of pay **(Figure 9)**. The average value of the promised match was 4.5% of pay; the median value, 4.0%.

Average promised employer matches remained relatively stable from 2013 through 2016. Since 2016, average match rates have increased slightly through 2022 **(Figure 10)**. Median promised matches have remained stable since 2015.

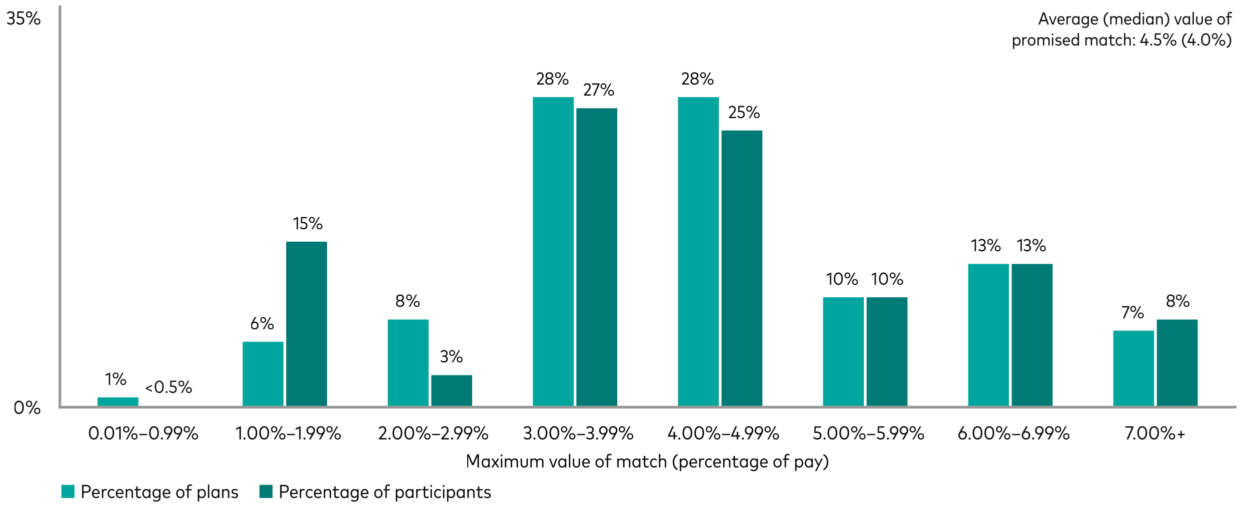
Another way to assess matching formulas is to calculate the employee-elective deferral needed to realize the maximum value of the match. In 2022, about 8 in 10 plans (covering 78% of participants) required participants to defer between 4.0% and 6.99% of their pay to receive the maximum employer match **(Figure 11)**.

The average employee-elective deferral required to maximize the match was 6.8% of pay; the median, 6.0%. The average has decreased slightly since 2017, with values falling from 7.4% to 6.8% **(Figure 12)**. The required median deferral has remained constant at 6.0% during the same period.

In 2022, two-thirds of participants received the full employer matching contribution **(Figure 13)**. Participants in automatic enrollment designs were slightly less likely to receive the full employer match than were participants with voluntary enrollment. However, after three years of automatic annual increases, all participants are more likely to be saving above the full employer match, and more than three-quarters of all participants will be receiving the full employer match, with 6 in 10 contributing at levels above the employer match.

Figure 9. Distribution of promised matching contributions, 2022 estimated

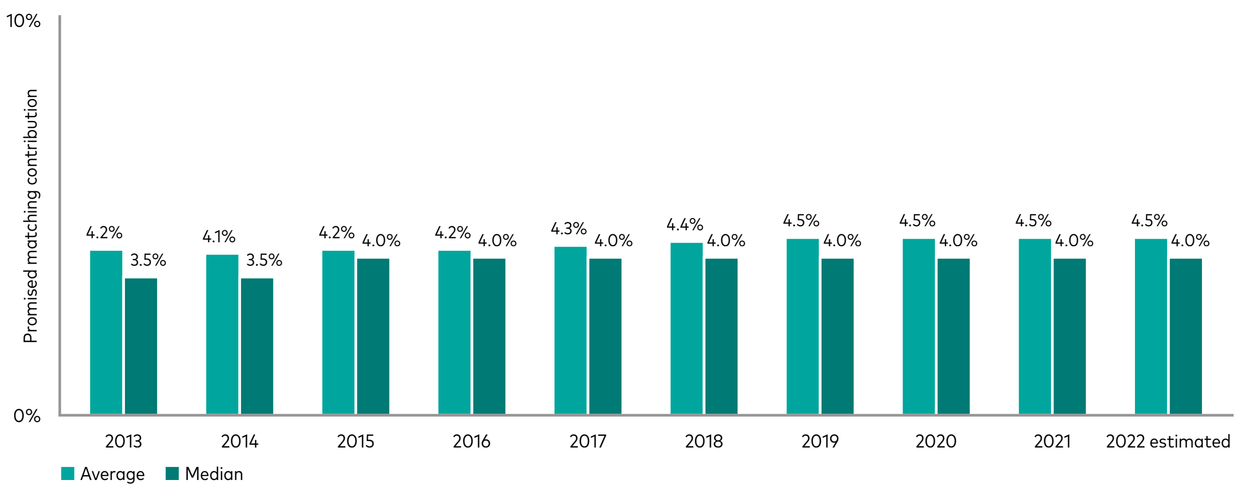
Vanguard defined contribution plans permitting employee-elective deferrals with a single- or multitier match formula



Source: Vanguard 2023.

Figure 10. Promised matching contributions

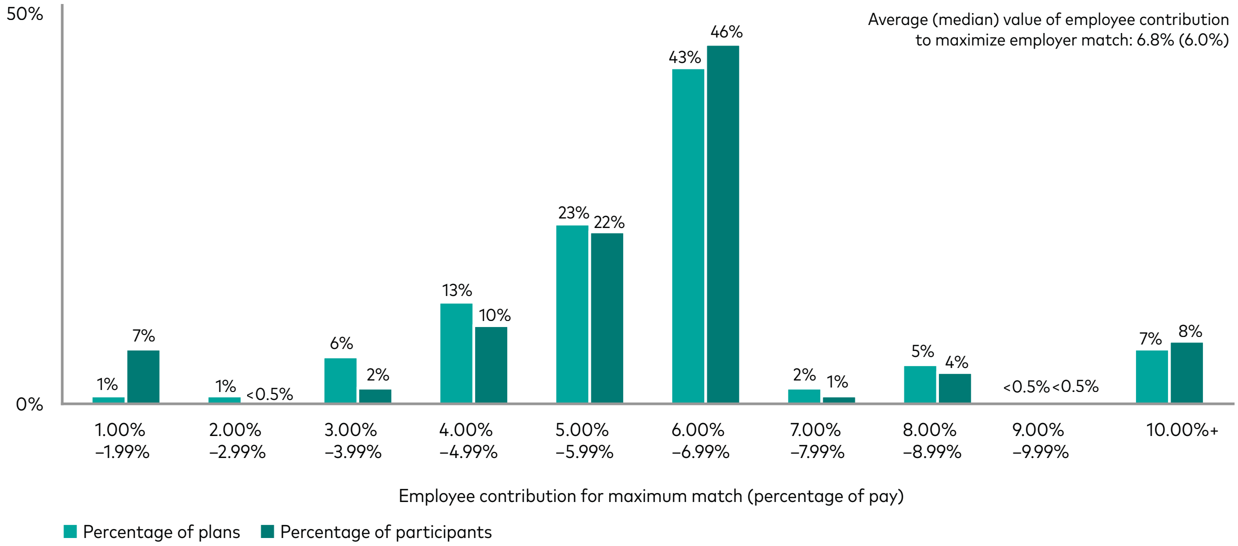
Vanguard defined contribution plans permitting employee-elective deferrals with a single- or multitier match formula



Source: Vanguard 2023.

Figure 11. Employee contributions for maximum match, 2022 estimated

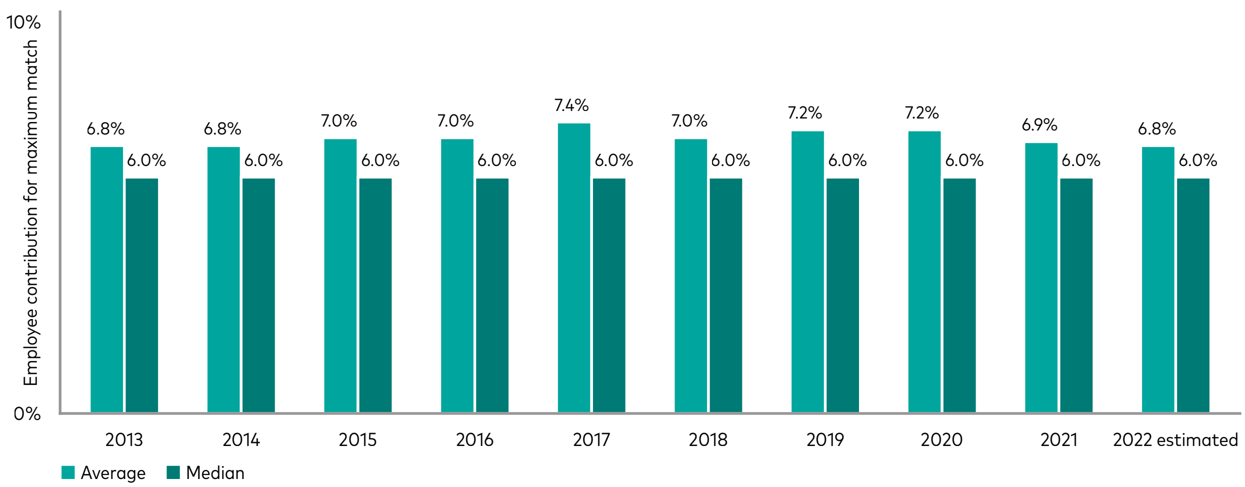
Vanguard defined contribution plans permitting employee-elective deferrals with a single- or multitier match formula



Source: Vanguard 2023.

Figure 12. Employee contributions for maximum match

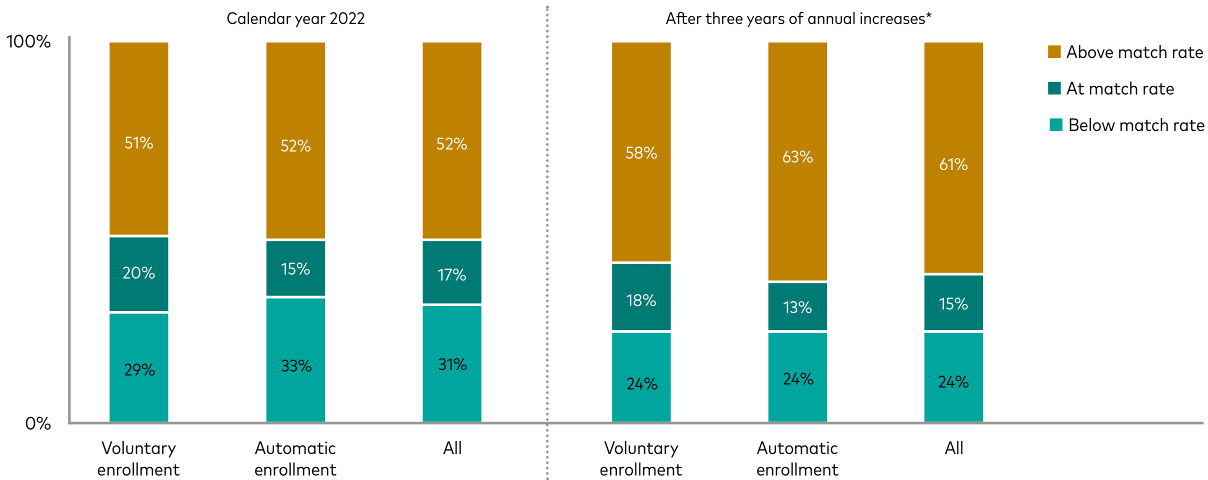
Vanguard defined contribution plans permitting employee-elective deferrals with a single- or multitier match formula



Source: Vanguard 2023.

Figure 13. Maximizing the match

Fraction of participants deferring at, above, or below plan-specific match level



*For participants in plans with automatic enrollment designs, annual increases are assumed only for those plans where the feature is offered and the participant has not opted out of the feature. For participants in voluntary enrollment designs, annual increases are assumed only for participants who have elected the option. The three-year projection assumes participants enrolled in annual increases do not opt out.

Source: Vanguard 2023.

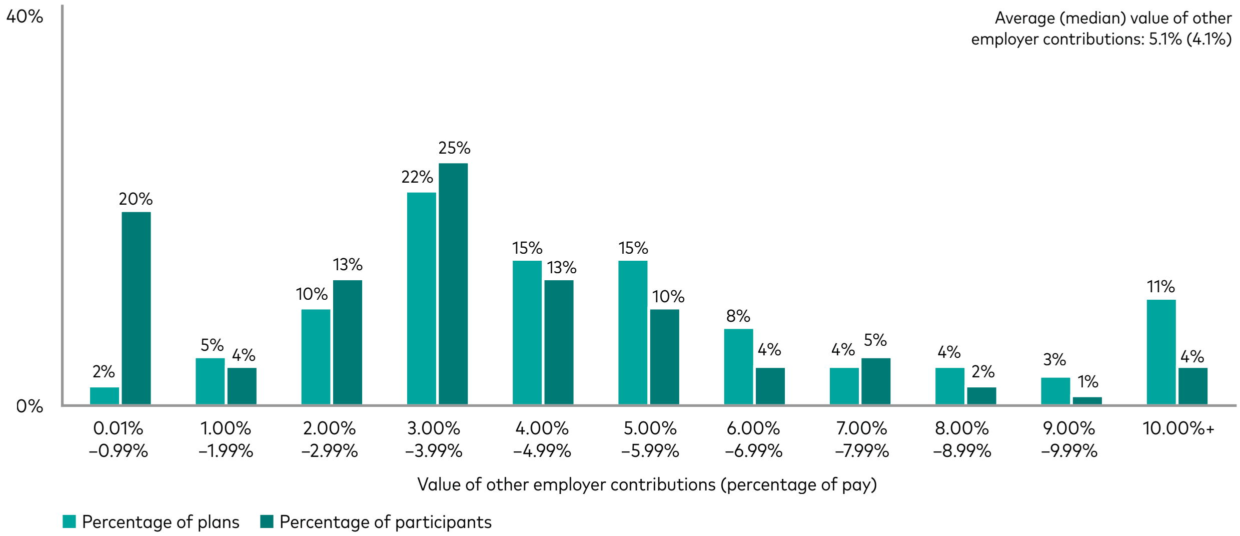
Other employer contributions

As noted earlier, in a minority of plan designs, employers may make another contribution to eligible employees' accounts in the form of a variable or fixed profit-sharing contribution or an ESOP contribution. Unlike matching contributions, these may be made on behalf of eligible employees, whether or not they contribute any part of their pay to the plan. As with matching contributions, eligibility is more restrictive for these types of employer contributions—many employees are not entitled to receive these until they complete one year of service.

The value of other employer contributions varied significantly from plan to plan in 2022. Among plans offering such contributions, 48% provided all participants with a contribution based on the same percentage of pay, while the other 52% varied the contribution by age and/or tenure. These nonmatching contributions varied in value from about 1% of pay to more than 10% of pay **(Figure 14)**. Among plans with a nonmatching employer contribution, the average contribution was equivalent to 5.1% of pay; the median contribution, 4.1% of pay. Between 2013 and 2022, the average value of other employer contributions remained stable **(Figure 15)**.

Figure 14. Other employer contributions, 2022 estimated

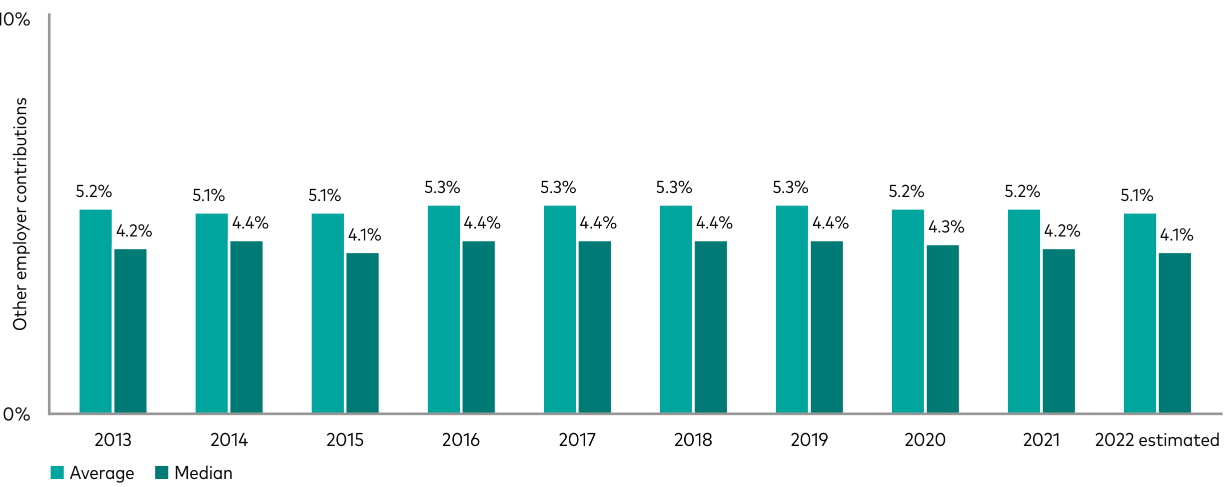
Vanguard defined contribution plans with other employer contributions



Source: Vanguard 2023.

Figure 15. Other employer contributions

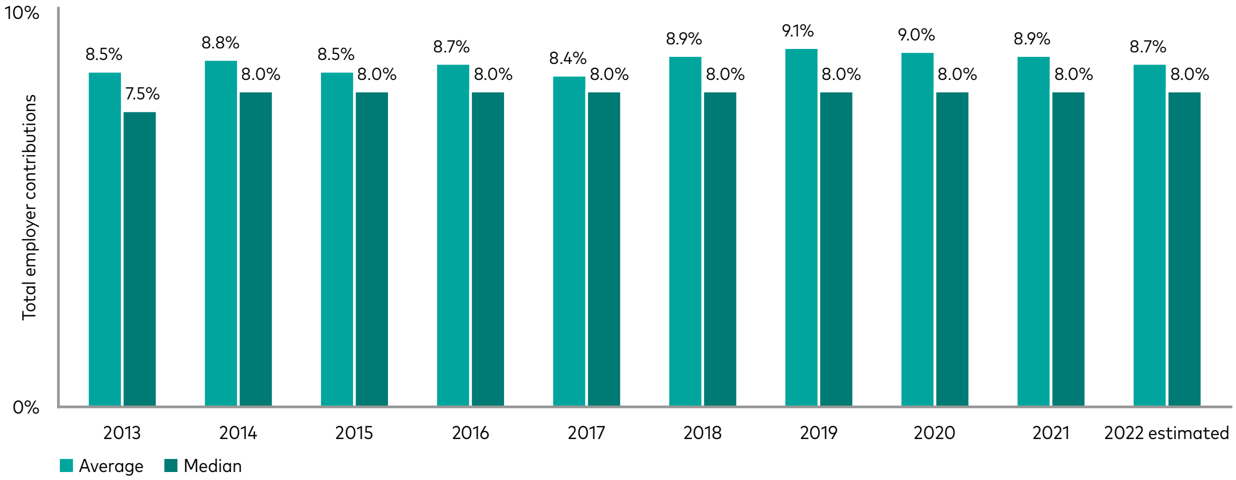
Vanguard defined contribution plans with other employer contributions



Source: Vanguard 2023.

Figure 16. Match and other employer contributions

Vanguard defined contribution plans with both match and other employer contributions



Source: Vanguard 2023.

As noted earlier, 36% of plans, covering 4 in 10 participants, provided both a matching and a nonmatching employer contribution in 2022. The median combined value of the promised match and other employer contributions was 8.0% **(Figure 16)**.

Safe harbor plan designs

Plan sponsors who do not want to perform nondiscrimination tests are able to adopt 1 of 3 different plan design options that will satisfy the safe harbor contribution requirements. As of year-end 2022, 33% of all plans had adopted a safe harbor design **(Figure 17)**.

Figure 17. Safe harbor plan design

Vanguard defined contribution plans permitting employee-elective deferrals and employer contributions

Plan size (number of participants)	Percentage of plans with a safe harbor design
<500	35%
500–999	30%
1,000–4,999	30%
5,000+	36%
All plans	33%

Source: Vanguard 2023.

Automatic enrollment designs

Historically, employees in a 401(k) or 403(b) plan have had to make an active choice to join the plan, but this trend is shifting. In voluntary enrollment plans, decisions were framed as a positive election: "Decide if you'd like to join the plan." Why have some employees failed to take advantage of their employer's plan? Research in the field of behavioral finance provides explanations:

- **Lack of planning skills.** Some employees are not active, motivated decision-makers when planning for retirement. They have weak planning skills and find it difficult to defer gratification.
- **Default decisions.** Faced with a complex choice and unsure of what to do, many individuals often take the default or "no decision" choice. In the case of a voluntary saving plan, which requires that a participant take action to sign up, the "no decision" choice is a decision to not contribute to the plan.
- **Inertia and procrastination.** Many individuals deal with a difficult choice by deferring it to another day. Eligible nonparticipants, unsure of what to do, postpone their decision. While many employees know they are not saving enough and express an interest in saving more, they simply never get around to joining the plan—or to increasing their contribution rates over time if they do join.

Automatic enrollment or autopilot plan designs reframe the savings decision. With an autopilot design, individuals are automatically enrolled into the plan, their deferral rates are automatically increased each year, and their contributions are automatically invested in a balanced investment strategy. Under an autopilot plan, the decision to save is framed negatively: "Quit the plan if you'd like." In such a design, "doing nothing" leads to participation in the plan and investment of assets in a long-term retirement portfolio.

As of year-end 2022, 58% of Vanguard plans permitting employee-elective deferrals had adopted components of an autopilot design **(Figure 18)**. Plan adoption of automatic enrollment has been consistently increasing over the past 15 years.

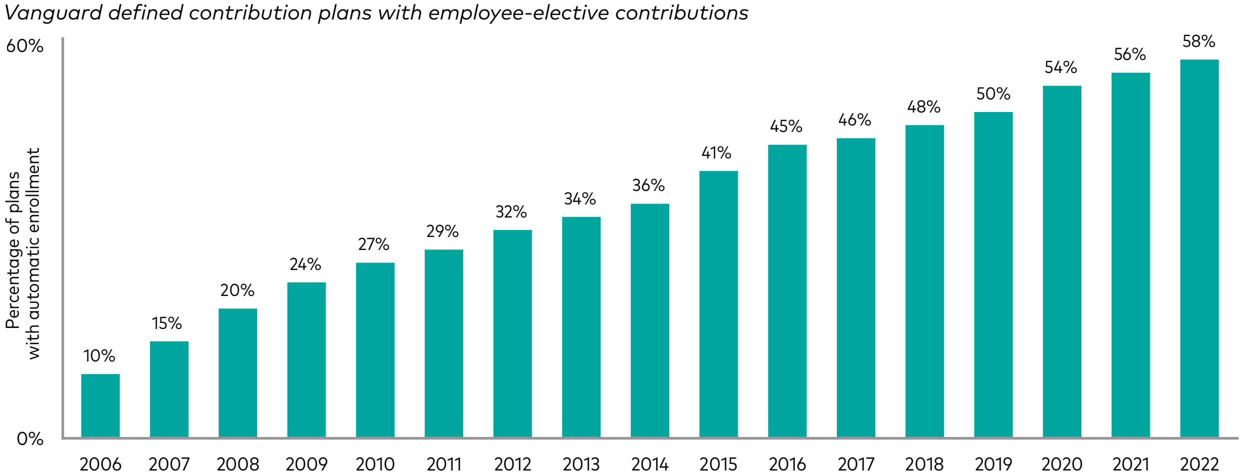
Larger plans were more likely than smaller plans to implement automatic enrollment, with 75% of larger plans using the feature **(Figure 19)**. As a result, 7 in 10 participants were in plans with autopilot designs, although automatic enrollment itself may only apply to newly eligible participants.

Among plans automatically enrolling employees, 69% used all three features of an autopilot design in 2022. These plans automatically enrolled employees, automatically increased deferral rates annually, and automatically invested participants' assets in a balanced fund. Another 3 in 10 plan sponsors automatically enrolled employees and invested participants' assets in a balanced fund but did not automatically increase participant deferral rates.

Automatic enrollment adoption varied by industry group **(Figure 20)**. Plans in the manufacturing industry were the most likely to adopt automatic enrollment, with 72% of plans offering the design, while plans in the education and health industry group were the least likely to automatically enroll employees (37%). All industries have substantially increased automatic enrollment design adoption over the past decade.

Figure 18. Automatic enrollment adoption

Vanguard defined contribution plans with employee-elective contributions



Source: Vanguard 2023.

Figure 19. Automatic enrollment design by plan size, 2022

Vanguard defined contribution plans with employee-elective deferrals

	Number of participants				
	All	**<500**	**500–999**	**1,000–4,999**	**>5,000**
Percentage of plans with employee-elective contributions offering	**58%**	**38%**	**73%**	**76%**	**75%**
Percentage of participants in plans offering	**72%**	**48%**	**73%**	**78%**	**71%**
For plans offering automatic enrollment					
Percentage of plans with automatic enrollment, automatic saving rate increases, and a balanced default fund	69%	62%	68%	74%	71%
Percentage of plans with automatic enrollment and a balanced default fund	30%	36%	32%	26%	29%
Percentage of plans with automatic enrollment and a money market or stable value default fund	1%	2%	0%	0%	0%

Source: Vanguard 2023.

Figure 20. Automatic enrollment adoption by industry

Vanguard defined contribution plans permitting employee-elective deferrals

	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Manufacturing	48%	52%	56%	58%	61%	63%	66%	69%	70%	72%
Finance, insurance, and real estate	42%	45%	48%	49%	50%	52%	56%	59%	64%	66%
Transportation, utilities, and communications	36%	39%	42%	49%	56%	57%	58%	58%	62%	63%
Wholesale and retail trade	43%	45%	51%	56%	56%	59%	59%	57%	58%	58%
Media, entertainment, and leisure	36%	39%	45%	49%	49%	53%	55%	55%	58%	58%
Agriculture, mining, and construction	39%	41%	44%	46%	48%	50%	52%	54%	54%	52%
Business, professional, and nonprofit	25%	28%	29%	32%	34%	36%	39%	43%	45%	47%
Education and health	16%	19%	24%	28%	29%	33%	35%	33%	34%	37%

Source: Vanguard 2023.

Thirty-four percent of these plans automatically enrolled participants at a 3% contribution rate **(Figure 21)**. Sixty-nine percent of plans automatically increased the contribution rate annually. Ninety-nine percent of plans were using a target-date or other balanced investment strategy as the default fund, with 98% choosing a target-date fund.

Automatic enrollment plan design is improving. In 2022, 59% of plans chose a default of 4% or higher, compared with 35% of plans in 2013 **(Figure 22)**. In fact, 28% of plans chose a default of 6% or more in 2022—more than double the proportion of plans choosing 6% or more in 2013.

Figure 21. Automatic enrollment design trends

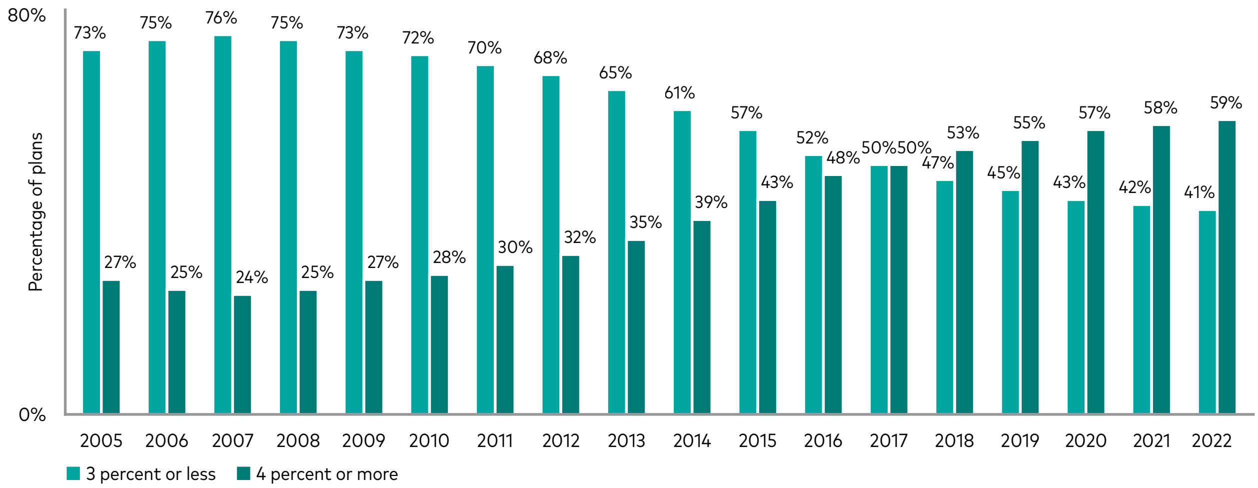
Vanguard defined contribution plans with automatic enrollment

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Default automatic enrollment rate	1 percent	2%	2%	1%	1%	1%	1%	2%	1%	1%	2%
	2 percent	12%	10%	8%	7%	8%	6%	5%	5%	5%	5%
	3 percent	51%	49%	48%	44%	41%	40%	38%	37%	36%	34%
	4 percent	13%	15%	16%	15%	15%	15%	15%	15%	14%	14%
	5 percent	9%	9%	11%	13%	14%	15%	16%	16%	17%	17%
	6 percent or more	13%	15%	16%	20%	21%	23%	24%	26%	27%	28%
Default automatic increase rate	1 percent	67%	68%	68%	65%	64%	64%	66%	67%	67%	66%
	2 percent	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
	Voluntary election	17%	18%	20%	24%	25%	26%	26%	24%	24%	25%
	Service feature not offered	14%	12%	10%	9%	9%	8%	6%	7%	7%	6%
Default automatic increase cap	<6 percent	3%	3%	2%	2%	3%	2%	2%	2%	2%	2%
	6 percent	20%	18%	16%	14%	14%	13%	13%	13%	12%	12%
	7 to 9 percent	8%	9%	11%	10%	9%	7%	6%	6%	5%	6%
	10 percent	41%	42%	42%	44%	44%	46%	47%	46%	42%	41%
	11 to 20 percent	21%	21%	22%	23%	23%	23%	23%	26%	29%	32%
	>20 percent	3%	2%	2%	2%	2%	2%	2%	2%	3%	2%
	No cap	4%	5%	5%	5%	5%	7%	7%	5%	7%	5%
Default fund	Target-date fund	93%	95%	97%	97%	97%	98%	98%	98%	98%	98%
	Other balanced fund	5%	3%	2%	2%	2%	1%	1%	1%	1%	1%
	Subtotal	98%	98%	99%	99%	99%	99%	99%	99%	99%	99%
	Money market or stable value fund	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%

Source: Vanguard 2023.

Figure 22. Automatic enrollment default trends

Vanguard defined contribution plans with automatic enrollment



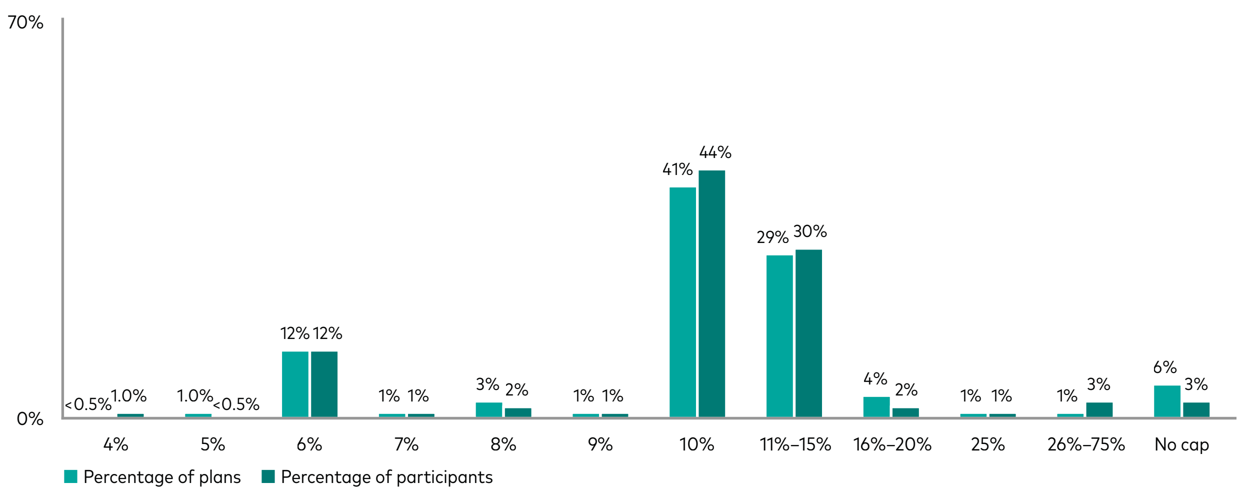
Source: Vanguard 2023.

Forty-one percent of plans with automatic enrollment and annual increases capped the annual increase at 10%, and 44% of annual-increase participants were capped at that level **(Figure 23)**. One in 3 plans implemented caps between 11% and 25%. Six percent of plans had no cap—likely an error. We recommend plan sponsors set the cap at a level where participants are saving 15% or more, including employer contributions.

Plan sponsors may also elect to offer automatic annual increases in voluntary enrollment plans. Participants are then presented with the annual increase election at enrollment and when they change their employee-elective deferral rate. In 2022, 32% of plans with voluntary enrollment offered an automatic annual increase option, and two-thirds of participants in these designs had access to the option **(Figure 24)**. Nearly 3 in 10 participants in these plans elected automatic annual increases when offered.

Figure 23. Automatic increase plan caps

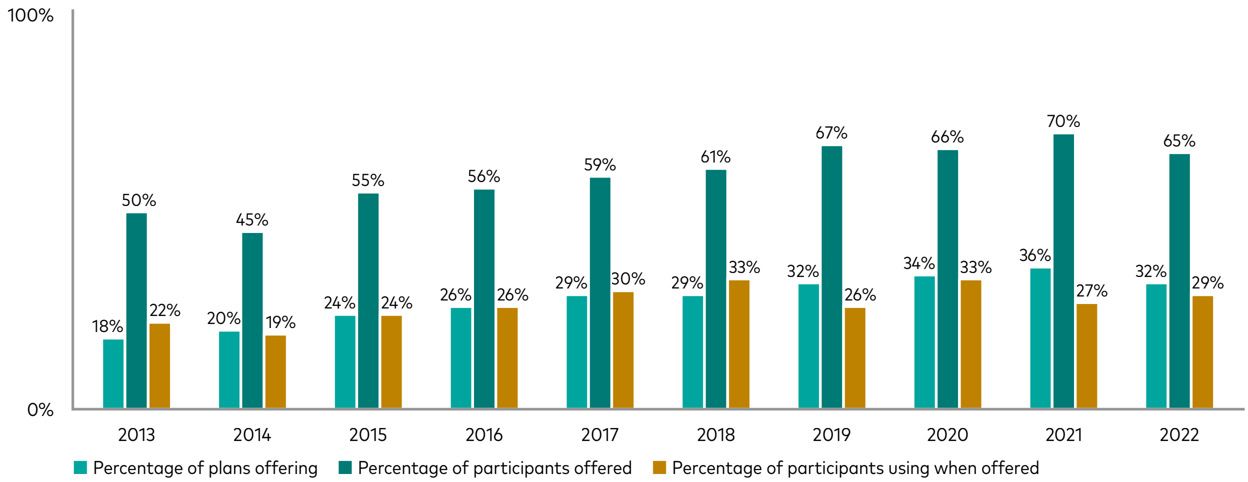
Automatic enrollment plans with an automatic annual increase as of December 31, 2022



Source: Vanguard 2023.

Figure 24. Voluntary annual increase adoption

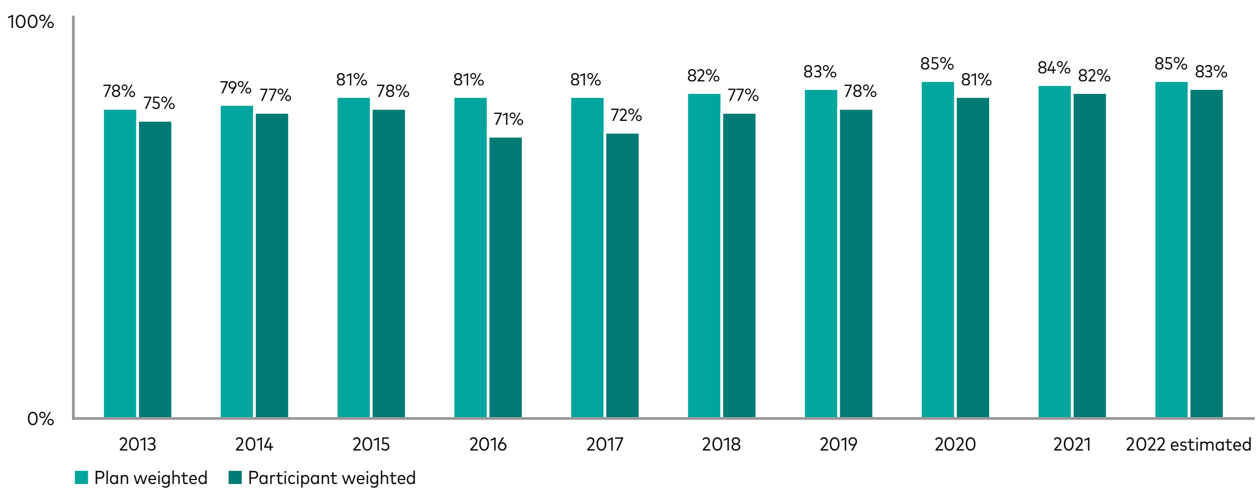
Voluntary enrollment plans with voluntary annual increase



Source: Vanguard 2023.

Figure 25. Plan participation rates

Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard 2023.

Participation rates

A plan's participation rate—the percentage of eligible employees who choose to make voluntary contributions—remains the broadest metric for gauging 401(k) plan performance. The most common measure of participation rate is calculated by taking the average of rates among a group of plans. We refer to this as the plan-weighted participation rate. In 2022, Vanguard's plan-weighted participation rate was 85% (estimated; **see the Methodology section on page 114**) **(Figure 25)**. It has risen by 7 percentage points since 2013.

A second measure of participation rate considers all employees in Vanguard-administered plans as if they were in a single plan. We refer to this as the participant-weighted participation rate. Across the universe of Vanguard participants, 83% of eligible employees were enrolled in their employer's voluntary saving program in 2022. This broader measure of plan participation rose between 2013 and 2015 from 75% to 78%, reflecting the adoption of automatic enrollment by larger plan sponsors. However, this measure fell to 71% in 2016, reflecting a change in the underlying sectors these plans represent—specifically an increase in the proportion of employees in retail plans with low participation. Since the drop in 2016, this measure has increased each year.

These two measures provide different views of employee participation in retirement saving plans. The first measure indicates that in the average plan, about 1 in 7 eligible employees failed to contribute in 2022. The second measure shows that within the entire employee universe, about 1 in 6 employees failed to take advantage of their employer's plan. The first measure is a useful benchmark for an individual plan sponsor because it is calculated at the plan level; the second is a valuable measure of the progress of 401(k) plans because it looks at all eligible employees across all plans.

Distribution of participation rates

Participation rates varied considerably across plans in 2022. Three in 4 plans had a participation rate of 80% or higher, while 4% of plans had a participation rate below 50% **(Figure 26)**.

Plan size was a differentiator, with smaller plans having lower participation rates **(Figure 27)**, perhaps due to lower adoption of automatic enrollment designs, which are proven to increase plan participation.

Figure 26. Distribution of participation rates

Vanguard defined contribution plans permitting employee-elective deferrals

Plan participation rate	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 estimated
90%–100%	31%	35%	40%	41%	44%	47%	51%	55%	54%	53%
80%–89%	30%	28%	25%	24%	23%	23%	22%	20%	21%	22%
70%–79%	14%	14%	14%	13%	12%	11%	9%	9%	9%	9%
60%–69%	9%	9%	8%	9%	8%	7%	7%	6%	6%	7%
50%–59%	7%	6%	5%	5%	6%	5%	5%	5%	5%	5%
<50%	9%	8%	8%	8%	7%	7%	6%	5%	5%	4%
Average plan participation rate	78%	79%	81%	81%	81%	82%	83%	85%	84%	85%

Source: Vanguard 2023.

Figure 27. Participation rates by plan size

Vanguard defined contribution plans permitting employee-elective deferrals

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 estimated
Plan-weighted participation rate	<500	76%	77%	79%	79%	80%	80%	81%	83%	82%	82%
	500–999	82%	82%	83%	84%	84%	84%	85%	85%	85%	85%
	1,000–4,999	81%	80%	84%	85%	85%	86%	87%	88%	88%	89%
	5,000+	81%	74%	82%	77%	78%	82%	83%	83%	86%	87%
	All plans	**78%**	**79%**	**81%**	**81%**	**81%**	**82%**	**83%**	**85%**	**84%**	**85%**
Participant-weighted participation rate	<500	69%	72%	75%	73%	75%	72%	73%	77%	77%	77%
	500–999	78%	77%	77%	73%	77%	79%	80%	80%	80%	81%
	1,000–4,999	72%	73%	80%	78%	81%	82%	84%	85%	84%	83%
	5,000+	77%	67%	77%	67%	68%	75%	76%	79%	81%	84%
	All participants	**75%**	**77%**	**78%**	**71%**	**72%**	**77%**	**78%**	**81%**	**82%**	**83%**

Source: Vanguard 2023.

Participation rates by employee demographics

Participation rates also varied considerably by employee demographics **(Figure 28)**. Income was one of the primary determinants. Forty-seven percent of eligible employees with income of less than $15,000 contributed to their employer's DC plan in 2022, while 95% of employees with income of more than $150,000 elected to participate.

Participation rates were lowest for employees younger than 25. Sixty-two percent of younger workers elected to contribute to their employer's plan, while more than 8 in 10 employees between ages 35 and 64 made such deferrals. Tenure also had a significant influence on plan participation. Seventy-four percent of eligible employees with less than two years on the job participated in their employer's plan, while nearly 9 in 10 workers with four or more years of tenure were participants.

While men and women appeared to participate at the same level in 2022, these overall averages fail to account for income differences between men and women. At all income levels, women were more likely than men to join their employer's plan **(Figure 29)**. For example, 89% of women earning $50,000 to $74,999 participated in their employer's plan—compared with 84% of men in the same income group.

Participation rates also varied by industry group **(Figure 30)**. Employees in the finance, insurance, and real estate industry group had the highest participation rate, with 9 in 10 workers participating in their employer's plan, while employees in the wholesale and retail trade group had the lowest participation rate at 67%.

Figure 28. Participation rates by participant demographics

Vanguard defined contribution plans permitting employee-elective deferrals

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 estimated
All		**75%**	**77%**	**78%**	**71%**	**72%**	**77%**	**78%**	**81%**	**82%**	**83%**
Income	<$15,000	29%	29%	27%	33%	18%	38%	36%	46%	41%	47%
	$15,000–$29,999	51%	54%	48%	48%	45%	54%	57%	58%	58%	60%
	$30,000–$49,999	71%	75%	75%	69%	68%	71%	74%	75%	75%	76%
	$50,000–$74,999	76%	79%	80%	77%	79%	82%	83%	83%	85%	86%
	$75,000–$99,999	82%	83%	84%	85%	84%	86%	86%	87%	88%	88%
	$100,000–$149,999	88%	88%	88%	89%	90%	91%	91%	91%	92%	91%
	$150,000+	92%	92%	92%	92%	94%	94%	95%	96%	96%	95%
Age	<25	53%	57%	54%	42%	38%	51%	50%	54%	59%	62%
	25–34	71%	74%	74%	69%	70%	75%	77%	80%	81%	83%
	35–44	76%	79%	79%	75%	76%	80%	81%	83%	85%	86%
	45–54	79%	81%	81%	76%	78%	81%	82%	84%	85%	86%
	55–64	80%	82%	83%	77%	79%	82%	83%	85%	86%	86%
	65+	74%	75%	77%	69%	70%	72%	73%	77%	78%	78%
Gender	Male	75%	76%	77%	71%	71%	78%	79%	81%	83%	83%
	Female	77%	77%	79%	71%	73%	78%	78%	82%	81%	83%
Job tenure (years)	0–1	62%	67%	64%	56%	56%	63%	65%	67%	71%	74%
	2–3	72%	75%	78%	72%	72%	77%	79%	82%	82%	84%
	4–6	75%	79%	81%	76%	78%	82%	82%	85%	86%	87%
	7–9	78%	79%	81%	76%	80%	83%	83%	85%	87%	88%
	10+	83%	84%	85%	80%	80%	84%	85%	86%	87%	87%

Source: Vanguard 2023.

Figure 29. Participation by income and gender, 2022 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

	Female	Male	All
<$15,000	51%	44%	47%
$15,000–$29,999	63%	57%	60%
$30,000–$49,999	78%	75%	76%
$50,000–$74,999	89%	84%	86%
$75,000–$99,999	92%	86%	88%
$100,000–$149,999	94%	90%	91%
$150,000+	96%	95%	95%

Source: Vanguard 2023.

Figure 30. Participation rates by industry sector, 2022 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

	Plan weighted	Participant weighted
Overall	**85%**	**83%**
Finance, insurance, and real estate	90%	93%
Agriculture, mining, and construction	86%	86%
Business, professional, and nonprofit	86%	81%
Manufacturing	85%	89%
Transportation, utilities, and communications	84%	82%
Education and health	80%	88%
Media, entertainment, and leisure	80%	89%
Wholesale and retail trade	78%	67%

Source: Vanguard 2023.

Figure 31. Participation rates by plan design, 2022 estimated

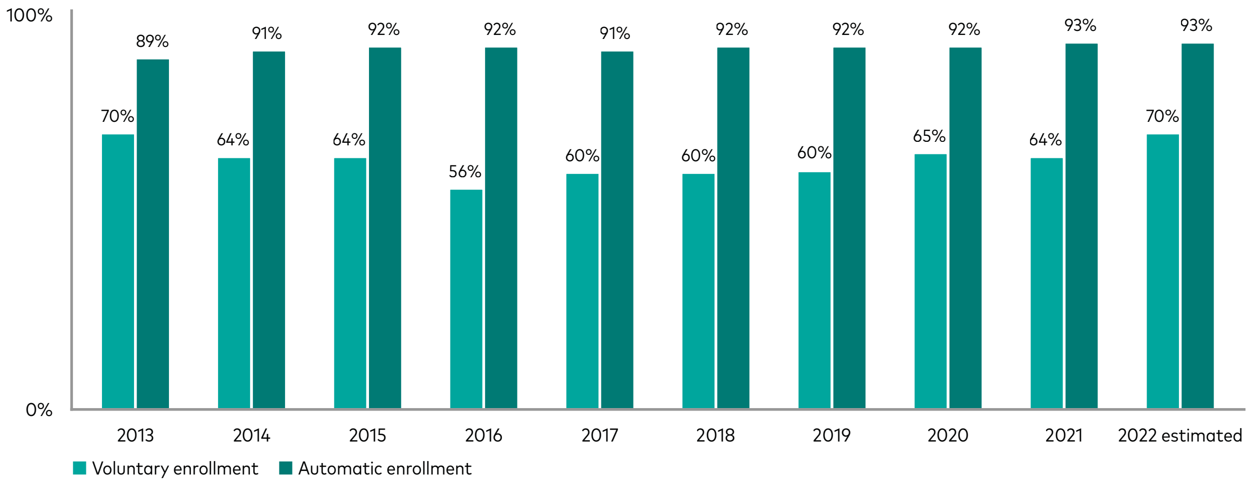
Vanguard defined contribution plans permitting employee-elective deferrals

		Voluntary enrollment	Automatic enrollment	All
All		**70%**	**93%**	**83%**
Income	<$15,000	28%	80%	47%
	$15,000–$29,999	39%	85%	60%
	$30,000–$49,999	60%	90%	76%
	$50,000–$74,999	75%	94%	86%
	$75,000–$99,999	79%	95%	88%
	$100,000–$149,999	85%	96%	91%
	$150,000+	92%	97%	95%
Age	<25	33%	88%	62%
	25–34	66%	94%	83%
	35–44	74%	94%	86%
	45–54	76%	94%	86%
	55–64	77%	94%	86%
	65+	67%	91%	78%
Gender	Male	69%	93%	83%
	Female	72%	93%	83%
Job tenure (years)	0–1	48%	89%	74%
	2–3	66%	95%	84%
	4–6	73%	95%	87%
	7–9	78%	96%	88%
	10+	81%	95%	87%

Source: Vanguard 2023.

Figure 32. Plan participation rates by plan design, participant-weighted trend

Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard 2023.

Impact of automatic enrollment on plan design

Reflecting the increased adoption of automatic enrollment, there has generally been improved participation rates between 2013 and 2022 among demographic groups that traditionally have lower voluntary participation rates. Automatically enrolled employees had an overall participation rate of 93% in 2022, compared with a rate of 70% for employees in plans with voluntary enrollment **(Figure 31)**.

Plans with automatic enrollment had higher participation rates across all demographic variables. For employees with automatic enrollment earning less than $30,000, the participation rate was more than double that of those with voluntary enrollment.

Between 2013 and 2022, plans with automatic enrollment had consistently strong participation rates **(Figure 32)**. And while plans with voluntary enrollment saw declining participation rates from 2013 through 2016, there has been an increase in rates over the past several years.

In 2022, 91% of automatic enrollment plans had participation rates of 80% or higher, compared with 48% of voluntary enrollment plans **(Figure 33)**. More than one-third of voluntary enrollment plans had participation rates below 70%.

Figure 33. Distribution of participation rates by plan design

Vanguard defined contribution plans permitting employee-elective deferrals

Percentage of plans

	2022 estimated		
Plan participation rate	**All plans**	**Voluntary enrollment**	**Automatic enrollment**
90%–100%	53%	23%	72%
80%–89%	22%	25%	19%
70%–79%	9%	16%	4%
60%–69%	7%	13%	3%
50%–59%	5%	10%	1%
<50%	4%	13%	<0.5%

Source: Vanguard 2023.

Employee deferrals

In a typical DC plan, employees are the main source of funding, while employer contributions play a secondary role. Thus, the level of participant deferrals is a critical determinant of whether the DC plan will generate an adequate level of retirement savings.

Vanguard participants saved 7.4% of their income, on average, in their employer's plan in 2022 **(Figure 34)**. The median participant deferral rate was 6.4%, meaning that half of participants were saving above this rate and half were saving below it.

Vanguard deferral rates are drawn from recordkeeping data and exclude eligible employees not contributing to their plans. Industry deferral rates sometimes include eligible employees not contributing to their plans and are generally self-reported by plan sponsors.

Average and median deferral rates were somewhat steady between 2013 and 2018 and have increased slightly over the past four years.

Changes to deferral rates

Thirty-nine percent of participants saw an increase to their elected deferral rate in 2022, either through an automatic increase feature or by their own direction **(Figure 35)**. Nine percent of participants decreased their elected deferral rate, and 2% stopped contributing. Overall, elected deferral rate changes have remained consistent over the past four years—a time that has seen various forms of economic uncertainty (COVID-19, high inflation, rising interest rates, etc.).

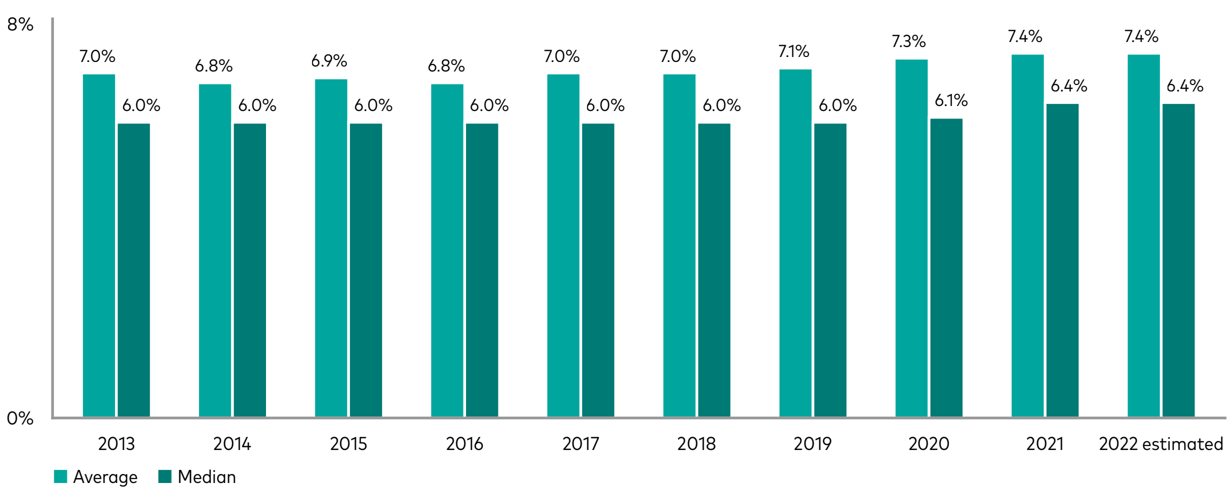
Distribution of deferral rates

Individual deferral rates varied considerably among participants in 2022 **(Figure 36)**. Twenty-four percent of participants had a deferral rate of 10% or higher, compared with 20% of participants in 2016. And while 25% of participants had a deferral rate below 4% in 2022, this compares favorably with 2016, when the rate was 30%. Only 15% of participants saved the statutory maximum of $20,500 ($27,000 for participants age 50 or older) (**see page 43**). In plans offering catch-up contributions, 16% of participants 50 or older took advantage of this feature in 2022 (**see page 44**).

Plan size had little effect on participant deferral rates **(Figure 37)**. Plans with 5,000 or more participants had an average deferral rate of 7.3% in 2022—close to the overall average rate of 7.4%. Employees at large firms typically have more generous compensation packages and so arguably should have a higher propensity to save than employees at small companies. But the presence of other employer-funded retirement benefits as part of that package may dilute this effect.

Figure 34. Participant employee-elective deferral rates

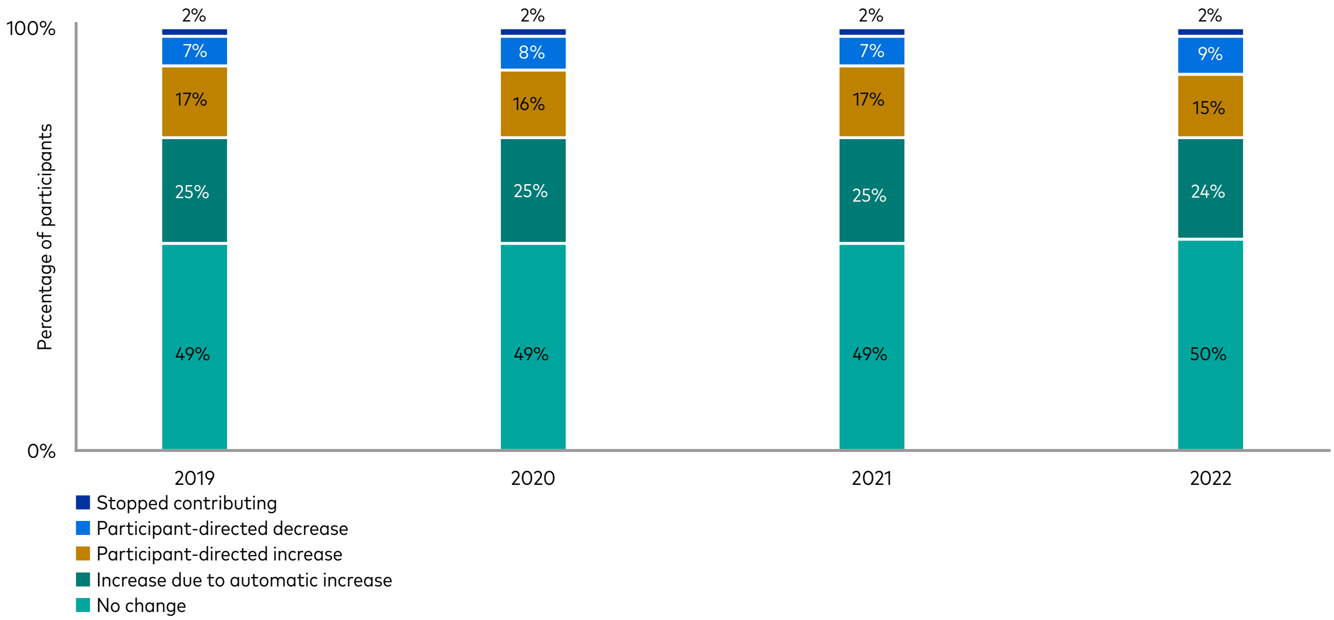
Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard 2023.

Figure 35. Trend in elected deferral rate changes

Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard 2023.

Figure 36. Distribution of participant employee-elective deferral rates

Vanguard defined contribution plans permitting employee-elective deferrals

Percentage of participants

Deferral rate	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 estimated
0.1%–3.9%	28%	30%	29%	30%	28%	28%	27%	26%	25%	25%
4.0%–6.0%	23%	23%	22%	22%	22%	22%	21%	20%	20%	19%
6.1%–9.9%	29%	28%	29%	28%	29%	29%	30%	31%	32%	32%
10.0%–14.9%	14%	13%	14%	14%	15%	15%	16%	16%	16%	17%
15.0%+	6%	6%	6%	6%	6%	6%	6%	7%	7%	7%

Source: Vanguard 2023.

Figure 37. Participant employee-elective deferral rates by plan size

Vanguard defined contribution plans permitting employee-elective deferrals

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 estimated
Average—all plans		7.0%	6.8%	6.9%	6.8%	7.0%	7.0%	7.1%	7.3%	7.4%	7.4%
Median		6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.1%	6.4%	6.4%
Average by plan size (number of participants)	<500	7.0%	6.9%	7.1%	7.2%	7.3%	7.3%	7.4%	7.7%	7.7%	7.7%
	500–999	6.8%	7.1%	6.8%	7.0%	7.0%	7.1%	7.3%	7.6%	7.5%	7.5%
	1,000–4,999	6.9%	6.7%	6.9%	6.8%	6.9%	7.0%	7.1%	7.3%	7.5%	7.4%
	5,000+	7.0%	6.8%	7.0%	6.8%	7.0%	6.9%	7.0%	7.3%	7.3%	7.3%

Source: Vanguard 2023.

Deferral rates by employee demographics

As with plan participation rates, employee demographics have a strong influence on deferral rates **(Figure 38)**. Income is the primary determinant of deferral rates, which generally rise with income. The statutory maximum contribution was $19,500 ($26,000 for participants ages 50 and older), and a highly compensated employee was one who earned $130,000 or more in 2021 (based on the prior year for 2022).

In 2022, participants with income of less than $30,000 had deferral rates in the 4.7%-to-5.5% range, while participants earning $75,000 to $99,999 had a deferral rate of 8.2%—a saving rate two-thirds higher. The deferral rate was 9.2% for participants earning between $100,000 and $149,999.

Age is another important variable influencing saving. The deferral rate was lowest for participants younger than 25, at 5.2% of income. Participants ages 55 to 64 deferred nearly twice as much, averaging 8.7% of income. Deferral rates also rose directly with employee tenure.

Account balance and gender play a role. Participants with account balances of less than $10,000 had the lowest average deferral rate, 3.9%. As account balances rose, so did average deferral rates. And while men overall saved at slightly higher rates than women, upon examining the differences at higher income levels, women in that cohort generally saved at slightly higher rates **(Figure 39)**.

Deferral rates also varied by industry group **(Figure 40)**. Participants in media, entertainment, and leisure had the highest average deferral rates, while participants in wholesale and retail trade had the lowest.

Figure 38. Employee-elective deferral rates by participant demographic

Vanguard defined contribution plans permitting employee-elective deferrals

Average deferral rate		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 estimated
All		**7.0%**	**6.8%**	**6.9%**	**6.8%**	**7.0%**	**7.0%**	**7.1%**	**7.3%**	**7.4%**	**7.4%**
Income	<$15,000	5.6%	6.3%	5.4%	4.6%	6.1%	5.0%	4.9%	5.0%	5.5%	5.5%
	$15,000–$29,999	4.8%	4.9%	4.6%	4.6%	4.7%	4.7%	4.5%	4.8%	4.7%	4.7%
	$30,000–$49,999	5.8%	5.8%	5.7%	5.7%	5.4%	5.5%	5.5%	5.7%	5.5%	5.5%
	$50,000–$74,999	7.0%	6.9%	6.9%	6.9%	6.7%	6.8%	6.9%	7.0%	7.1%	7.0%
	$75,000–$99,999	8.1%	7.9%	8.0%	7.9%	7.9%	8.0%	8.1%	8.2%	8.3%	8.2%
	$100,000–$149,999	8.8%	8.7%	8.8%	8.7%	8.8%	8.9%	9.1%	9.2%	9.3%	9.2%
	$150,000+	7.5%	7.3%	7.7%	7.6%	7.7%	7.9%	8.1%	8.2%	8.1%	8.0%
Age	<25	4.4%	4.1%	4.7%	4.8%	5.0%	4.7%	4.9%	5.2%	5.1%	5.2%
	25–34	5.8%	5.5%	5.9%	5.9%	6.1%	6.1%	6.2%	6.6%	6.8%	6.7%
	35–44	6.4%	6.3%	6.4%	6.3%	6.5%	6.5%	6.7%	6.9%	7.1%	7.0%
	45–54	7.3%	7.2%	7.3%	7.0%	7.2%	7.2%	7.3%	7.5%	7.5%	7.6%
	55–64	8.6%	8.5%	8.6%	8.3%	8.5%	8.5%	8.7%	8.8%	8.7%	8.7%
	65+	9.8%	9.7%	9.7%	9.0%	9.4%	9.1%	9.1%	9.2%	9.0%	9.0%
Gender	Male	7.0%	6.9%	6.9%	6.9%	7.0%	7.1%	7.2%	7.4%	7.5%	7.5%
	Female	7.0%	6.8%	6.9%	6.6%	6.8%	6.6%	6.8%	7.0%	7.1%	7.2%
Job tenure (years)	0–1	4.9%	4.6%	5.0%	5.0%	5.1%	5.0%	5.1%	5.5%	5.4%	5.4%
	2–3	6.3%	6.2%	6.5%	6.3%	6.6%	6.4%	6.4%	6.6%	6.9%	7.0%
	4–6	7.0%	7.0%	7.1%	6.9%	7.3%	7.1%	7.2%	7.4%	7.6%	7.6%
	7–9	7.2%	7.2%	7.4%	7.2%	7.6%	7.6%	7.7%	7.8%	8.0%	8.0%
	10+	8.0%	8.0%	8.0%	7.9%	8.1%	8.2%	8.4%	8.6%	8.7%	8.7%
Account balance	<$10,000	3.8%	3.8%	3.9%	3.9%	3.8%	3.9%	3.7%	4.0%	4.0%	3.9%
	$10,000–$24,999	5.9%	6.1%	6.4%	6.4%	6.2%	6.6%	6.4%	6.3%	6.6%	6.7%
	$25,000–$49,999	6.9%	6.9%	7.4%	7.5%	7.2%	7.6%	7.5%	7.5%	7.6%	7.9%
	$50,000–$99,999	7.7%	7.7%	8.1%	8.2%	8.2%	8.5%	8.5%	8.5%	8.6%	8.8%
	$100,000–$249,999	9.2%	9.1%	9.3%	9.1%	9.2%	9.5%	9.5%	9.6%	9.5%	9.7%
	$250,000+	10.4%	10.2%	10.4%	10.2%	10.3%	10.5%	10.6%	10.6%	10.4%	10.4%

Source: Vanguard 2023.

Figure 39. Deferral rates by income and gender, 2022

Vanguard defined contribution plans permitting employee-elective deferrals

Average deferral rate

	Female	Male	All
<$15,000	5.3%	6.0%	5.5%
$15,000–$29,999	4.6%	5.0%	4.7%
$30,000–$49,999	5.6%	5.4%	5.5%
$50,000–$74,999	7.1%	6.9%	7.0%
$75,000–$99,999	8.4%	8.1%	8.2%
$100,000–$149,999	9.4%	9.1%	9.2%
$150,000+	8.1%	7.9%	8.0%

Source: Vanguard 2023.

Figure 40. Deferral rates by industry sector, 2022 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

Average deferral rate

	Average	Median
Overall	**7.4%**	**6.4%**
Media, entertainment, and leisure	8.8%	7.9%
Business, professional, and nonprofit	7.9%	6.9%
Education and health	7.8%	6.2%
Agriculture, mining, and construction	7.7%	6.9%
Finance, insurance, and real estate	7.6%	6.8%
Manufacturing	7.5%	6.5%
Transportation, utilities, and communications	7.2%	6.0%
Wholesale and retail trade	5.9%	5.0%

Source: Vanguard 2023.

Impact of automatic enrollment

Participants automatically enrolled in their plan had an average deferral rate of 7.3% in 2022, slightly lower than the average deferral rate for participants who voluntarily enrolled **(Figure 41)**.

In prior years, the gap between average deferral rates of participants automatically and voluntarily enrolled was wide. In 2013, this spread was nearly 2 percentage points. However, it appears that automatic annual increases, as well as higher default deferral rates, have caused deferral rates to converge.

This suggests that higher default deferral rates would be amenable to participants in automatic enrollment designs. Our research indicates that "quit rates" do not deteriorate when higher default percentages are used to enroll employees.[2]

Maximum contributors

During 2022, 15% of participants saved the statutory maximum amount of $20,500 ($27,000 for those age 50 or older) **(Figure 42)**. Participants who contributed the maximum dollar amount tended to have higher incomes, were older, had longer tenures with their current employer, and had accumulated substantially higher account balances.

Fifty-eight percent of participants with income of more than $150,000 contributed the maximum allowed, as did 44% of participants with an account balance of more than $250,000. And 1 in 6 participants older than 65 contributed the maximum.

Figure 41. Participant deferral rates by plan design, 2022 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

Average deferral rate

		Voluntary enrollment	Automatic enrollment	All
All		**7.5%**	**7.3%**	**7.4%**
Income	<$15,000	7.1%	4.6%	5.5%
	$15,000–$29,999	5.8%	4.2%	4.7%
	$30,000–$49,999	5.8%	5.3%	5.5%
	$50,000–$74,999	7.2%	6.9%	7.0%
	$75,000–$99,999	8.2%	8.3%	8.2%
	$100,000–$149,999	8.8%	9.5%	9.2%
	$150,000+	7.7%	8.1%	8.0%
Age	<25	5.9%	5.0%	5.2%
	25–34	6.7%	6.8%	6.7%
	35–44	7.0%	7.1%	7.0%
	45–54	7.6%	7.6%	7.6%
	55–64	8.7%	8.8%	8.7%
	65+	9.1%	8.9%	9.0%
Gender	Male	7.5%	7.3%	7.5%
	Female	7.5%	6.8%	7.2%
Job tenure (years)	0–1	5.7%	5.3%	5.4%
	2–3	7.1%	6.9%	7.0%
	4–6	7.6%	7.6%	7.6%
	7–9	7.3%	8.4%	8.0%
	10+	8.2%	9.2%	8.7%
Account balance	<$10,000	4.4%	3.8%	3.9%
	$10,000–$24,999	6.7%	6.8%	6.7%
	$25,000–$49,999	7.7%	8.0%	7.9%
	$50,000–$99,999	8.5%	9.0%	8.8%
	$100,000–$249,999	9.5%	9.8%	9.7%
	$250,000+	10.3%	10.5%	10.4%

Source: Vanguard 2023.

2 For an in-depth analysis of automatic enrollment, see Jeffrey W. Clark and Jean A. Young, ***Automatic Enrollment: The Power of the Default***. Vanguard research. February 2021.

Figure 42. Participants contributing the maximum by participant demographics, 2022 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

All		**15%**
Income	<$15,000	1%
	$15,000–$29,999	<0.5%
	$30,000–$49,999	<0.5%
	$50,000–$74,999	1%
	$75,000–$99,999	4%
	$100,000–$149,999	17%
	$150,000+	58%
Age	<25	3%
	25–34	11%
	35–44	16%
	45–54	18%
	55–64	19%
	65+	18%
Gender	Male	16%
	Female	14%
Job tenure (years)	0–1	6%
	2–3	15%
	4–6	16%
	7–9	19%
	10+	20%
Account balance	<$10,000	<0.5%
	$10,000–$24,999	2%
	$25,000–$49,999	6%
	$50,000–$99,999	11%
	$100,000–$249,999	21%
	$250,000+	44%
Industry group	Media, entertainment, and leisure	42%
	Business, professional, and nonprofit	22%
	Finance, insurance, and real estate	17%
	Agriculture, mining, and construction	16%
	Education and health	14%
	Manufacturing	10%
	Transportation, utilities, and communications	7%
	Wholesale and retail trade	5%

Source: Vanguard 2023.

Catch-up contributions

Nearly all Vanguard plans offered catch-up contributions in 2022. Catch-up contributions permit participants ages 50 and older to contribute more than permitted for those younger than 50. Sixteen percent of eligible participants took advantage of this feature in 2022 **(Figure 43)**. Participants earning less than $100,000 would need deferral rates higher than 20% of income to make catch-up contributions, suggesting that adoption of such contributions by participants is quite strong.

Participants making catch-up contributions had similar characteristics to participants making the maximum contribution to their plan—higher incomes and substantially higher account balances.

Fifty-six percent of participants with income of more than $150,000 and 38% with an account balance of more than $250,000 made catch-up contributions.

Roth contributions

At year-end 2022, the Roth feature was offered by 80% of Vanguard plans and had been adopted by 17% of participants in plans offering the feature **(Figure 44)**, up from 11% in 2018. Those who used this feature tended to be younger or higher-income participants.

After-tax contributions

After-tax employee-elective deferrals were available to participants in 22% of Vanguard plans in 2022 **(Figure 45)**. The after-tax feature is more likely to be offered by large plans, and 36% of participants had access to this feature.

Ten percent of employees offered the after-tax deferral feature took advantage of it. Those who used the feature tended to have higher incomes and longer tenures.

Figure 43. Catch-up contribution participation rates by participant demographics, 2022 estimated

Vanguard defined contribution plans permitting catch-up contributions

Percentage of participants using if offered		**16%**
Income	<$15,000	1%
	$15,000–$29,999	<0.5%
	$30,000–$49,999	<0.5%
	$50,000–$74,999	2%
	$75,000–$99,999	5%
	$100,000–$149,999	20%
	$150,000+	56%
Gender	Male	17%
	Female	12%
Job tenure (years)	0–1	7%
	2–3	14%
	4–6	15%
	7–9	18%
	10+	19%
Account balance	<$10,000	<0.5%
	$10,000–$24,999	2%
	$25,000–$49,999	6%
	$50,000–$99,999	9%
	$100,000–$249,999	16%
	$250,000+	38%
Industry group	Media, entertainment, and leisure	32%
	Education and health	24%
	Business, professional, and nonprofit	24%
	Finance, insurance, and real estate	22%
	Agriculture, mining, and construction	19%
	Manufacturing	13%
	Transportation, utilities, and communications	9%
	Wholesale and retail trade	9%

Source: Vanguard 2023.

Figure 44. Roth participation rates by participant demographics, 2022 estimated

Vanguard defined contribution plans permitting Roth contributions

Percentage of plans offering		**80%**
Percentage of participants offered		**93%**
Percentage of participants using if offered		**17%**
Income	<$15,000	8%
	$15,000–$29,999	9%
	$30,000–$49,999	10%
	$50,000–$74,999	16%
	$75,000–$99,999	21%
	$100,000–$149,999	22%
	$150,000+	18%
Age	<25	18%
	25–34	22%
	35–44	18%
	45–54	15%
	55–64	13%
	65+	8%
Gender	Male	18%
	Female	16%
Job tenure (years)	0–1	15%
	2–3	18%
	4–6	18%
	7–9	19%
	10+	16%
Account balance	<$10,000	11%
	$10,000–$24,999	19%
	$25,000–$49,999	20%
	$50,000–$99,999	20%
	$100,000–$249,999	19%
	$250,000+	18%
Industry group	Business, professional, and nonprofit	25%
	Transportation, utilities, and communications	21%
	Education and health	17%
	Finance, insurance, and real estate	17%
	Agriculture, mining, and construction	16%
	Manufacturing	14%
	Media, entertainment, and leisure	14%
	Wholesale and retail trade	13%

Source: Vanguard 2023.

Figure 45. After-tax participation rates by participant demographics, 2022 estimated

Vanguard defined contribution plans permitting after-tax contributions

Percentage of plans offering	22%
Percentage of participants offered	36%
Percentage of participants using if offered	10%

Income	<$15,000	1%
	$15,000–$29,999	1%
	$30,000–$49,999	3%
	$50,000–$74,999	6%
	$75,000–$99,999	7%
	$100,000–$149,999	7%
	$150,000+	27%
Age	<25	4%
	25–34	11%
	35–44	14%
	45–54	11%
	55–64	8%
	65+	5%
Gender	Male	10%
	Female	9%
Job tenure (years)	0–1	6%
	2–3	12%
	4–6	12%
	7–9	13%
	10+	11%
Industry group	Media, entertainment, and leisure	40%
	Agriculture, mining, and construction	16%
	Education and health	9%
	Transportation, utilities, and communications	7%
	Business, professional, and nonprofit	7%
	Finance, insurance, and real estate	6%
	Manufacturing	5%
	Wholesale and retail trade	2%

Source: Vanguard 2023.

Roth and after-tax offerings

While after-tax offerings have remained somewhat stable over the past five years, plans of all sizes have continued to adopt Roth accounts **(Figure 46)**. In addition, more than one-third of plans with at least 5,000 participants offered both Roth and after-tax contributions in 2022, up from 28% in 2018.

Figure 46. Plans offering Roth and after-tax trend

Vanguard defined contribution plans permitting employee-elective deferrals

Percentage of plans offering Roth

Plan size (number of participants)	2018	2019	2020	2021	2022
<500	61%	65%	65%	68%	71%
500-999	78%	78%	81%	80%	84%
1,000-5,000	81%	83%	82%	86%	88%
>5,000	87%	88%	88%	91%	94%
All plans	71%	74%	74%	77%	80%

Percentage of plans offering after-tax

Plan size (number of participants)	2018	2019	2020	2021	2022
<500	10%	10%	10%	11%	13%
500-999	19%	17%	21%	23%	21%
1,000-5,000	28%	28%	27%	28%	29%
>5,000	34%	34%	36%	39%	41%
All plans	18%	18%	19%	21%	22%

Percentage of plans offering both Roth and after-tax

Plan size (number of participants)	2018	2019	2020	2021	2022
<500	6%	6%	6%	7%	9%
500-999	14%	13%	17%	18%	17%
1,000-5,000	23%	24%	24%	25%	26%
>5,000	28%	28%	29%	34%	37%
All plans	13%	14%	15%	17%	18%

Source: Vanguard 2023.

Aggregate contributions

Considering both employee and employer contributions, the average total participant contribution rate in 2022 was 11.3% (estimated; see the Methodology section on page 114), and the median was 10.6% **(Figure 47)**. These rates exclude eligible nonparticipants. Aggregate participant and employer contribution rates were somewhat stable between 2013 and 2018 and have increased slightly over the past four years.

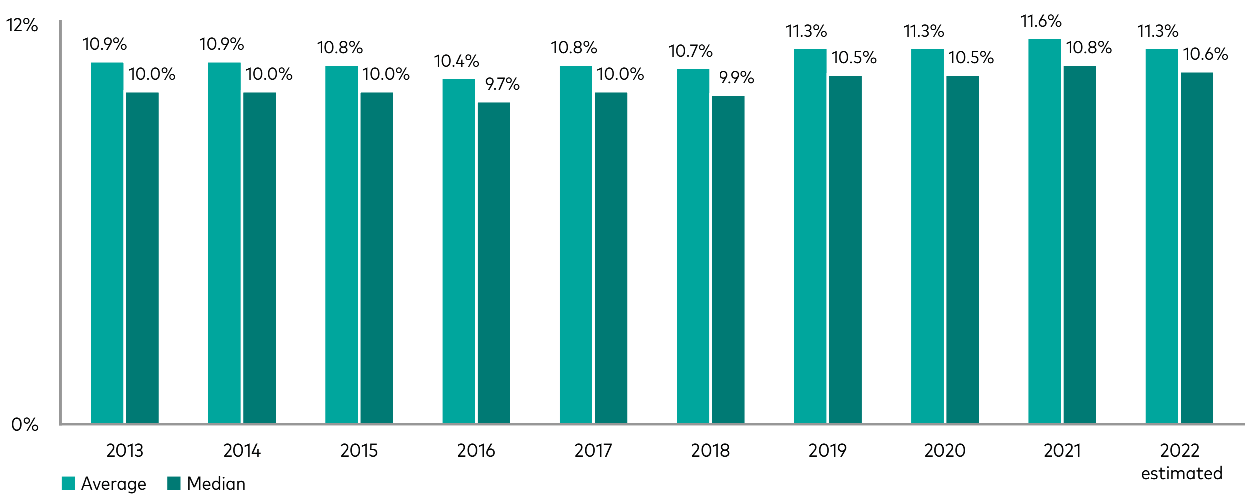
When eligible nonparticipants were included, with their 0% contribution rate, the average aggregate contribution rate was 9.7%, and the median rate was 9.4% **(Figure 48)**. Aggregate employee and employer contribution rates were stable between 2013 and 2015, and declined in 2016, reflecting a change in the underlying sectors these plans represent—specifically an increase in the proportion of retail plans with voluntary enrollment. Since 2016, this measure has increased.

Participants automatically enrolled in their plan had an average total contribution rate of 11.5% in 2022, compared with 11.0% for those voluntarily enrolled **(Figure 49)**.

Eligible employees hired under an automatic enrollment feature had an average total contribution rate of 11.0%, nearly 40% higher than the rate of 8.0% for those hired under voluntary enrollment **(Figure 50)**. Plans with automatic enrollment had higher total contribution rates across all demographic variables, with the widest gaps for younger, less-tenured, and lower-income employees.

Figure 47. Aggregate participant and employer contribution rates

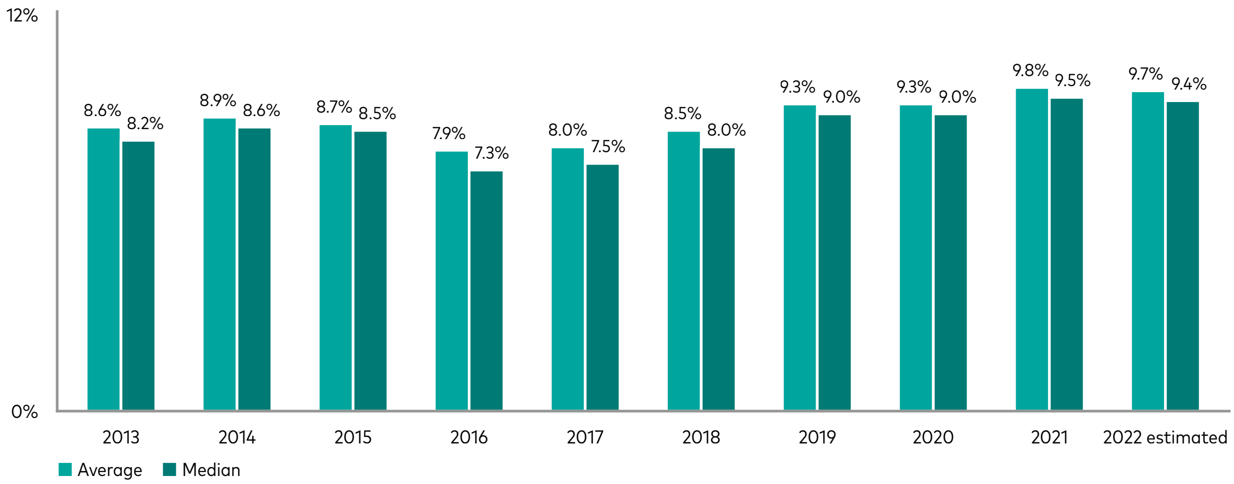
Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard 2023.

Figure 48. Aggregate employee and employer contribution rates

Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard 2023.

Figure 49. Aggregate participant and employer contribution rates by plan design, 2022 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

		Voluntary enrollment	Automatic enrollment	All
All		**11.0%**	**11.5%**	**11.3%**
Income	<$15,000	9.4%	6.6%	7.6%
	$15,000–$29,999	8.4%	6.0%	6.8%
	$30,000–$49,999	9.0%	8.3%	8.6%
	$50,000–$74,999	10.6%	10.7%	10.6%
	$75,000–$99,999	11.5%	12.4%	12.0%
	$100,000–$149,999	12.3%	13.8%	13.2%
	$150,000+	12.4%	14.6%	13.9%
Age	<25	8.6%	7.9%	8.1%
	25–34	10.2%	10.9%	10.7%
	35–44	10.5%	11.5%	11.1%
	45–54	11.2%	12.0%	11.7%
	55–64	12.4%	13.3%	12.9%
	65+	12.4%	12.9%	12.7%
Gender	Male	11.3%	11.7%	11.5%
	Female	10.9%	10.5%	10.7%
Job tenure (years)	0–1	8.5%	8.4%	8.4%
	2–3	11.2%	11.2%	11.2%
	4–6	11.8%	11.9%	11.9%
	7–9	11.0%	13.2%	12.3%
	10+	11.6%	14.5%	12.9%
Account balance	<$10,000	6.0%	4.9%	5.2%
	$10,000–$24,999	9.6%	10.0%	9.8%
	$25,000–$49,999	10.9%	12.0%	11.4%
	$50,000–$99,999	11.6%	13.4%	12.4%
	$100,000–$249,999	13.0%	14.8%	13.8%
	$250,000+	14.3%	16.4%	15.2%

Source: Vanguard 2023.

Figure 50. Aggregate employee and employer contribution rates by plan design, 2022 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

		Voluntary enrollment	Automatic enrollment	All
All		**8.0%**	**11.0%**	**9.7%**
Income	<$15,000	2.8%	5.7%	3.9%
	$15,000–$29,999	3.4%	5.5%	4.3%
	$30,000–$49,999	5.6%	7.8%	6.8%
	$50,000–$74,999	8.3%	10.2%	9.4%
	$75,000–$99,999	9.3%	12.0%	10.8%
	$100,000–$149,999	10.6%	13.4%	12.2%
	$150,000+	11.6%	14.3%	13.4%
Age	<25	3.0%	7.3%	5.2%
	25–34	6.9%	10.4%	9.0%
	35–44	8.0%	11.0%	9.8%
	45–54	8.9%	11.5%	10.3%
	55–64	9.9%	12.9%	11.5%
	65+	9.0%	12.2%	10.5%
Gender	Male	8.0%	11.1%	9.9%
	Female	8.0%	10.1%	9.2%
Job tenure (years)	0–1	4.2%	7.7%	6.4%
	2–3	7.6%	10.9%	9.7%
	4–6	8.9%	11.6%	10.6%
	7–9	8.9%	12.9%	11.1%
	10+	9.8%	14.0%	11.6%

Source: Vanguard 2023.

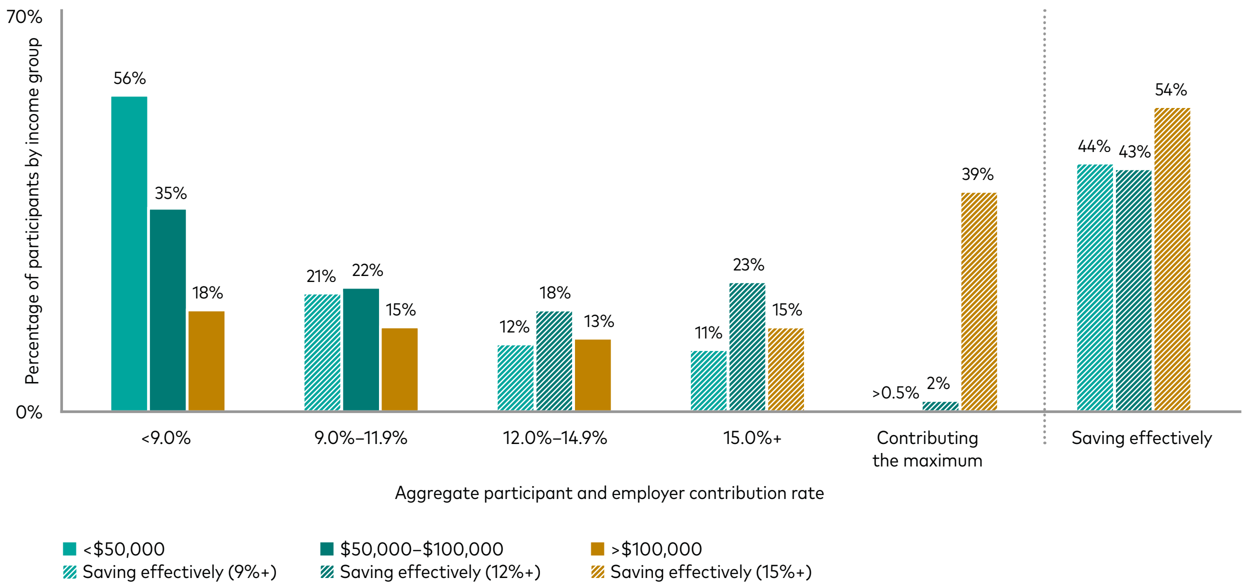
Distribution of aggregate contribution rates

Vanguard estimates that a typical participant should target a total contribution rate of 12% to 15%, including both employee and employer contributions. Forty-eight percent of participants in 2022 had total employee and employer contribution rates that met those thresholds or reached the statutory contribution limit **(Figure 51)**.

For participants with lower wages, Social Security is expected to replace a higher percentage of income, and so a lower retirement saving rate may be appropriate. For higher-wage participants, Social Security replaces a lower percentage of income, and saving rates may need to be higher. In fact, higher-wage participants may not be able to achieve sufficient saving rates within the plan because of statutory contribution limits.

Figure 51. Distribution of aggregate participant and employer contribution rates, 2022 estimated

Vanguard defined contribution plans permitting employee-elective deferrals



Note: The percentage noted after the income range is the total contribution rate recommended for effective savings.

Source: Vanguard 2023.

Account balances

Account balances are a widely cited measure of the overall effectiveness of DC plans. They are determined by contribution levels and investment performance over time.

Vanguard account balances are a measure of how much plan participants have accumulated for retirement at a given employer. In the United States, DC plans are not a closed system. When participants change jobs or retire, their plan assets may remain with the plan of the employer they are leaving, may be rolled over to another employer plan or to an IRA, or may be cashed out.

As a result, current DC plan balances often do not reflect lifetime savings and are only a partial measure of retirement preparedness for most participants.

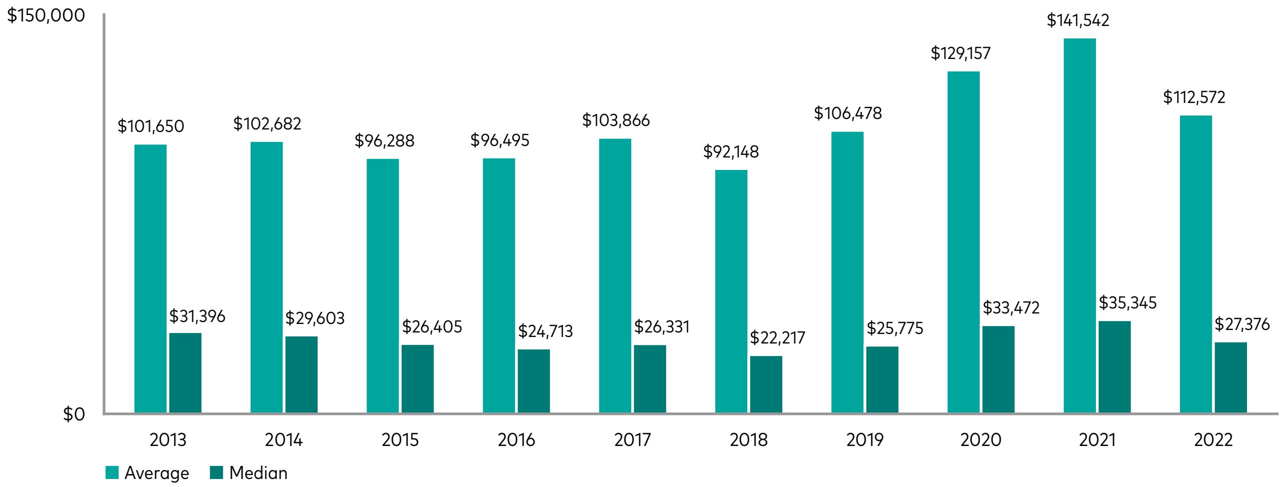
Average versus median balances

In 2022, the average account balance for Vanguard participants was $112,572, and the median balance was $27,376 **(Figure 52)**—decreases of 20% and 23%, respectively, from 2021. The average one-year participant total return was –15.8% (**see page 87**).

The wide divergence between the median and the average balance is due to a small number of very large accounts that significantly raised the average above the median **(Figure 53)**. One in 3 participants had an account balance of less than $10,000, while another 1 in 4 had a balance of more than $100,000. Twelve percent of participants had a balance of $250,000 or more.

Figure 52. Account balances

Vanguard defined contribution plans



Source: Vanguard 2023.

Figure 53. Distribution of account balances

Vanguard defined contribution plans

Percentage of accounts

Range of balance	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<$10,000	30%	31%	33%	34%	34%	36%	33%	29%	29%	33%
$10,000–$19,999	12%	11%	12%	12%	11%	12%	12%	11%	11%	12%
$20,000–$39,999	14%	13%	13%	13%	13%	13%	13%	13%	12%	13%
$40,000–$59,999	8%	8%	8%	8%	7%	7%	7%	8%	8%	7%
$60,000–$79,999	6%	6%	5%	5%	5%	5%	5%	6%	5%	5%
$80,000–$99,999	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
$100,000–149,999	7%	7%	7%	6%	7%	6%	7%	7%	7%	7%
$150,000–199,999	5%	5%	4%	4%	4%	4%	4%	5%	5%	4%
$200,000–249,999	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
$250,000+	11%	12%	11%	11%	12%	10%	12%	14%	16%	12%

Source: Vanguard 2023.

Because of the skewed distribution of assets, average balances are indicative of participants at about the 75th percentile—that is, about 75% of all participants had balances below the average, and 25% had balances above. Average balances are more indicative of the results experienced by longer-tenured, more affluent, or older participants. The median balance represents the typical participant: Half of all participants had balances above the median, and half had balances below.

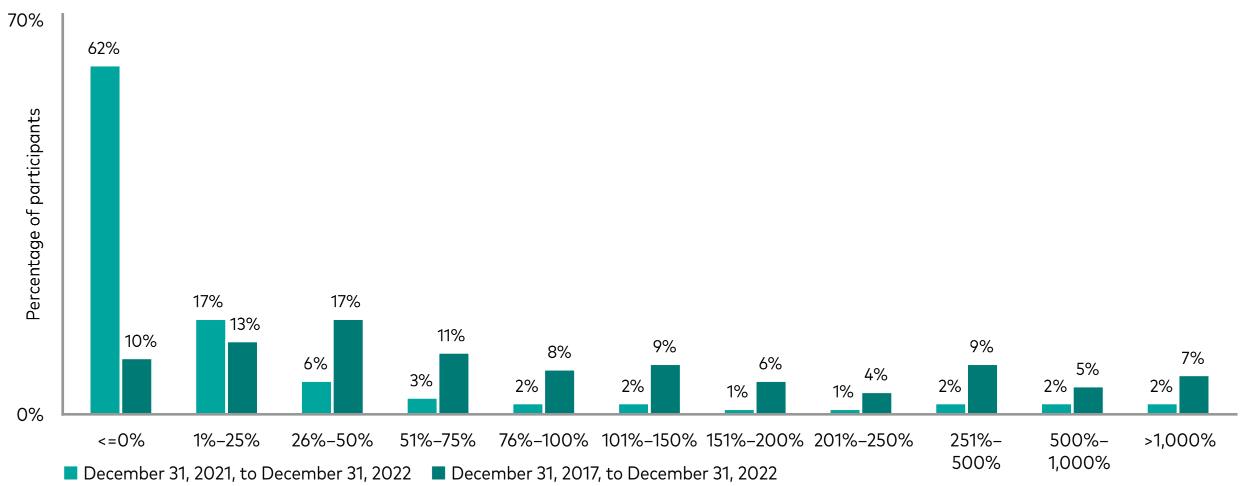
Change in account balances

Market performance and an evolving participant base caused the change in average and median account balances in 2022. When we examined continuous participants—those with an account balance in both December 2021 and December 2022—the median account balance declined by 8% **(Figure 54)**. Sixty-two percent of these continuous participants saw their balances decline, primarily due to negative returns in the equity and bond markets. Thirty-eight percent saw their balances rise, primarily due to ongoing contributions. Among continuous participants with a balance in both December 2017 and December 2022, the median account balance rose 70%, and 90% of continuous participants had a higher account balance in 2022 than in 2017.

Account balances are widely available on statements and websites and are often cited as participants' primary tool for monitoring investment results. Because of ongoing contributions, account balances will appear to be less negatively impacted during falling markets. This "contribution effect" may mask the psychological impact of falling stock prices on participants.

Figure 54. Change in account balances, continuous participants

Vanguard defined contribution participants with a balance at both the beginning and end of the period



	December 31, 2021–December 31, 2022	December 31, 2017–December 31, 2022
Median change	–8%	70%
Percentage of participants with positive changes	38%	90%

Source: Vanguard 2023.

Account balances by participant demographics

Median and average account balances varied considerably by participant demographics in 2022 **(Figure 55)**. Income, age, and job tenure are among the factors that influence account balances. These three factors are intertwined. Not only does income, on average, tend to rise somewhat with age, making saving more affordable, but older participants generally save at higher rates. Also, the longer an employee's tenure with a firm, the more likely they are to earn a higher salary, participate in the plan, and contribute at higher levels. Longer-tenured participants also have higher balances because they have been contributing to their employer's plan for a longer period.

Gender also influences current balances. Fifty-six percent of Vanguard participants are male, and men had average and median balances 43% higher than those of women in 2022. Gender is often a proxy for other factors, such as income. Women in our sample tended to have lower incomes than men. However, as noted earlier in this report, women tended to save more than men at each respective income level.

A different picture emerges when account balances are compared based on income. When income is factored in, account balances were closer in 2022 **(Figure 56)**. For example, female participants with an income between $30,000 and $99,999 had average account balances that were within 4% to 7% of their male counterparts.

Figure 55. Account balances by participant demographics, 2022

Vanguard defined contribution plans

		All participants	
		Average	**Median**
All		**$112,572**	**$27,376**
Income	<$15,000	$20,765	$4,033
	$15,000–$29,999	$13,871	$4,568
	$30,000–$49,999	$28,672	$11,556
	$50,000–$74,999	$66,918	$31,064
	$75,000–$99,999	$113,617	$58,665
	$100,000–$149,999	$186,066	$104,155
	$150,000+	$340,245	$201,301
	Terminated	$117,544	$28,427
Age	<25	$5,236	$1,948
	25–34	$30,017	$11,357
	35–44	$76,354	$28,318
	45–54	$142,069	$48,301
	55–64	$207,874	$71,168
	65+	$232,710	$70,620
Gender	Male	$136,977	$34,961
	Female	$95,570	$24,714
Job tenure (years)	0–1	$14,341	$3,441
	2–3	$35,780	$14,739
	4–6	$61,842	$30,404
	7–9	$97,416	$52,992
	10+	$247,170	$124,300

Source: Vanguard 2023.

Figure 56. Account balances by income and gender, 2022

Vanguard defined contribution plans permitting employee-elective deferrals

		Female	Male	All
Average	<$15,000	$16,807	$27,653	$20,765
	$15,000–$29,999	$13,092	$17,864	$13,871
	$30,000–$49,999	$29,957	$32,046	$28,672
	$50,000–$74,999	$67,959	$72,281	$66,918
	$75,000–$99,999	$114,995	$120,183	$113,617
	$100,000–$149,999	$182,680	$202,524	$186,066
	$150,000+	$307,365	$395,219	$340,245
	Terminated	$101,081	$138,266	$117,544
Median	<$15,000	$3,550	$4,819	$4,033
	$15,000–$29,999	$4,031	$6,197	$4,568
	$30,000–$49,999	$12,084	$12,792	$11,556
	$50,000–$74,999	$32,293	$33,756	$31,064
	$75,000–$99,999	$60,772	$62,892	$58,665
	$100,000–$149,999	$104,386	$115,846	$104,155
	$150,000+	$185,513	$239,968	$201,301
	Terminated	$27,776	$31,883	$28,427

Source: Vanguard 2023.

Balances by industry group

There were significant variations in account balances by industry sector, which reflect a complex mixture of firm characteristics (influencing employer contributions) and workforce demographics (influencing participant saving rates). Participants in the agriculture, mining, and construction industry group had average and median account balances about two times higher than some other industries **(Figure 57)**.

Figure 57. Balances by industry sector, 2022

Vanguard defined contribution plans

	Average	Median
All	**$112,572**	**$27,376**
Agriculture, mining, and construction	$185,201	$38,398
Finance, insurance, and real estate	$160,975	$51,055
Media, entertainment, and leisure	$133,404	$55,457
Business, professional, and nonprofit	$133,228	$35,310
Manufacturing	$126,497	$37,303
Transportation, utilities, and communications	$100,729	$15,587
Wholesale and retail trade	$96,150	$24,244
Education and health	$73,377	$17,262

Source: Vanguard 2023.

Section 2: Managing participant accounts

Participant investment decisions are a critical determinant of long-term retirement savings growth.

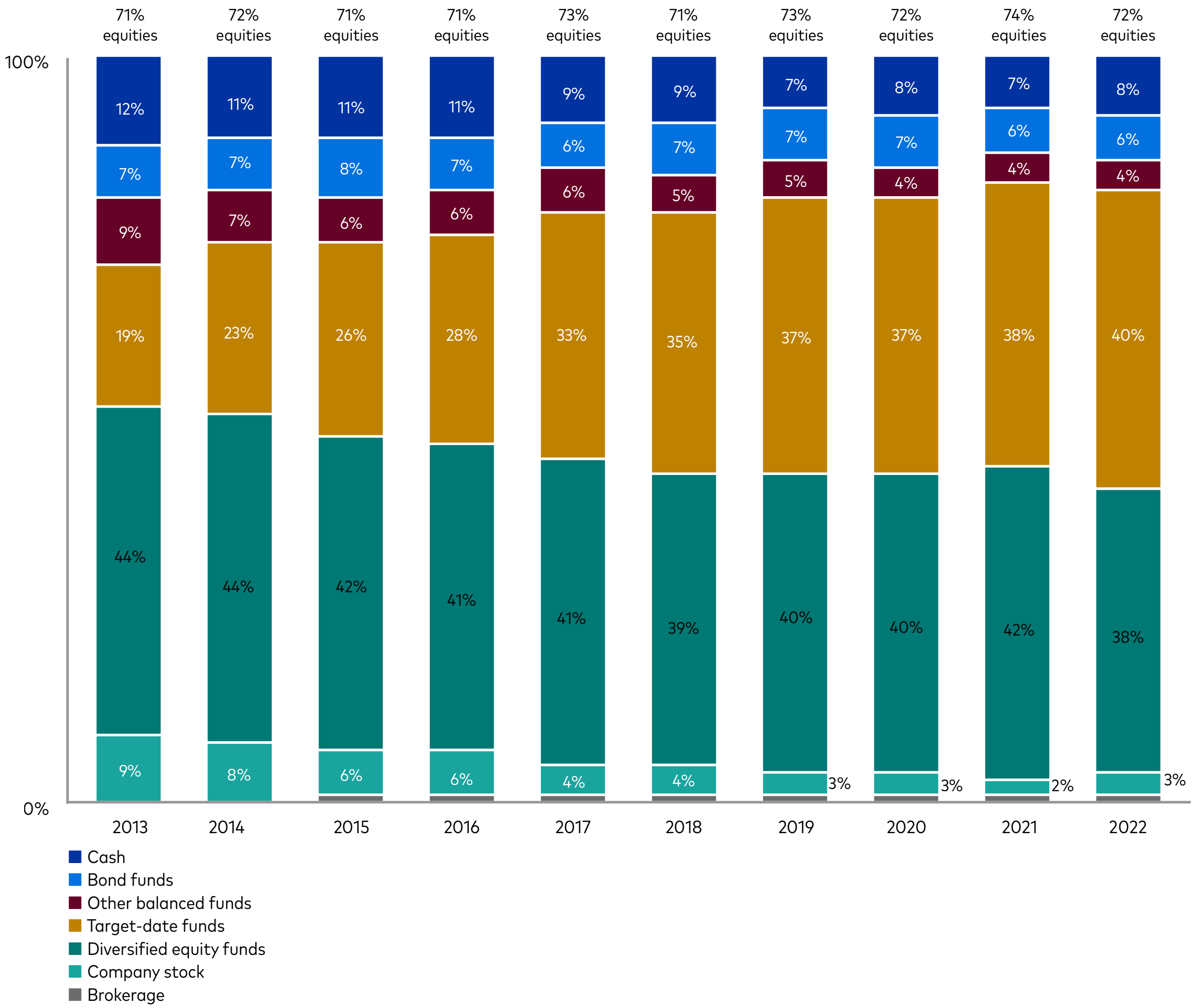
Asset and contribution allocations

Seventy-two percent of plan assets were invested in equities in 2022 **(Figure 58)**. This allocation includes the equity component of balanced strategies. The overall equity allocations of the past 10 years have remained relatively consistent.

In 2022, investments in balanced strategies reached 44%, including 40% in target-date funds and 4% in other balanced options. The growth of target-date funds is dramatically reshaping DC plan investment patterns by increasing age-appropriate equity allocations and reducing extreme allocations.

Figure 58. Plan asset allocation summary

Vanguard defined contribution plans



Source: Vanguard 2023.

Seventy-eight percent of plan contribution dollars were invested in equities during 2022, and nearly 2 of 3 plan contribution dollars were directed to target-date funds **(Figure 59)**.

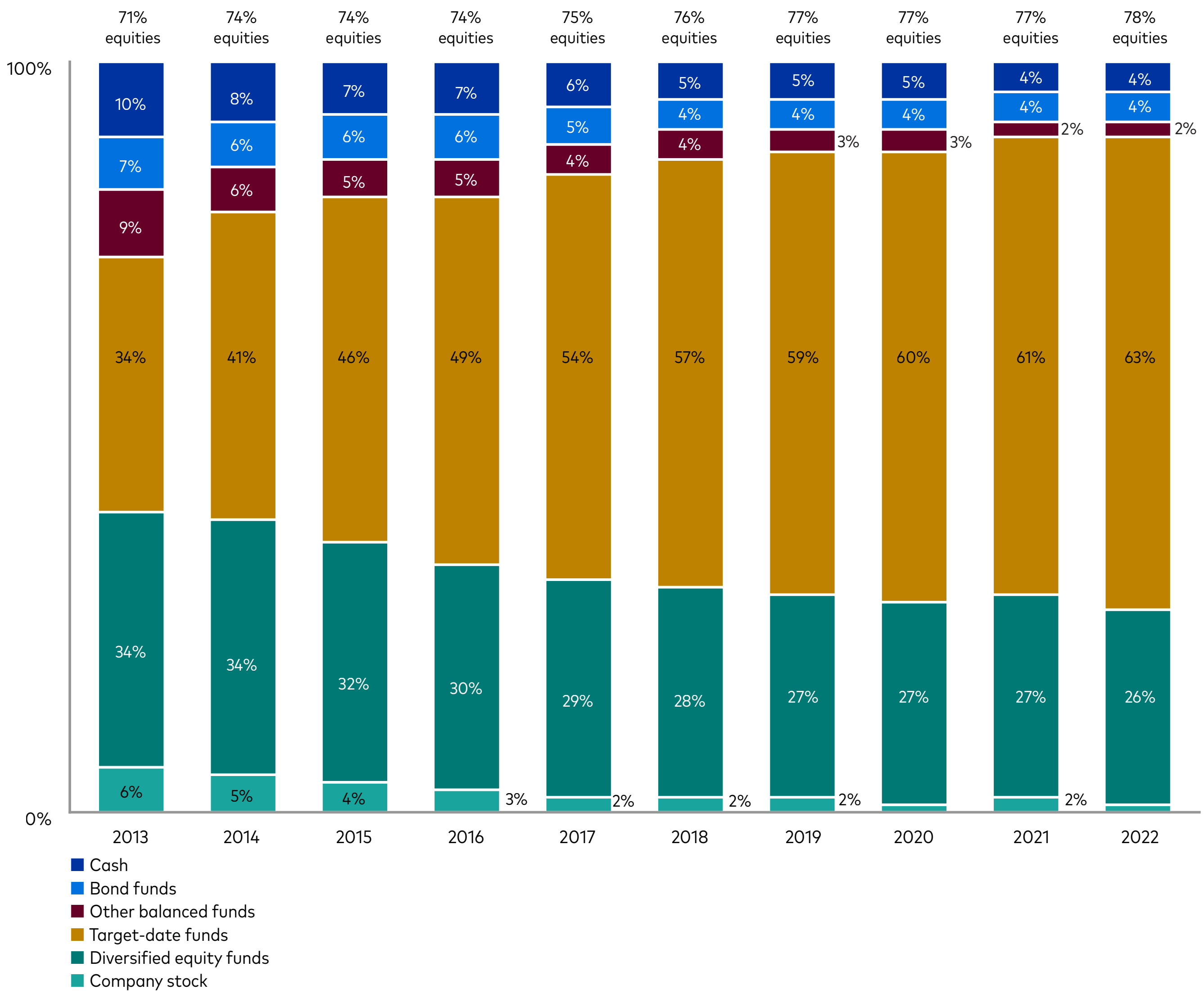
Asset allocation by participant demographics

The average participant-weighted asset allocation to equities was 77% in 2022, and asset allocation decisions varied among participant demographics **(Figure 60)**. In the past, higher-income participants tended to assume somewhat more equity market risk, on average, than lower-income participants. However, with the rising adoption of target-date funds and automatic enrollment, participants of all income segments have similar equity risk.

All participants, regardless of income level, had slightly more than three-quarters of their average account balance allocated to equities in 2022; at the median, participants allocated 86% to equities.

Figure 59. Plan contribution allocation summary

Vanguard defined contribution plans



Source: Vanguard 2023.

Figure 60. Asset allocation by participant demographics, 2022

Vanguard defined contribution plans

		Brokerage	Company stock	Diversified equity funds	Target-date funds	Other balanced funds	Bond funds	Cash	Average equity participant weighted	Median equity participant weighted
	All asset weighted	**1%**	**3%**	**38%**	**40%**	**4%**	**6%**	**8%**	**—**	**—**
	Average participant weighted	**<0.5%**	**2%**	**19%**	**70%**	**2%**	**3%**	**5%**	**77%**	**86%**
Income	<$15,000	1%	2%	33%	49%	3%	6%	6%	81%	89%
	$15,000–$29,999	<0.5%	1%	24%	61%	3%	5%	5%	77%	87%
	$30,000–$49,999	<0.5%	3%	25%	58%	2%	5%	7%	77%	86%
	$50,000–$74,999	<0.5%	3%	30%	51%	3%	5%	8%	77%	86%
	$75,000–$99,999	<0.5%	3%	35%	46%	3%	6%	7%	77%	86%
	$100,000–$149,999	<0.5%	3%	39%	41%	3%	6%	7%	77%	86%
	$150,000+	1%	2%	42%	38%	4%	7%	6%	77%	85%
	Terminated	<0.5%	4%	39%	34%	4%	7%	12%	74%	86%
Age	<25	<0.5%	1%	16%	80%	1%	1%	1%	89%	89%
	25–34	1%	1%	22%	72%	1%	2%	1%	88%	89%
	35–44	1%	2%	32%	57%	2%	3%	3%	85%	89%
	45–54	1%	3%	43%	40%	3%	5%	5%	75%	79%
	55–64	1%	3%	41%	32%	4%	8%	11%	62%	64%
	65+	<0.5%	4%	37%	25%	5%	10%	19%	47%	44%
Gender	Male	1%	3%	40%	37%	4%	6%	9%	77%	86%
	Female	<0.5%	2%	36%	43%	4%	7%	8%	76%	86%
Job tenure (years)	0–1	<0.5%	1%	22%	71%	1%	3%	3%	84%	89%
	2–3	1%	1%	23%	70%	1%	2%	2%	82%	89%
	4–6	1%	1%	24%	67%	1%	3%	3%	81%	89%
	7–9	1%	1%	27%	62%	2%	4%	3%	79%	87%
	10+	1%	3%	42%	32%	4%	8%	10%	69%	76%
Account balance	<$10,000	<0.5%	1%	8%	86%	1%	1%	2%	80%	89%
	$10,000–$24,999	<0.5%	2%	14%	78%	1%	2%	3%	79%	88%
	$25,000–$49,999	<0.5%	2%	19%	71%	2%	3%	4%	77%	86%
	$50,000–$99,999	<0.5%	2%	23%	63%	2%	4%	6%	76%	85%
	$100,000–$149,999	<0.5%	2%	28%	56%	3%	4%	7%	74%	82%
	$150,000–$199,999	<0.5%	2%	31%	51%	3%	5%	7%	73%	81%
	$200,000–$249,999	1%	2%	34%	46%	3%	5%	8%	73%	80%
	$250,000+	1%	3%	45%	29%	4%	8%	10%	71%	78%

Source: Vanguard 2023.

Participants younger than 45 had the highest equity exposure, with about 89% of plan assets, at the median, invested in equities in 2022.

Equity allocations were lowest for participants older than 65, many of whom are retired or will be soon. Participants older than 65 had a median equity allocation of 44%. The rising use of target-date funds has markedly changed the age-related variation in equity exposure (**see page 78**).

Asset allocation by industry group

In 2022, asset allocations varied somewhat by industry group (**Figure 61**). Participants in the media, entertainment, and leisure group had the most aggressive allocations and the highest allocations to target-date funds, while participants in the agriculture, mining, and construction group had high allocations to company stock and the highest allocations to cash.

Figure 61. Asset allocation by industry group, 2022

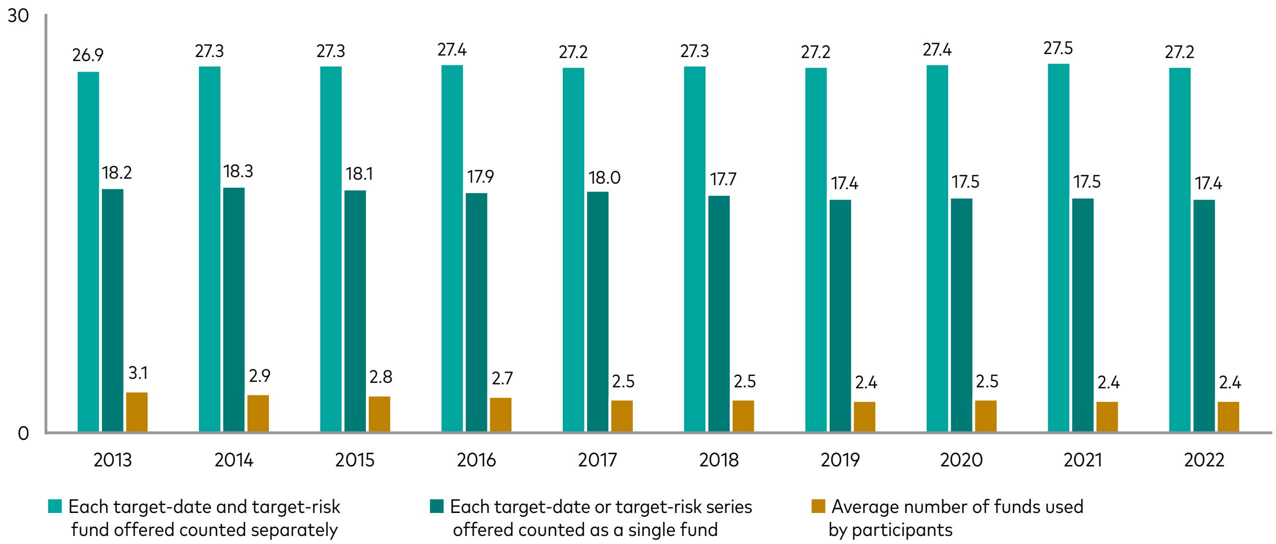
Vanguard defined contribution plans

		Brokerage	Company stock	Diversified equity funds	Target-date funds	Other balanced funds	Bond funds	Cash	Average equity participant weighted	Median equity participant weighted
All asset weighted		1%	3%	38%	40%	4%	6%	8%	—	—
Average participant weighted		<0.5%	2%	19%	70%	2%	3%	5%	77%	86%
Industry group	Media, entertainment, and leisure	2%	<0.5%	34%	50%	5%	5%	4%	80%	89%
	Business, professional, and nonprofit	1%	3%	42%	37%	3%	7%	7%	77%	86%
	Transportation, utilities, and communications	<0.5%	5%	41%	32%	5%	7%	10%	77%	86%
	Education and health	1%	<0.5%	36%	43%	5%	7%	7%	77%	86%
	Finance, insurance, and real estate	1%	2%	39%	39%	3%	7%	11%	76%	86%
	Manufacturing	<0.5%	3%	36%	43%	3%	6%	9%	76%	86%
	Agriculture, mining, and construction	<0.5%	6%	32%	39%	4%	5%	13%	76%	86%
	Wholesale and retail trade	<0.5%	3%	44%	34%	1%	8%	11%	76%	86%

Source: Vanguard 2023.

Figure 62. Average number of investment options offered and used

Vanguard defined contribution plans



Source: Vanguard 2023.

Plan investment options

Participant DC plan investment decisions occur within the context of a set or a menu of choices offered by the employer.

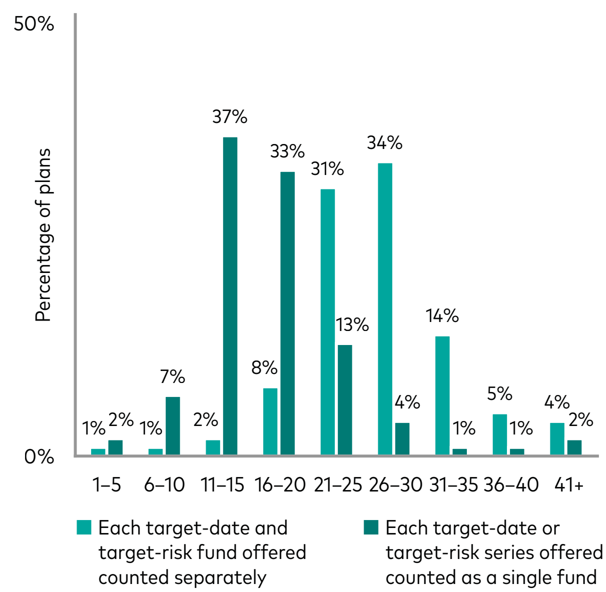
Number of options offered

The average Vanguard plan offered 27.2 investment options in 2022, down slightly from 27.5 in 2021, although generally in line with the past 10 years **(Figure 62)**. When each distinct target-date (or target-risk) fund was counted as a single offering, the average number of investment options in 2022 was 17.4. By this measure, sponsors have dropped one investment option on a net basis since 2013.

The number of funds used by participants has declined over the past 10 years. This is directly attributable to the growth of target-date funds. Counting a target-date or target-risk series as a single-fund offering, the median plan sponsor offered 16 investment options in 2022. Only 8% of plans offered more than 25 distinct investment options, while 9% of plans offered 10 or fewer **(Figure 63)**.

Figure 63. Number of options offered, 2022

Vanguard defined contribution plans



Source: Vanguard 2023.

Types of options offered

Nearly all Vanguard DC plans offered an array of investment options covering four major investment categories: equities, bonds, balanced funds (including target-date and target-risk strategies), and money market or stable value options **(Figure 64)**. Given most sponsors' desire to promote equity-oriented portfolios for retirement, diversified equity funds continued to be the most popular type of fund offered. Equity offerings typically included both indexed and actively managed U.S. stock funds, including large-, mid-, or small-capitalization stocks, as well as one or more international funds.

Figure 64. Types of investment options offered, 2022
Vanguard defined contribution plans

	Number of participants				
	All	**<500**	**500–999**	**1,000–4,999**	**5,000+**
Cash	**99%**	**98%**	**<99.5%**	**<99.5%**	**99%**
Money market	70%	71%	74%	68%	63%
Stable value/Investment contract	68%	62%	71%	72%	81%
Bond funds	**98%**	**97%**	**<99.5%**	**<99.5%**	**100%**
Active	80%	74%	82%	85%	93%
Index	89%	88%	87%	89%	96%
Inflation-protected securities	35%	34%	33%	37%	39%
Multisector	8%	6%	8%	11%	7%
High yield	17%	18%	18%	17%	14%
International	19%	18%	20%	21%	15%
Global	5%	3%	6%	9%	6%
Emerging markets	1%	<0.5%	1%	1%	1%
Balanced funds	**99%**	**99%**	**<99.5%**	**<99.5%**	**100%**
Traditional balanced	62%	68%	60%	57%	49%
Target-risk	13%	19%	10%	7%	3%
Target-date	96%	92%	98%	<99.5%	100%
Equity funds	**99%**	**98%**	**<99.5%**	**100%**	**100%**
Domestic equity funds	**99%**	**98%**	**<99.5%**	**100%**	**100%**
Large-cap index	98%	97%	<99.5%	<99.5%	99%
Large-cap active	90%	89%	90%	91%	89%
Large-cap value	87%	88%	86%	89%	78%
Large-cap growth	91%	90%	93%	92%	90%
Large-cap blend	98%	97%	<99.5%	<99.5%	99%
Mid-cap index	83%	79%	91%	86%	84%
Mid-cap active	52%	55%	47%	52%	46%
Small-cap index	63%	64%	68%	64%	46%
Small-cap active	63%	63%	68%	64%	61%
Socially responsible	15%	12%	13%	17%	25%
International equity funds	**97%**	**96%**	**98%**	**99%**	**99%**
Index international	79%	73%	79%	86%	94%
Active international	83%	79%	88%	84%	87%
Emerging markets	35%	33%	36%	39%	31%
Global equity funds	**17%**	**21%**	**15%**	**11%**	**15%**
Sector funds	**38%**	**39%**	**39%**	**39%**	**26%**
Company stock	**8%**	**2%**	**6%**	**12%**	**27%**
Self-directed brokerage	**20%**	**16%**	**16%**	**22%**	**38%**
Managed account program	**41%**	**20%**	**45%**	**59%**	**81%**

A stable value investment is neither insured nor guaranteed by the U.S. government. There is no assurance that the investment will be able to maintain a stable net asset value, and it is possible to lose money in such an investment.

Source: Vanguard 2023.

Virtually all plans offered international equity funds, but only one-third offered separate emerging markets funds. Many of the broader international funds already include emerging markets exposure, as do target-date and some balanced strategies. Thirty-eight percent of plans offered sector funds, such as technology or health care funds **(Figure 65)**. One in 5 plans offered a self-directed brokerage feature.

Meanwhile, plan sponsor interest in target-date funds remained strong, with 96% of plans offering them at year-end 2022.

The types of investment options offered did not vary substantially by plan size. However, large plans were much more likely than small plans to offer company stock, stable value funds, self-directed brokerage accounts, and managed account programs. In addition, larger plans have been quicker than smaller plans to add target-date and socially responsible funds. Smaller plans were more likely than large plans to offer sector funds.

Figure 65. Types of sector options offered, 2022

Vanguard defined contribution plans

	Number of participants				
	All	**<500**	**500–999**	**1,000–4,999**	**5,000+**
Sector funds	**38%**	**39%**	**39%**	**39%**	**26%**
REIT	32%	32%	33%	35%	25%
Health care	8%	12%	8%	5%	3%
Energy	5%	6%	4%	3%	3%
Precious metals	2%	3%	1%	2%	1%
Technology	3%	3%	4%	3%	2%
Utilities	1%	1%	2%	1%	2%
Natural resources	1%	1%	1%	1%	1%
Financials	<0.5%	<0.5%	0%	<0.5%	1%
Communications	<0.5%	<0.5%	<0.5%	<0.5%	1%
Consumer	<0.5%	<0.5%	<0.5%	1%	1%
Industrials	<0.5%	0%	0%	<0.5%	1%

Source: Vanguard 2023.

Tiering

Tiering is a clear, effective way to present plan investment choices to participants. Investment options are presented in categories, or tiers. Typically, tiers are all-in-one options, such as target-date or risk-based balanced funds, an index core, and supplemental investment options. Many Vanguard plan sponsors tier their investment lineup.

Index core

Offering a passive (or index) core is a newer development in investment menu design. A passive core is a comprehensive set of low-cost index options that span the global capital markets. In our definition, a passive core, at a minimum, consists of four options covering U.S. equities, non-U.S. equities, U.S. taxable bonds, and cash. A passive core of these four options offers participants broad diversification, varying levels of risk exposure, and very low investment costs.

In 2022, 69% of Vanguard plans offered at least four options within an index core, and nearly 7 in 10 Vanguard participants were offered an index core **(Figure 66)**. In addition, many of these plans also offered a passive target-date fund to further simplify participant portfolio construction. Sixty-seven percent of plans offered both an index core and passive target-date funds, and 7 in 10 participants had access to these fund lineups. Compare this with 2013, when 49% of plans offered an index core, and 43% offered both an index core and passive target-date funds **(Figure 67)**. Fifty-nine percent of participants were offered an index core in 2013, with 57% offered both an index core and passive target-date funds **(Figure 68)**.

Figure 66. Index core offered, 2022

Vanguard defined contribution plans

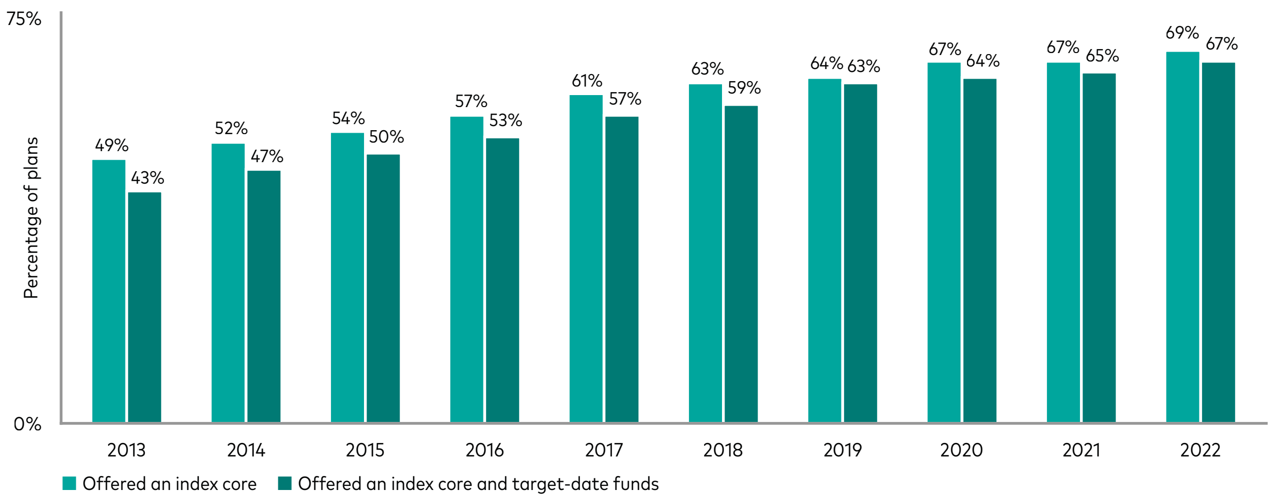
	Number of participants				
	All	**<500**	**500–999**	**1,000–4,999**	**5,000+**
Percentage of plans offering an index core	69%	63%	71%	77%	75%
Percentage of plans offering an index core and target-date funds	67%	59%	69%	77%	75%
Percentage of participants offered an index core	68%	68%	72%	78%	66%
Percentage of participants offered an index core and target-date funds	68%	64%	69%	77%	66%

An index core includes broadly diversified index funds for U.S. stocks, U.S. bonds, and international stocks. At a minimum, the definition includes index funds for large-cap U.S. stocks, intermediate or long-term bonds, and developed markets.

Source: Vanguard 2023.

Figure 67. Index core offered trend, plans

Vanguard defined contribution plans

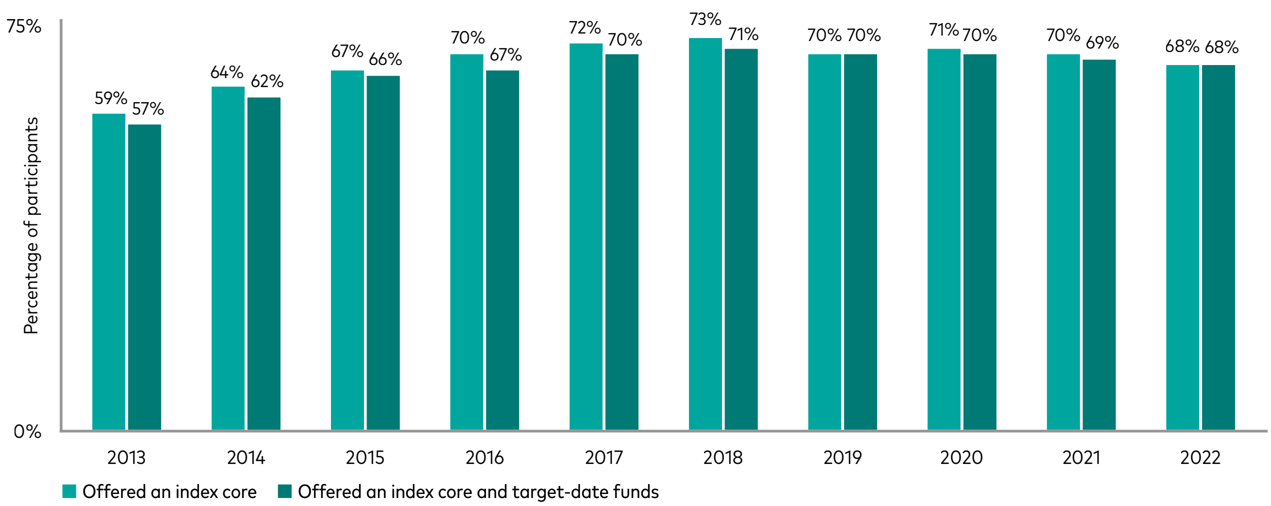


An index core includes broadly diversified index funds for U.S. stocks, U.S. bonds, and international stocks. At a minimum, the definition includes index funds for large-cap U.S. stocks, intermediate or long-term bonds, and developed markets.

Source: Vanguard 2023.

Figure 68. Index core offered trend, participants

Vanguard defined contribution plans



An index core includes broadly diversified index funds for U.S. stocks, U.S. bonds, and international stocks. At a minimum, the definition includes index funds for large-cap U.S. stocks, intermediate or long-term bonds, and developed markets.

Source: Vanguard 2023.

Default funds

Increasingly, participants are being directed into plan sponsor-selected default investments rather than making their own active investment choices. Default investing is becoming more important because of concerns about participants' level of investment knowledge and the growing use of automatic enrollment. In response, the U.S. Department of Labor (DOL), acting under the Pension Protection Act of 2006, deemed three types of default investments as eligible for special fiduciary protection. Known as qualified default investment alternatives (QDIAs), these options include target-date funds, other balanced funds, and managed account advisory services.

Nearly all Vanguard plans had designated a default fund in 2022, and 93% had selected a target-date or balanced fund option as the default option **(Figure 69)**. In 2013, about 1 in 7 plan sponsors had designated a money market or stable value fund as the default option **(Figure 70)**.

Eighty-eight percent of plans had specifically designated a QDIA under the DOL's regulations in 2022. Typically, these were plans with automatic enrollment or employer contributions other than a match. Among plans choosing a QDIA, 98% of designated QDIAs were target-date funds and 2% were balanced funds.

Figure 69. Default fund designations, 2022

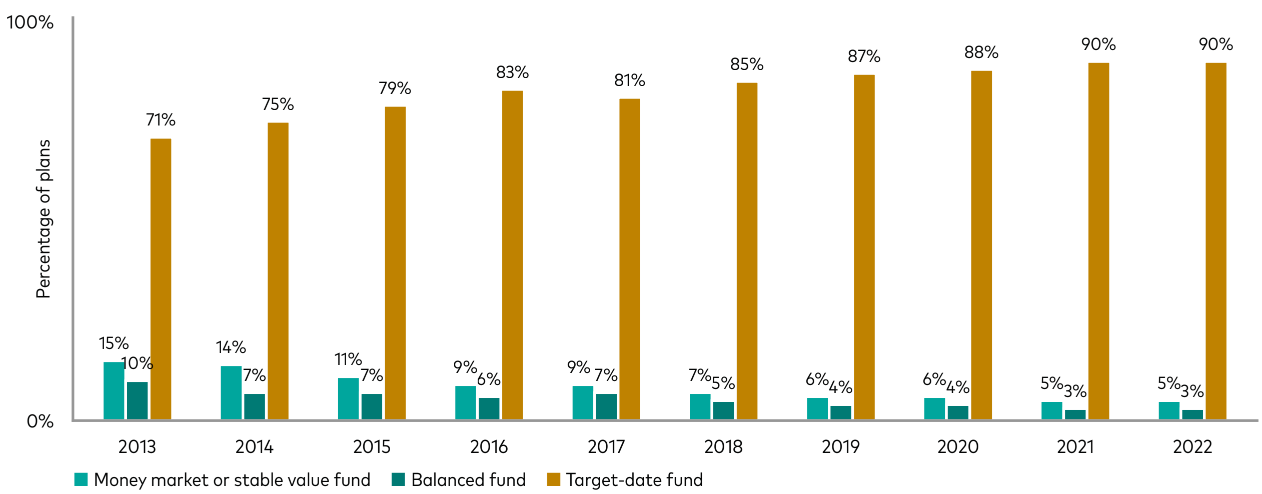
Vanguard defined contribution plans

		QDIA plans	Non-QDIA plans	All plans
Among all plans	**Target-date fund**	86%	4%	90%
	Balanced fund	2%	1%	3%
	Money market or stable value	–	5%	5%
	Total plans designating default	**88%**	**10%**	**98%**
Among plans designating a QDIA	**Target-date fund**	98%	–	–
	Balanced fund	2%	–	–
	Total plans designating a QDIA	**100%**	–	–

Source: Vanguard 2023.

Figure 70. Default fund designation trend

Vanguard defined contribution plans



Source: Vanguard 2023.

Number of options used

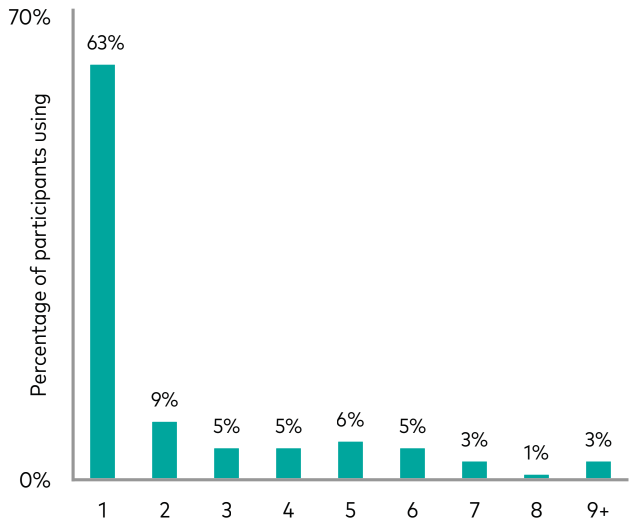
Although sponsors tend to offer a large menu of investment choices, 63% of participants used only one fund in 2022 **(Figure 71)**. On average, Vanguard participants used 2.4 options, and the median participant used just 1.0 option—fewer than the 3.1 options used in 2013.

One reason for this change is the growing number of single target-date fund investors. Of the 63% of participants who held a single-fund option in their account in 2022, 93% were invested in a single target-date fund **(Figure 72)**. Since 2013, the percentage of single-fund investors holding cash investments has declined from 11% to 3% due to the growth of automatic enrollment, the availability of target-date funds, and a shift in default fund designations by employers.

Figure 71. Number of options used, 2022

Vanguard defined contribution plans

Percentage of participants using

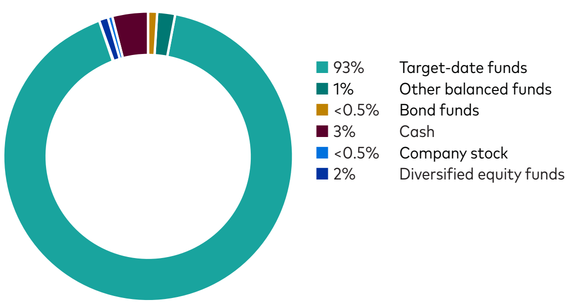


Source: Vanguard 2023.

Figure 72. Single-fund holders, 2022

Vanguard defined contribution plans

Percentage of single-fund participants using



		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Percentage of participants holding a single fund		44%	48%	51%	55%	59%	60%	62%	60%	61%	63%
Percentage of single-fund participants using	Cash	11%	8%	7%	6%	5%	4%	4%	4%	4%	3%
	Bond funds	1%	1%	1%	1%	<0.5%	1%	<0.5%	<0.5%	<0.5%	<0.5%
	Traditional balanced funds	13%	5%	4%	6%	5%	5%	5%	2%	1%	1%
	Target-date funds	69%	81%	84%	83%	87%	87%	88%	91%	92%	93%
	Diversified equity funds	4%	4%	3%	3%	2%	2%	2%	2%	2%	2%
	Company stock	2%	1%	1%	1%	1%	1%	1%	1%	<0.5%	<0.5%

Source: Vanguard 2023.

Types of options used

Which options offered by DC plans do participants actually use? A balanced fund (including target-date and other balanced funds) was the most common participant holding (87% of all participants) in 2022, followed by a diversified domestic equity fund (30% of all participants) **(Figure 73)**. Among the balanced options held, target-date funds were overwhelmingly more likely to be held (83% of participants offered) than traditional balanced funds (12% of participants offered) or target-risk funds (10% of participants offered).

Ninety-five percent of participants were offered a large-cap U.S. equity index fund in 2022, yet only about 1 in 7 used that option. However, participants holding balanced strategies (whether traditional, target-date, or target-risk) are often holding substantial equity index exposure.

Only 1 in 6 participants chose to hold a bond fund, and about 1 in 8 chose a money market or stable value cash investment.

Most Vanguard DC participants were offered a stand-alone international equity fund, but only 1 in 5 chose to use one. Emerging markets funds were offered and used even less frequently, with 1 in 3 participants having access, but only 8% choosing to use one. Increasingly, international equity exposure is occurring through packaged investment programs, such as target-date funds.

Figure 73. Types of sector options offered and used, 2022

Vanguard defined contribution plans

	Percentage of plans offering	Percentage of participants offered	Percentage of participants offered using	Percentage of all participants using
Cash	**99%**	**>99.5%**	**12%**	**12%**
Money market	70%	62%	6%	4%
Stable value/Investment contract	68%	83%	10%	9%
Bond funds	**98%**	**>99.5%**	**17%**	**17%**
Active	80%	93%	7%	<0.5%
Index	89%	95%	14%	13%
Inflation-protected securities	35%	39%	3%	1%
Multisector	8%	8%	2%	<0.5%
High-yield	17%	11%	3%	<0.5%
International	19%	17%	3%	1%
Global	5%	5%	2%	<0.5%
Emerging markets	1%	1%	2%	<0.5%
Balanced funds	**99%**	**>99.5%**	**87%**	**87%**
Traditional balanced	62%	54%	12%	6%
Target-risk	13%	4%	10%	<0.5%
Target-date	96%	>99.5%	83%	83%
Equity funds	**99%**	**>99.5%**	**30%**	**30%**
Domestic equity funds	**99%**	**>99.5%**	**29%**	**29%**
Large-cap index	98%	95%	23%	22%
Large-cap active	90%	92%	16%	14%
Large-cap value	87%	79%	9%	7%
Large-cap growth	91%	86%	13%	11%
Large-cap blend	98%	99%	23%	23%
Mid-cap index	83%	82%	14%	11%
Mid-cap active	52%	43%	7%	3%
Small-cap index	63%	46%	11%	5%
Small-cap active	63%	55%	7%	4%
Socially responsible	15%	31%	5%	2%
International equity funds	**97%**	**99%**	**19%**	**19%**
Index international	79%	92%	14%	13%
Active international	83%	87%	10%	8%
Emerging markets	35%	34%	8%	3%
Global equity funds	**17%**	**18%**	**3%**	**1%**
Sector funds	**38%**	**27%**	**6%**	**2%**
Company stock	**8%**	**22%**	**36%**	**8%**
Self-directed brokerage	**20%**	**41%**	**1%**	**<0.5%**
Managed account program	**41%**	**77%**	**9%**	**7%**

Source: Vanguard 2023.

Sector funds were offered to one-quarter of participants in 2022 and were used infrequently; only 6% of participants offered these funds used them **(Figure 74)**.

Four in 10 Vanguard participants were offered a self-directed brokerage feature. Self-directed brokerage accounts allow participants to choose investments from thousands of individual stocks, bonds, and mutual funds. In plans offering this feature, only 1% of these participants used it in 2022. In these plans, about 2% of plan assets were invested in the self-directed brokerage feature.[3]

Figure 74. Types of sector options offered and used, 2022

Vanguard defined contribution plans

	Percentage of plans offering	Percentage of participants offered	Percentage of participants offered using	Percentage of all participants using
Sector funds	**38%**	**27%**	**6%**	**2%**
REIT	32%	25%	5%	1%
Health care	8%	3%	7%	<0.5%
Energy	5%	2%	5%	<0.5%
Precious metals	2%	1%	2%	<0.5%
Technology	3%	1%	5%	<0.5%
Utilities	1%	1%	2%	<0.5%
Natural resources	1%	1%	4%	<0.5%
Financials	<0.5%	<0.5%	1%	<0.5%
Communications	<0.5%	<0.5%	1%	<0.5%
Consumer	<0.5%	<0.5%	2%	<0.5%
Industrials	<0.5%	<0.5%	1%	<0.5%

Source: Vanguard 2023.

3 For an analysis of participant brokerage holdings in DC plans, see John A. Lamancusa and Jean A. Young, ***The Brokerage Option in DC Plans***. Vanguard research. May 2021.

The offering and use of equity funds that incorporate environmental, social, and governance (ESG) factors have been increasing modestly over the past five years **(Figure 75)**. Larger plans have been more likely than smaller plans to include these funds in their investment lineups.

Figure 75. Socially responsible funds offered and used

Vanguard defined contribution plans

		2018	2019	2020	2021	2022
All plans	Percentage of plans offering socially responsible funds	10%	11%	12%	13%	15%
	Percentage of participants offered socially responsible funds	22%	27%	26%	30%	31%
	Percentage of participants offered socially responsible funds using	4%	4%	5%	6%	5%
Plans with <1,000 participants	Percentage of plans offering socially responsible funds	8%	9%	10%	11%	13%
	Percentage of participants offered socially responsible funds	9%	9%	10%	11%	14%
	Percentage of participants offered socially responsible funds using	3%	4%	3%	3%	3%
Plans with 1,000+ participants	Percentage of plans offering socially responsible funds	14%	14%	16%	18%	19%
	Percentage of participants offered socially responsible funds	23%	29%	28%	31%	32%
	Percentage of participants offered socially responsible funds using	4%	4%	5%	6%	5%

Source: Vanguard 2023.

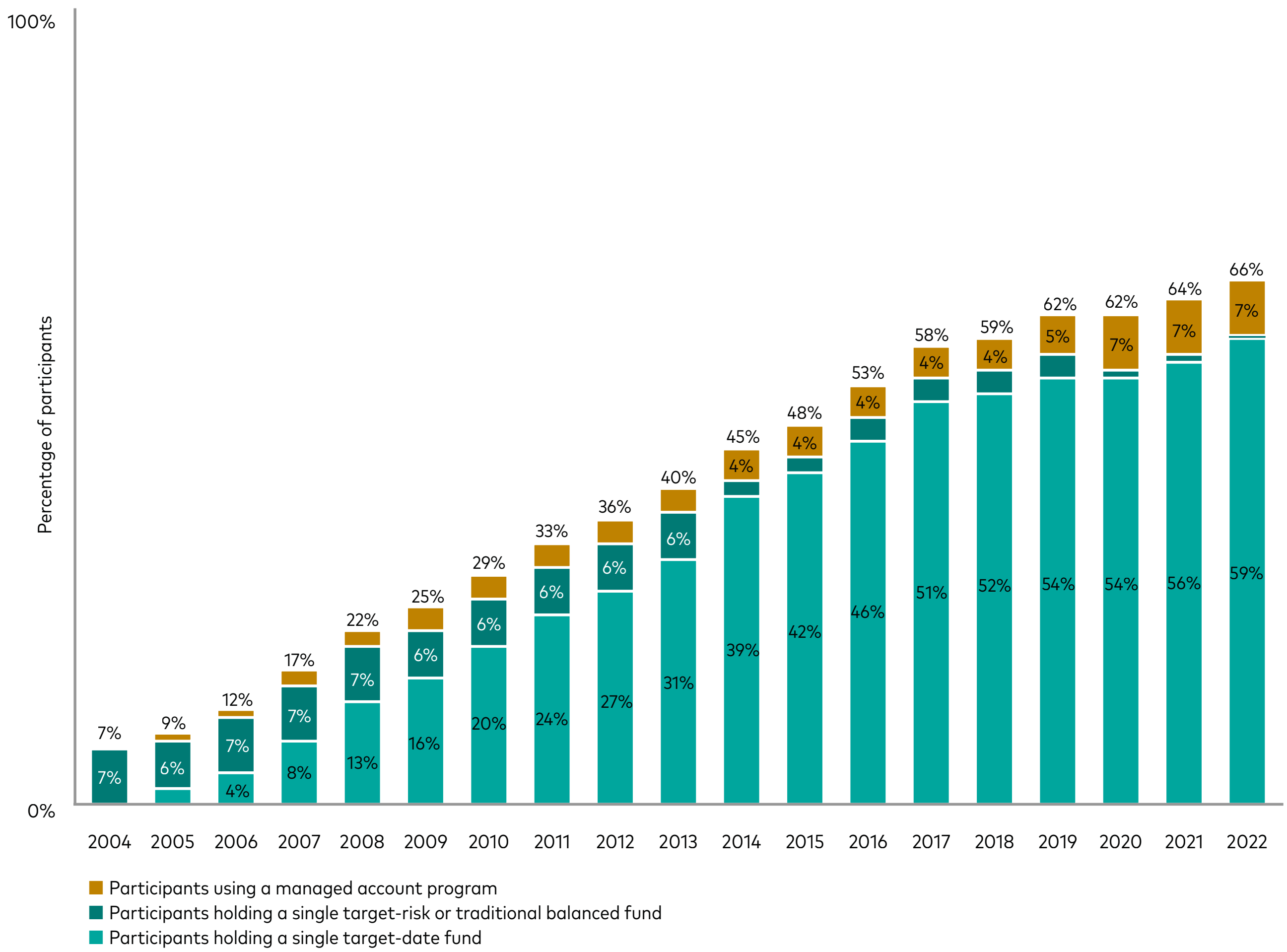
Professionally managed allocations

The expanded offering and use of professionally managed allocations is the most notable effect of plan investment menus on participant choices. Participants with professionally managed allocations have their entire account balance invested in a single target-date, target-risk, or traditional balanced fund, or in a managed account advisory service.

In 2022, 66% of Vanguard participants were invested in a professionally managed allocation **(Figure 76)**.

Figure 76. Participants with professionally managed allocations

Vanguard defined contribution plans



Source: Vanguard 2023.

Driving this development is the growing use of target-date funds. Fifty-nine percent of participants were invested in a single target-date fund in 2022, nearly twice as many as in 2013. These professionally managed investment options signal a shift in responsibility for investment decision-making away from the participant and toward employer-selected investment and advice programs.

There were distinct differences between participants with professionally managed allocations and those without, as well as distinctions among participants with each of the three types of managed allocations **(Figure 77)**.

Participants who constructed their own portfolios tended to be older and longer tenured with higher average and median balances. Single target-date fund investors were shorter tenured with lower account balances. They were more likely to be in an automatic enrollment plan and to have been defaulted into the fund. In contrast, managed account investors were older, longer tenured, and had higher balances. Finally, some plan sponsors have opted to reenroll participants into the plan's QDIA. This most often occurs when changing providers. One percent of single target-date fund investors were reenrolled in 2022.

Figure 77. Demographic characteristics of participants with professionally managed allocations, 2022

Vanguard defined contribution plans

	All	All other participants	Single target-date fund	Single balanced fund	Managed account
Percentage of participants	–	34%	59%	<1%	7%
Percentage male	56%	60%	54%	62%	57%
Median age	43	50	39	49	49
Median tenure	7	14	4	13	11
Average account balance	$112,572	$219,044	$45,386	$110,556	$158,321
Median account balance	$27,376	$91,459	$11,780	$37,403	$72,509
Percentage web-registered	79%	90%	70%	69%	98%
Percentage defaulted under automatic enrollment	41%	–	73%	17%	–
Percentage defaulted under reenrollment	1%	–	1%	<0.5%	–

Source: Vanguard 2023.

Professionally managed allocations by participant demographics

The percentage of participants with a professionally managed allocation varied somewhat by participant demographics in 2022 **(Figure 78)**. Younger and less-tenured participants were more likely to be single target-date fund investors. Higher-paid, higher-balance participants tended to use managed account programs more often. However, use of the strategy was distributed evenly across most demographics, highlighting the value managed accounts can provide to various cohorts of participants.

Participants in automatic enrollment plans were more likely to have a professionally managed allocation than were those in voluntary arrangements because of a higher percentage of single target-date fund investors.

Figure 78. Professionally managed allocations by demographics, 2022

Vanguard defined contribution plans

		Participants holding a single target-date fund	Participants holding a single target-risk or traditional balanced fund	Participants using a managed account program	Total
All participants		**59%**	**<1%**	**7%**	**66%**
Income	<$15,000	83%	<0.5%	5%	88%
	$15,000–$29,999	84%	<0.5%	5%	88%
	$30,000–$49,999	72%	<0.5%	7%	79%
	$50,000–$74,999	60%	<0.5%	10%	70%
	$75,000–$99,999	51%	<0.5%	12%	63%
	$100,000–$149,999	45%	<0.5%	12%	57%
	$150,000+	40%	<1%	11%	51%
	Terminated	52%	<1%	5%	58%
Age	<25	86%	<0.5%	2%	88%
	25–34	75%	<0.5%	4%	80%
	35–44	63%	<1%	7%	70%
	45–54	51%	<1%	8%	60%
	55–64	43%	<1%	9%	53%
	65+	35%	1%	8%	44%
Gender	Male	55%	<1%	7%	63%
	Female	61%	<1%	7%	68%
Job tenure (years)	0–1	84%	<0.5%	3%	87%
	2–3	75%	<0.5%	5%	80%
	4–6	69%	<0.5%	7%	76%
	7–9	61%	<1%	7%	70%
	10+	34%	<1%	10%	45%
Account balance	<$10,000	84%	<0.5%	3%	87%
	$10,000–$24,999	68%	<1%	6%	75%
	$25,000–$49,999	58%	<1%	8%	66%
	$50,000–$99,999	48%	<1%	9%	58%
	$100,000–$149,999	39%	<1%	10%	51%
	$150,000–$199,999	33%	<1%	11%	45%
	$200,000–$249,999	29%	<1%	11%	41%
	$250,000+	17%	<1%	11%	28%
Plan design	Automatic enrollment	63%	<0.5%	7%	70%
	Voluntary enrollment	50%	<1%	7%	58%

Source: Vanguard 2023.

Target-date funds

Target-date funds base portfolio allocations on an expected retirement date, with allocations growing more conservative as the participant approaches the fund's target year. The percentage of plans offering target-date funds has grown from 86% in 2013 to 96% in 2022 **(Figure 79)**. At year-end 2022, nearly all participants were in plans offering target-date funds.

Among plans offering the strategy, target-date options accounted for 40% of all plan assets **(Figure 80)**. In these plans, 63% of all contributions were directed to target-date funds.

Figure 79. Use of target-date funds

Vanguard defined contribution plans

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Percentage of all plans offering target-date funds	86%	88%	90%	92%	92%	93%	94%	95%	95%	96%
Percentage of recordkeeping assets in target-date funds	19%	23%	26%	28%	33%	35%	37%	37%	38%	40%
Percentage of all contributions directed to target-date funds	34%	41%	46%	49%	54%	57%	59%	60%	61%	63%
Percentage of all participants offered target-date funds	90%	97%	98%	97%	97%	97%	98%	99%	>99.5%	>99.5%
Percentage of all participants using target-date funds	55%	64%	69%	72%	75%	77%	78%	80%	81%	83%

Source: Vanguard 2023.

Note: 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.

Figure 80. Plan use of target-date funds

Vanguard defined contribution plans offering target-date funds

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Percentage of plan assets invested in target-date funds		**20%**	**24%**	**26%**	**29%**	**33%**	**35%**	**37%**	**37%**	**38%**	**40%**
Percentage of plan contributions invested in target-date funds		**38%**	**42%**	**47%**	**50%**	**55%**	**58%**	**60%**	**60%**	**61%**	**63%**
Distribution of percentage of plan assets in target-date funds	**<10%**	21%	16%	13%	11%	9%	7%	6%	5%	5%	5%
	10%–19%	31%	28%	26%	22%	19%	16%	14%	13%	11%	10%
	20%–29%	23%	25%	25%	25%	23%	23%	20%	20%	19%	17%
	30%–39%	10%	11%	13%	15%	18%	18%	20%	22%	23%	21%
	40%–49%	5%	7%	8%	9%	10%	12%	13%	13%	14%	17%
	50%+	10%	13%	15%	18%	21%	24%	27%	27%	28%	30%
Distribution of percentage of plan contributions to target-date funds	**<10%**	7%	6%	4%	4%	3%	2%	1%	2%	2%	2%
	10%–19%	14%	10%	8%	7%	6%	4%	4%	3%	2%	3%
	20%–29%	21%	17%	14%	10%	8%	8%	7%	6%	5%	3%
	30%–39%	22%	22%	18%	17%	14%	12%	9%	9%	7%	7%
	40%–49%	16%	17%	21%	20%	19%	18%	16%	14%	14%	12%
	50%+	20%	28%	35%	42%	50%	56%	63%	66%	70%	73%

Source: Vanguard 2023.

Note: 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.

Participant use of target-date funds

Among participants using target-date funds, 61% of their account balances were invested in these funds **(Figure 81)**. They directed 82% of their 2022 total contributions to target-date funds. Participants invest in target-date funds in one of two ways. "Pure" investors hold a single target-date fund. They accounted for 71% of all target-date investors in 2022. The remaining target-date investors are "mixed" investors. They hold a target-date fund in combination with other investments or, less commonly, multiple target-date funds and/or other options.

Figure 81. Participant use of target-date funds

Vanguard defined contribution plan participants using target-date funds

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Percentage of all participants offered target-date funds		**90%**	**97%**	**98%**	**97%**	**97%**	**97%**	**98%**	**99%**	**>99.5%**	**>99.5%**
Percentage of participants using target-date funds when offered		**61%**	**66%**	**70%**	**74%**	**75%**	**79%**	**80%**	**80%**	**82%**	**83%**
Percentage of participant account balances in target-date funds		**48%**	**50%**	**51%**	**53%**	**57%**	**58%**	**60%**	**59%**	**60%**	**61%**
Percentage of total participant and employer contributions in target-date funds		**74%**	**75%**	**76%**	**78%**	**80%**	**81%**	**81%**	**81%**	**81%**	**82%**
Distribution of percentage of participant assets in target-date funds	1%–24%	17%	15%	14%	13%	11%	11%	10%	11%	10%	10%
	25%–49%	10%	9%	9%	8%	8%	8%	8%	9%	9%	8%
	50%–74%	8%	7%	7%	6%	5%	5%	5%	4%	4%	4%
	75%–99%	7%	7%	7%	7%	7%	6%	6%	6%	6%	6%
	100%	58%	62%	63%	66%	69%	70%	71%	70%	71%	72%
Distribution of percentage of total participant and employer contributions in target-date funds	1%–24%	9%	9%	8%	8%	6%	6%	6%	7%	6%	6%
	25%–49%	8%	8%	8%	7%	7%	6%	7%	8%	8%	7%
	50%–74%	7%	6%	6%	4%	4%	4%	4%	4%	4%	4%
	75%–99%	5%	8%	5%	5%	4%	4%	4%	3%	3%	3%
	100%	71%	69%	73%	76%	79%	80%	79%	78%	79%	80%
Percentage of participants owning	One target-date fund only	56%	60%	62%	65%	67%	68%	69%	67%	69%	71%
	One target-date fund plus other funds	36%	33%	31%	28%	26%	26%	25%	27%	25%	23%
	Two or more target-date funds only	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
	Two or more target-date funds plus other funds	6%	5%	5%	5%	5%	4%	4%	4%	4%	4%

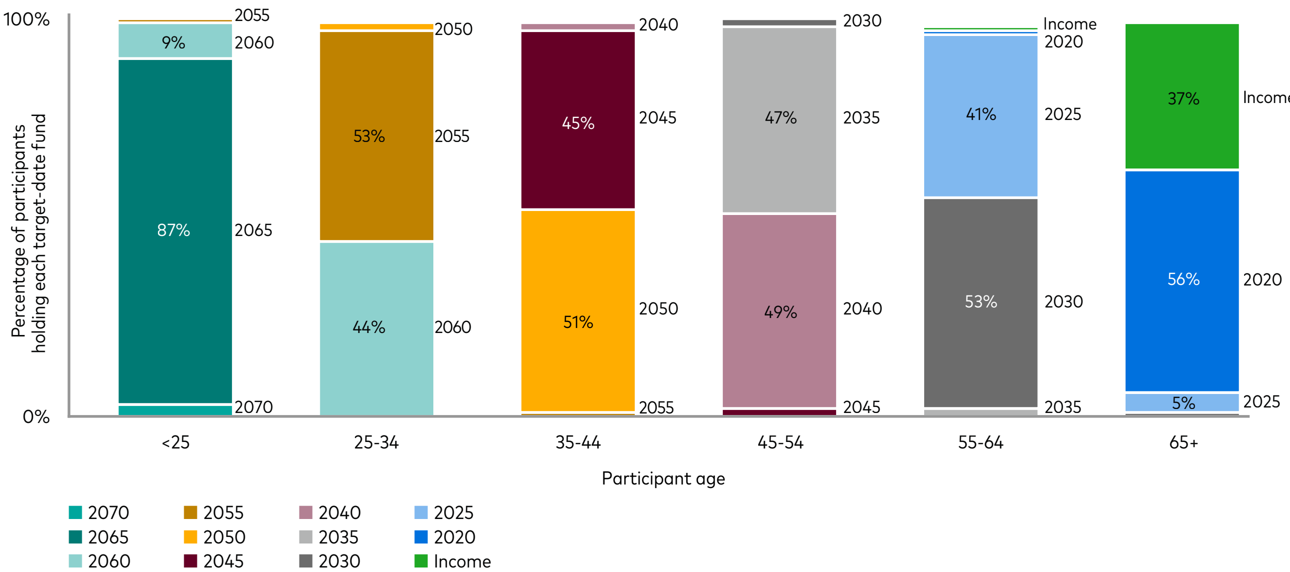
Source: Vanguard 2023.

Mixed target-date investors arise through both sponsor action and participant choice. Sponsor actions include employer contributions in company stock; nonelective contributions to the plan's default fund; recordkeeping corrections applied to the plan's default fund; or mapping of assets from an existing investment option to the default fund because of a plan menu change. Mixed investors who choose to combine a target-date fund with other plan options appear to pursue a range of reasonable diversification strategies, although they do not fit within the all-in-one portfolio approach of the target-date concept.

Single target-date fund investors appeared to select, or are defaulted into, a target-date fund with an appropriate target date **(Figure 82)**. More than one-half of participants ages 25 to 34 were invested in a 2055 target-date fund in 2022, and most of the remaining participants were in a 2060 target-date fund. Similarly, 53% of participants ages 55 to 64 were invested in a 2030 target-date fund, and most of the remaining participants were in a 2025 target-date fund.

Figure 82. Target-date fund use by age, 2022

Vanguard defined contribution plan participants holding a single target-date fund (59% of all participants)



	<25	25–34	35–44	45–54	55–64	65+
Percentage of single target-date fund holders	7%	30%	27%	19%	13%	4%

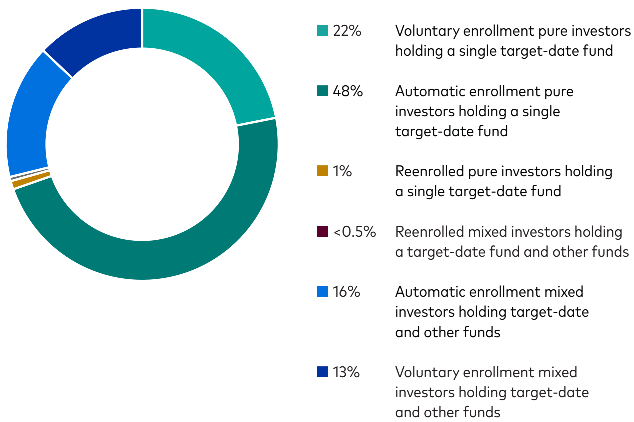
Source: Vanguard 2023.

Automatic enrollment into a target-date fund default is one important factor explaining the increase in the number of pure target-date investors. However, a large percentage of pure investors voluntarily selected target-date options.

Of the 71% of participants who were pure investors in 2022, a portion of them were in plans not offering automatic enrollment. One-third of pure investors were in plans where participants made the choice to select the fund **(Figure 83)**.

Figure 83. Plan design and target-date funds, 2022

Vanguard defined contribution plan participants holding target-date funds



Source: Vanguard 2023.

Participant equity allocations

Equities are the dominant asset class holding of many plan participants. From an investment risk perspective, an asset allocation to equities of 80% or more appears appropriate for the long-term retirement objectives of most DC plan participants.

The growing use of professionally managed allocations within DC plans, including target-date funds, is reshaping equity allocations by age and reducing extreme allocations.

Equity allocations by age

In prior reports, we have noted that participants' age-based equity allocation was hump-shaped, with younger participants adopting more conservative allocations, middle-aged participants holding the highest equity exposure, and older participants having equity exposure on par with younger participants **(Figure 84)**. In 2022, the equity allocation among Vanguard DC participants was downward sloping by age. This is tied directly to the growing use of target-date funds and managed account advice, both of which provide for a declining equity exposure with age.

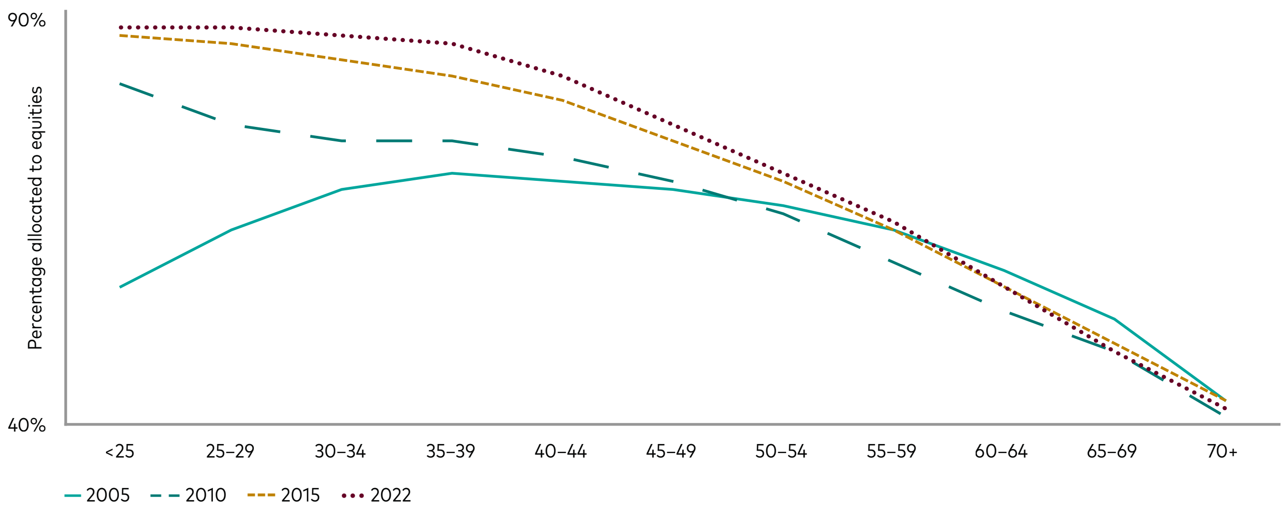
Influencing this change is the growth of default funds under automatic enrollment and the designation of target-date funds as the most common type of default investment. However, participants voluntarily choosing target-date funds also are contributing in a meaningful way to this shift.

The factors influencing age-related equity exposure in DC plans also are changing. On one hand, existing participants make few changes in their allocations as they grow older because of inertia in financial decision-making. On the other hand, the growing use of professionally managed allocations is contributing to a sharper delineation of equity risk-taking by age.

Figure 84. Trend in asset allocation by participant age

Vanguard defined contribution plans

Average equity allocation participant weighted



Equity allocation by age	<25	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+
2022	89%	89%	88%	87%	83%	77%	71%	65%	57%	49%	42%
2021	88%	88%	88%	86%	83%	77%	71%	64%	57%	49%	43%
2020	88%	88%	87%	85%	81%	76%	70%	64%	56%	49%	43%
2019	88%	88%	87%	85%	81%	76%	70%	64%	56%	49%	43%
2018	88%	87%	86%	84%	80%	75%	69%	62%	55%	47%	42%
2017	88%	87%	86%	84%	81%	76%	71%	64%	57%	50%	43%
2016	87%	87%	85%	83%	80%	75%	69%	63%	56%	49%	43%
2015	88%	87%	85%	83%	80%	75%	70%	64%	57%	50%	43%
2014	87%	86%	84%	82%	79%	75%	70%	64%	57%	51%	45%
2013	85%	83%	80%	79%	76%	73%	68%	63%	56%	51%	44%
2012	85%	81%	78%	76%	74%	70%	65%	59%	53%	48%	41%
2011	84%	79%	76%	75%	73%	69%	64%	59%	52%	48%	40%
2010	82%	77%	75%	75%	73%	70%	66%	60%	54%	49%	41%
2009	77%	73%	72%	72%	71%	68%	64%	58%	53%	48%	40%
2008	73%	70%	70%	71%	69%	66%	62%	57%	52%	47%	39%
2007	67%	69%	72%	73%	72%	70%	68%	63%	59%	54%	44%
2006	61%	66%	70%	72%	71%	70%	67%	64%	59%	54%	44%
2005	57%	64%	69%	71%	70%	69%	67%	64%	59%	53%	43%

Source: Vanguard 2023.

Extreme equity allocations

The rising use of professionally managed allocations is also influencing extreme portfolio allocations **(Figure 85)**. The percentage of participants with no allocation to equities has fallen by three-quarters, from 13% in 2006, when the Pension Protection Act of 2006 was passed, to 3% in 2022. At the other extreme, the percentage of participants investing exclusively in equities has fallen from 19% to 4% over the same period.

The elimination of extreme equity allocations is a benefit of target-date funds. Participants who constructed their own portfolios tended to hold greater extremes in equity exposure **(Figure 86, Panel D)**.

Twenty percent of do-it-yourself investors held extreme portfolios in 2022 (8% with no equities, 12% with only equities). Professionally managed investors generally do not hold extreme positions because these portfolios typically include both equity and fixed income assets.

Figure 85. Distribution of equity exposure

Vanguard defined contribution plans

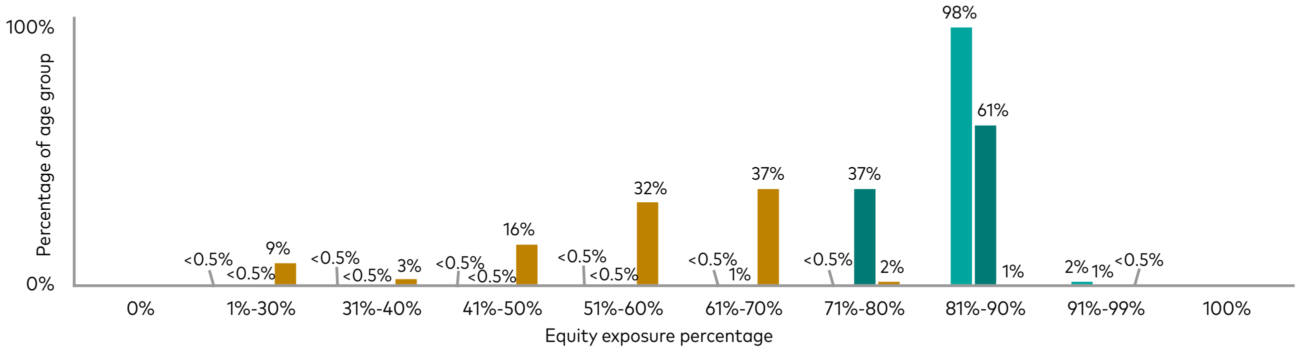
												Participant weighted	
		0%	**1%–30%**	**31%–40%**	**41%–50%**	**51%–60%**	**61%–70%**	**71%–80%**	**81%–90%**	**91%–99%**	**100%**	**Average**	**Median**
Percentage of contributions to equities, 2022		**2%**	**1%**	**1%**	**3%**	**6%**	**8%**	**17%**	**51%**	**6%**	**5%**	**79%**	**87%**
Percentage of account balance in equities	2022	3%	4%	1%	3%	6%	8%	16%	47%	8%	4%	77%	86%
	2021	3%	3%	1%	3%	6%	9%	17%	44%	9%	5%	77%	87%
	2020	3%	3%	2%	3%	7%	9%	12%	46%	10%	5%	76%	86%
	2019	3%	3%	4%	2%	7%	12%	13%	44%	8%	5%	76%	84%
	2018	3%	3%	4%	2%	6%	13%	13%	42%	8%	6%	75%	84%
	2017	3%	4%	3%	3%	6%	9%	18%	40%	9%	5%	75%	84%
	2016	4%	4%	4%	3%	6%	10%	16%	38%	9%	6%	74%	83%
	2015	5%	4%	2%	3%	7%	10%	12%	40%	10%	7%	74%	83%
	2014	5%	4%	3%	2%	8%	10%	13%	37%	10%	8%	74%	83%
	2013	6%	5%	6%	2%	6%	12%	12%	33%	10%	8%	72%	82%
	2012	7%	6%	5%	4%	7%	10%	15%	28%	9%	9%	69%	79%
	2011	8%	7%	5%	4%	7%	10%	14%	26%	9%	10%	68%	79%
	2010	9%	6%	3%	6%	6%	10%	12%	26%	9%	13%	68%	79%
	2009	11%	6%	3%	6%	7%	11%	11%	22%	9%	14%	66%	76%
	2008	11%	7%	4%	4%	9%	12%	11%	18%	8%	16%	65%	74%
	2007	11%	5%	2%	6%	5%	11%	11%	19%	13%	17%	68%	80%
	2006	13%	6%	3%	5%	5%	10%	11%	16%	12%	19%	68%	79%
	2005	13%	6%	3%	6%	6%	10%	9%	14%	12%	21%	67%	78%

Source: Vanguard 2023.

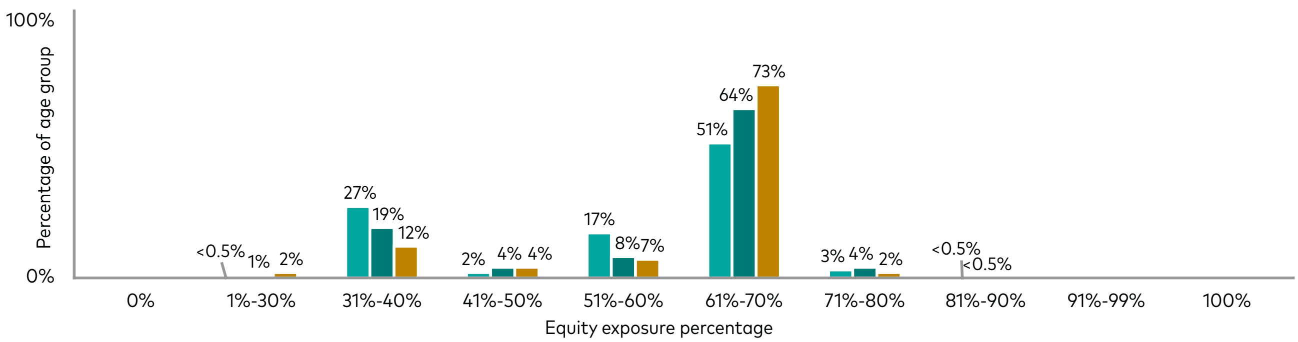
Figure 86. Distribution of equity exposure by investor type, 2022

Vanguard defined contribution plan participants

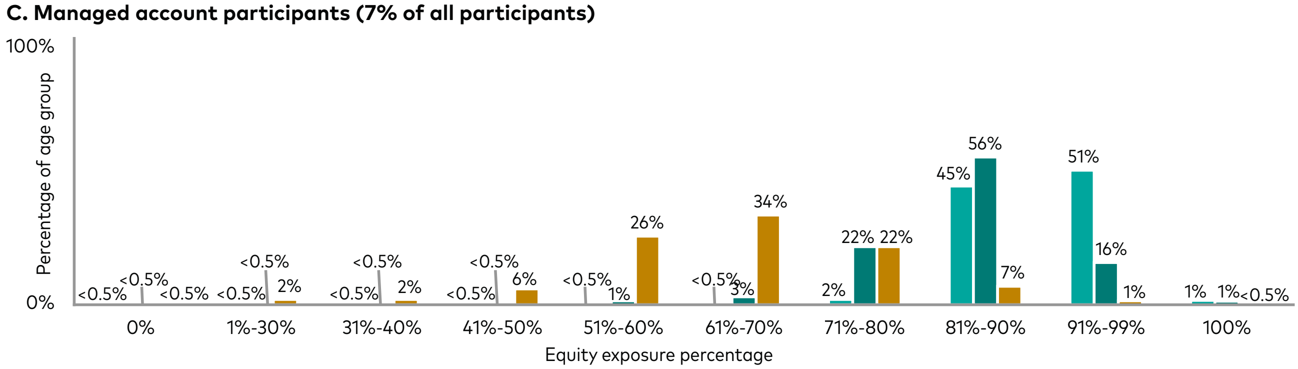
A. Single target-date participants (59% of all participants)



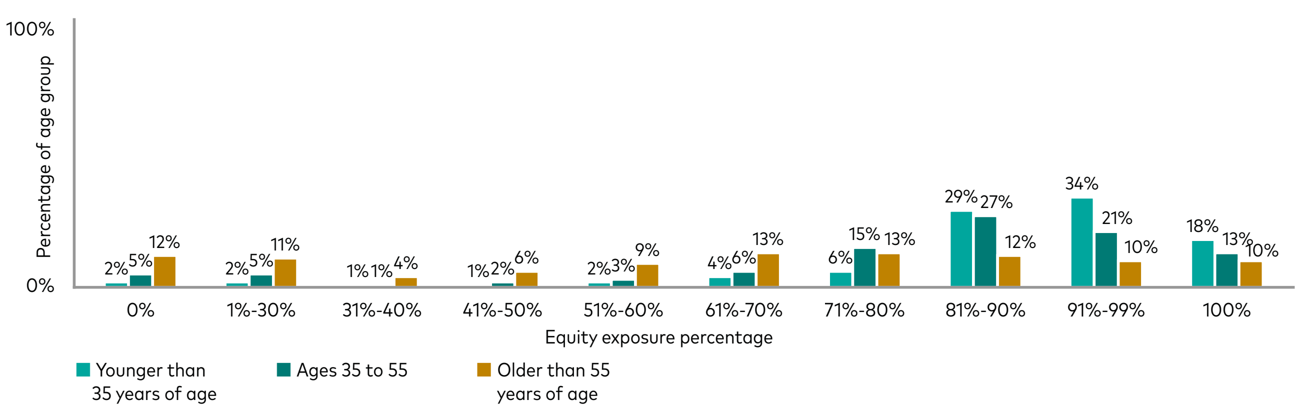
B. Single balanced fund participants (<1% of all participants)



C. Managed account participants (7% of all participants)



D. All other participants (34% of all participants)



Source: Vanguard 2023.

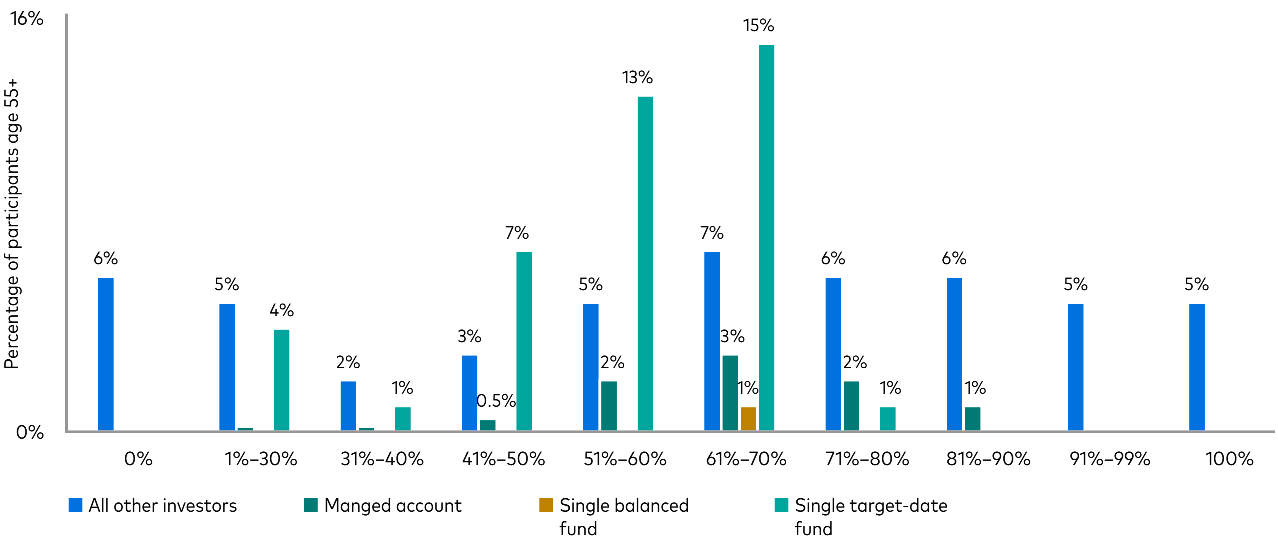
Among pure target-date investors, virtually all had equity allocations ranging from 51% to 90% of their portfolios in 2022. A large group of pure target-date investors had equity allocations in the 81%-to-90% range.

This reflects two facts: (1) automatic enrollment into target-date funds typically applies to new hires who are disproportionately younger than 40; and (2) in voluntary enrollment plans, a single target-date fund is a popular strategy among new hires. Among pure target-date investors, there is also age-appropriate variation in the equity allocation.

Older participants, who were perhaps preparing for or already in retirement, were most likely to construct their own portfolio in 2022 **(Figure 87)**. Fifty percent of participants 55 or older created their own allocations, with 4 in 10 using a single target-date fund and 9% using a managed account program. While older participants with professionally managed allocations had equity exposure between 40% and 80%, those who constructed their own portfolio had a wide dispersion of equity allocations, which were evenly distributed from 0% to 100%. These participants also had the highest balances.

Figure 87. Distribution of equity exposure by older participants, 2022

Vanguard defined contribution plan participants age 55+



	All other investors	Managed account	Single balanced fund	Single target-date fund
Percentage of population	**50%**	**9%**	**<1%**	**41%**
Average balance	$324,636	$240,076	$167,424	$76,965
Median balance	$152,414	$126,071	$62,576	$20,683

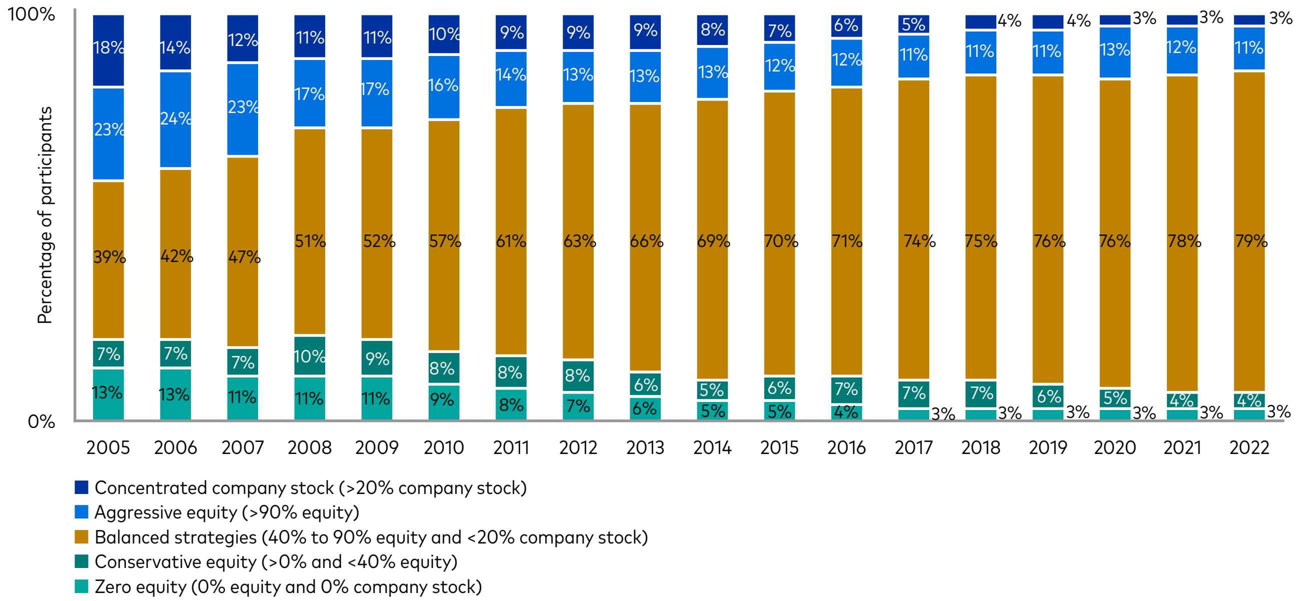
Source: Vanguard 2023.

This rising use of professionally managed allocations is also contributing to a reduction in portfolio construction errors **(Figure 88)**. The fraction of participants holding broadly diversified portfolios rose from 42% in 2006 to 79% in 2022.

The percentage of participants holding concentrated company stock positions was nearly one-fifth of the percentage in 2006. In addition, there have been reductions in all other extreme portfolios.

Figure 88. Participant portfolio construction

Vanguard defined contribution plan participants



Source: Vanguard 2023.

Figure 89. Advice offered, 2022

Vanguard defined contribution plans

	Number of participants				
	All	**<500**	**500–999**	**1,000–4,999**	**5,000+**
Percentage of plans offering managed account advice	41%	20%	45%	59%	81%
Percentage of participants offered managed account advice	77%	26%	44%	61%	86%
Percentage of participants offered managed account advice accessing	9%	9%	8%	8%	9%

Source: Vanguard 2023.

Advice

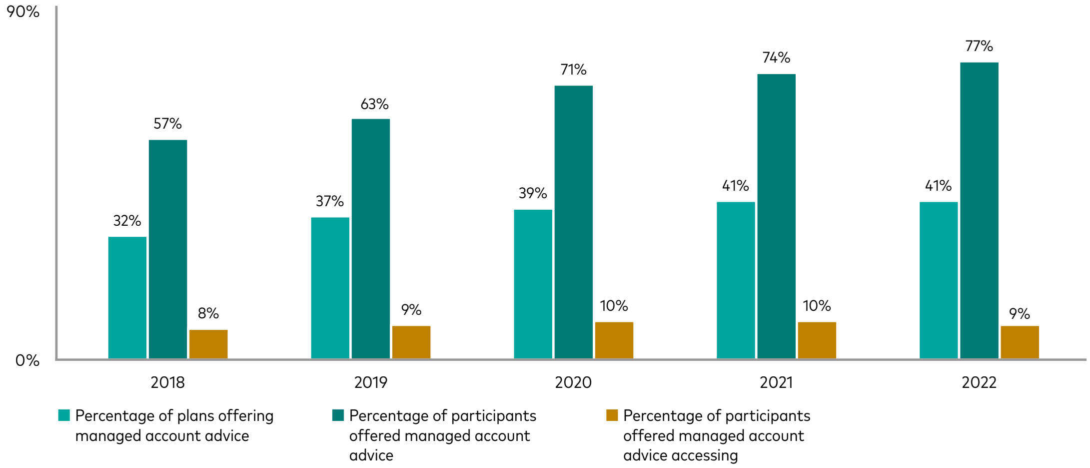
To address participant needs for assistance with investing and planning decisions, plan sponsors are increasingly offering managed account advice services.

Forty-one percent of Vanguard DC plans offered managed account advice in 2022. And with 8 in 10 larger plans offering it **(Figure 89)**, more than 3 in 4 participants had access to managed account advice.

Balancing competing goals with retirement saving can be complicated. As a result, helping participants create holistic financial well-being has become a priority for plan sponsors. During the past five years, the percentage of plans offering a managed account advice program has grown by nearly 30%, and in turn, the percentage of participants offered the service has grown by a similar amount **(Figure 90)**.

Figure 90. Advice offered trend

Vanguard defined contribution plans



Source: Vanguard 2023.

Company stock

Company stock is more likely to be offered as an investment option by a large plan—26% of Vanguard plans with 5,000 or more participants offered company stock in 2022, compared with 2% of plans with fewer than 500 participants. In some plans that offer company stock, participants can choose whether to invest their own contributions in this option.[4]

Employer contributions—which may be 401(k) matching, profit-sharing, or ESOP contributions—are either directed to company stock by the employer, invested at the participant's discretion, or a combination of the two.

As of 2022, 8% of Vanguard recordkeeping plans offered company stock as an investment option. However, because large plans are more likely to offer company stock, 22% of Vanguard recordkeeping participants had access to company stock in their employer's plan.

Among all Vanguard participants in 2022:

- 92% had no company stock investments—either because their employer did not offer company stock (78%) or because they chose not to invest in it (14%).
- 5% had company stock holdings of 1% to 20% of their account balance.
- 3% had concentrated company stock positions exceeding 20% of their account balance.

Among Vanguard plans actively offering company stock, 89% had 20% or less of plan assets invested in the option **(Figure 91)**. The remaining 11% had concentration levels above 20%.

4 For an in-depth analysis of company stock in DC plans, see John A. Lamancusa and Jean A. Young, ***Company Stock in DC Plans***. Vanguard research. December 2020.

Figure 91. Company stock exposure for plans and participants

Vanguard defined contribution plans actively offering company stock

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Balance of plan in company stock—percentage of plans	1%–20%	78%	79%	82%	81%	81%	82%	86%	88%	88%	89%
	21%–40%	16%	15%	14%	16%	18%	16%	12%	11%	11%	9%
	41%–60%	6%	6%	4%	3%	1%	1%	1%	1%	1%	0%
	61%–80%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
	>80%	0%	0%	0%	0%	0%	1%	1%	0%	0%	1%
Balance in company stock—percentage of participants	0%	47%	50%	50%	55%	61%	64%	67%	65%	66%	67%
	1%–20%	22%	22%	22%	21%	20%	17%	18%	23%	22%	21%
	21%–40%	14%	14%	13%	12%	10%	8%	7%	6%	7%	6%
	41%–60%	7%	6%	8%	6%	5%	4%	3%	3%	2%	3%
	61%–80%	4%	3%	2%	2%	1%	2%	1%	1%	1%	1%
	>80%	6%	5%	5%	4%	3%	5%	4%	2%	2%	2%

Source: Vanguard 2023.

In 2022, two-thirds of Vanguard participants offered company stock chose not to invest their contributions—or their employer's contributions—in the option. If they received employer stock contributions, they diversified these assets. At the other extreme, 1 in 8 participants in plans actively offering company stock had more than 20% of their account balance invested in it, and 2% had more than 80% of their account balance in company stock.

The shift away from participant company stock holdings continued in 2022. The percentage of participants in plans with company stock and holding a concentrated position of more than 20% of their account balance in company stock fell from 31% in 2013 to 12% in 2022, and fewer plans are offering company stock.

Despite this shift, why do 1 in 8 participants in plans offering company stock continue to hold a concentrated position in it? One reason is that most participants view company stock as a safer investment than a diversified equity fund. Another factor is that some plan sponsors decide to make employer contributions in company stock. This implied endorsement often leads participants to invest more of their savings in the option as well.

The effect is evident in the average company stock allocation for plans making employer contributions in cash compared with those making employer contributions in company stock. In 2022, plans offering company stock as an investment option but making employer contributions in cash had an average of 8% of plan assets invested in company stock **(Figure 92)**. Meanwhile, plans offering company stock as an investment option and making employer contributions in the stock had an average of 27% of plan assets in company stock.

Figure 92. Impact of company stock employer contributions on asset allocation, 2022

Vanguard defined contribution plans

		All Vanguard 401(k) plans with an employer contribution		
	Vanguard defined contribution plans	Plans making employer contributions in cash	Plans offering company stock making employer contributions in cash	Plans offering company stock making an employer contribution in company stock
Percentage of plans	—	**94%**	**5%**	**1%**
Brokerage	1%	1%	<0.5%	1%
Company stock	3%	<0.5%	8%	27%
Diversified equity funds	38%	38%	39%	36%
Target-date funds	40%	42%	35%	22%
Other balanced funds	4%	4%	2%	1%
Bond funds	6%	6%	7%	6%
Cash	8%	8%	9%	7%

Source: Vanguard 2023.

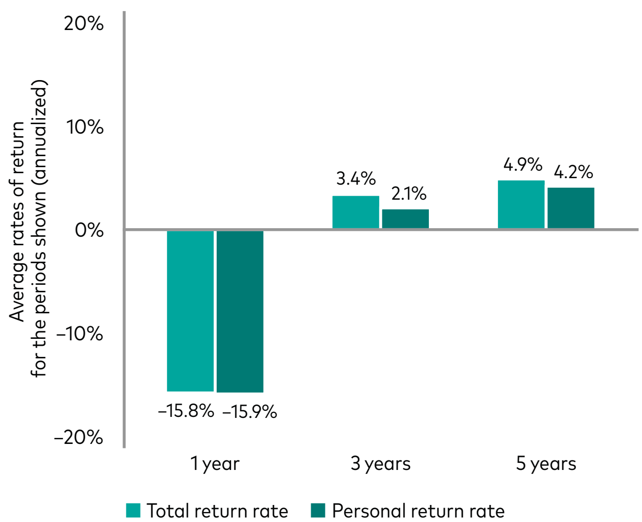
Investment returns

There are two categories of investment returns: total returns and personalized returns. Total returns reflect time-weighted investment performance and allow comparison with benchmark indexes. Personalized returns are dollar-weighted returns, reflecting account investment performance, adjusted for each participant's unique pattern of contributions, exchanges, and withdrawals. They are not directly comparable to time-weighted performance data for market indexes or mutual funds. Both return measures are influenced by market conditions; however, only total returns can be compared with published benchmark indexes.

Participant returns

Because of the decline in the equity and bond markets during 2022, average total and personal returns for DC participants were –15.8 % and 15.9%, respectively, for the one-year period ended December 31, 2022 **(Figure 93)**. Reflecting positive equity markets, average personal returns for DC participants were 2.1% across the three-year period and 4.2% for the five-year period ended December 31, 2022. Five-year participant total returns averaged 4.9% per year.

Figure 93. Participant rates of return, December 2022
Vanguard defined contribution plans



Market returns ended December 31, 2022	1 year	3 years	5 years
S&P 500	–18.1%	7.7%	9.4%
Bloomberg Barclays US Aggregate	–13.0%	–2.7%	0.0%
FTSE Developed ex US	–15.1%	1.0%	1.5%

Past performance is not a guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

Source: Vanguard 2023.

Distribution of returns

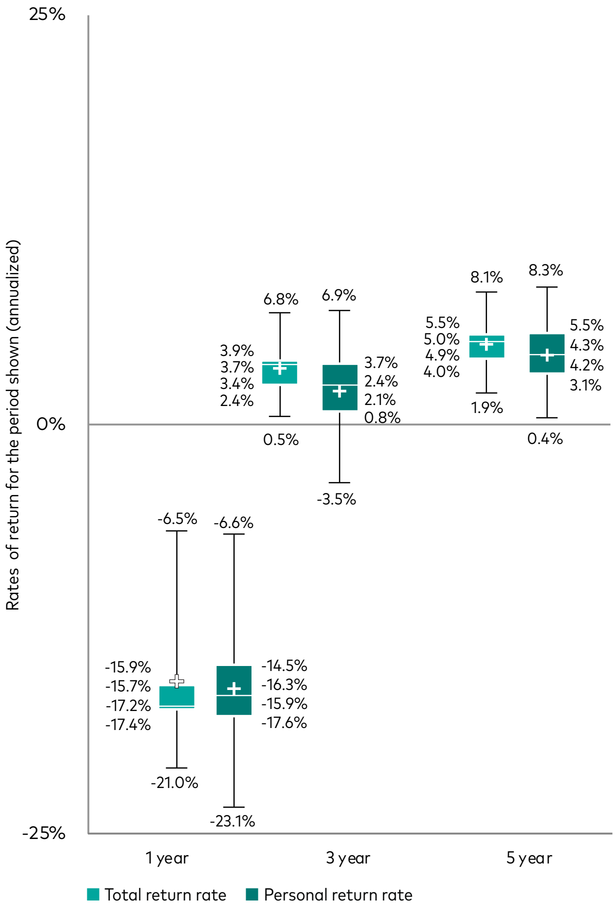
As of December 2022, five-year personalized annual returns were positive for nearly all Vanguard DC plan participants. There was wide variation in returns among participants **(Figure 94)**. Participants in the 5th percentile had five-year personalized returns of 0.4% per year in 2022. At the other extreme, participants above the 95th percentile had five-year personalized returns greater than 8.3% per year. The variation in returns is largely due to the variation in participant asset allocations and their individual account holdings.

Participants with managed allocations—notably target-date funds and managed account advisory services—had less dispersion in outcomes. Total five-year returns for single target-date investors ranged from 3.1% for the 5th percentile to 5.3% for the 95th percentile, a difference of 2.2 percentage points **(Figure 95)**. For managed account participants, the 5th-to-95th percentile differences were 3.7 percentage points. The managed account is a customized portfolio approach, and thus results are, accordingly, more dispersed than with target-date funds.

By comparison, among all other participants, realized returns for those making their own choices ranged from 1.2% per year for the 5th percentile to 8.8% for the 95th percentile, a difference of 7.6 percentage points.

Figure 94. Variation in participant total and personal return rates, 2022

Vanguard defined contribution plans



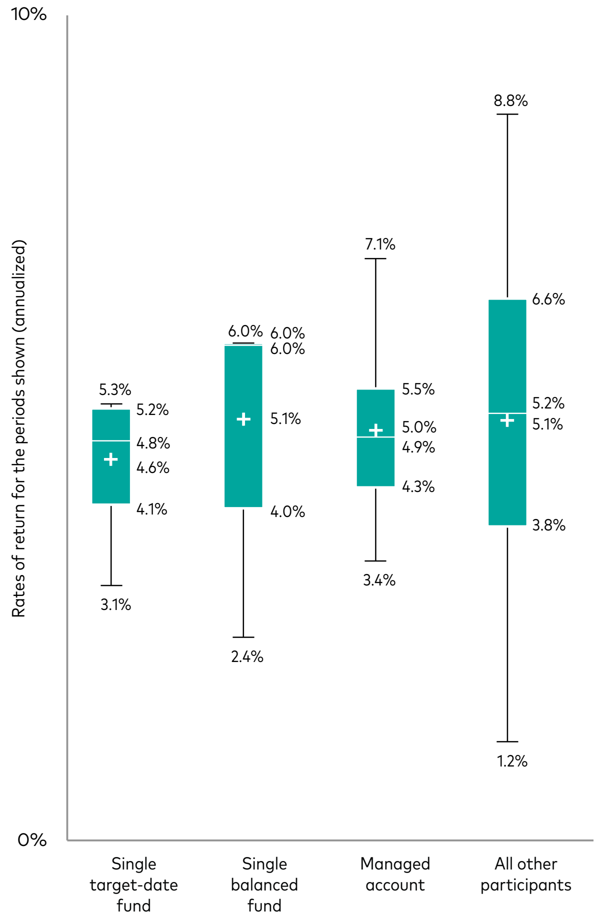
Note: Based on 4.1 million observations for 1 year; 3.1 million for 3 year; and 2.3 million for 5 year.

Past performance is not a guarantee of future returns.

Source: Vanguard 2023.

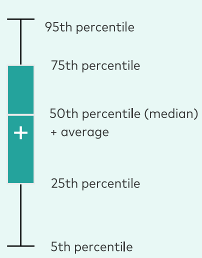
Figure 95. Distribution of five-year total returns by strategy, 2022

Vanguard defined contribution plans



Note: Based on 828,000 observations for single target-date fund investors; 20,000 for balanced fund investors; 77,000 for managed account investors; and 1.3 million for all other participants.

Source: Vanguard 2023.



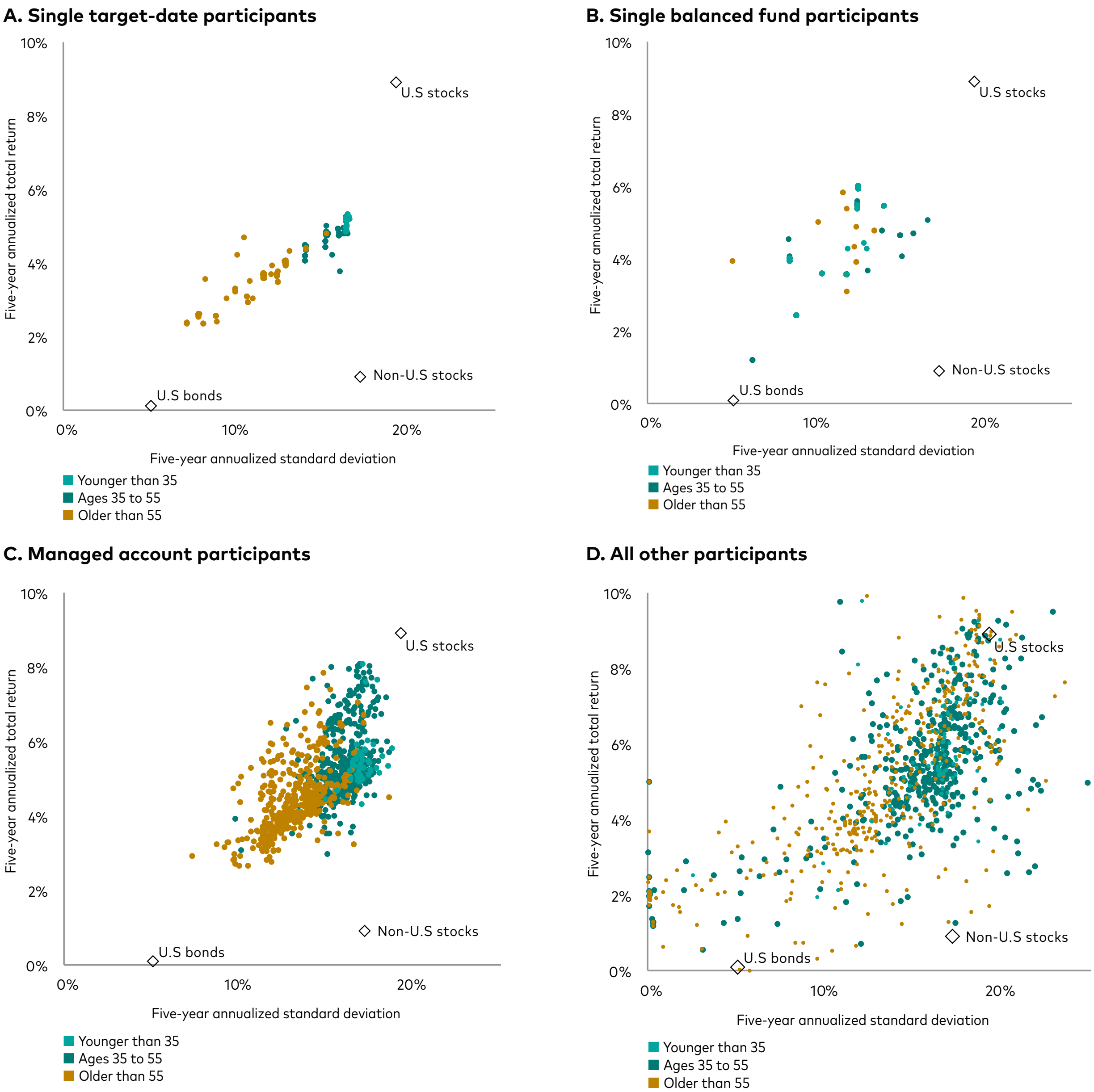
How to read a box and whisker chart:

This box and whisker chart shows the range of outcomes. Plot values represent the 95th, 75th, 50th, 25th, and 5th percentile values. The average value is represented by a white + and the median value by a white line. An example of how to interpret the data in Figure 94 is: For the five-year period, 5% of participants had total return rates (TRR) greater than 8.1%; 25% had TRRs greater than 5.5%; half had TRRs greater than 5.0%; 75% had TRRs greater than 4.0%; 95% had TRRs greater than 1.9%. The average five-year TRR was 4.9%.

During the five-year period ended December 31, 2022, outcomes for single target-date investors were distributed among major market indexes **(Figure 96, Panel A)**, with upward sloping reflecting a positive equity risk premium. These results are consistent with the fact that most of the target-date portfolios in our sample are a specific combination of indexed U.S. equities, international equities, U.S. bonds, and international bonds. In the target-date scatterplot, younger participants (represented by bright turquoise dots and in long-dated portfolios) are to the right of the chart; older participants (represented by dark yellow dots and in near-dated portfolios) are to the left. The figure includes about 1,000 observations. There appear to be far fewer because while there are many observations in our sample, they are all invested in a limited set of target-date portfolios, which means the range of portfolio outcomes is also limited. For example, if a plan offered 16 target-date options, then 1,000 participants invested solely in a single target-date fund would have 16 outcomes, not 1,000. The results for single balanced fund investors reflect the fact that most balanced funds have similar equity allocations, typically around 35% to 65% of assets **(Figure 96, Panel B)**. Managed account investors were more dispersed, reflecting the customized nature of managed account advice **(Figure 96, Panel C)**. The greatest dispersion of risk/return outcomes was among participants making their own investment choices **(Figure 96, Panel D)**. Over time, because of the growing use of professionally managed allocations in DC plans, this population is expected to decline.

Figure 96. Risk and return characteristics, 2018–2022

Defined contribution plan participants for the five-year period ended December 31, 2022



Past performance is no guarantee of future returns.

Note: Includes 1,000 random samples of participant accounts drawn from respective samples. Excludes 0.5% top and 0.5% bottom outliers for both risk and return, for a net sample of 980 observations.

Source: Vanguard 2023.

Trading activity

Participant trading or exchange activity is the movement of existing account assets from one plan investment option to another. This transaction is distinct from a contribution allocation decision, in which participants decide how future plan contributions should be invested. Exchange activity is a proxy for a participant's holding period for investments, as well as a measure of the participant's willingness to change their portfolio in response to short-term market volatility.

Exchange provisions

Daily trading is nearly universal for Vanguard DC plans, with virtually all plan sponsors allowing it. While assets can be traded daily, Vanguard and other investment companies serving DC plans typically have "round-trip" restrictions designed to thwart the minority of individual participants who seek to engage in active market-timing or day-trading.

Volume of exchanges

Even with increased market volatility in 2022, only 12% of participants made at least one portfolio trade or exchange during the year, down from 20% in 2004 **(Figure 97)**.

It is important to note that nearly all participants using a managed account had exchanges. In a managed account, the advisor oversees multiple fund holdings in a typical participant's account. The trading activity reflects the advisor rebalancing the participant's portfolio (or, with those initially signing up for the service, portfolio changes needed to arrive at the target portfolio strategy).

When participants with a managed account were excluded, only 6% of participants initiated an exchange, a decrease of 4 percentage points from 2020, when trading activity increased because of market volatility related to COVID-19. Trading activity in 2022 reached the lowest level in nearly two decades.

Another measure of trading is the volume of dollars traded. We measure dollar volume movements as a fraction of total recordkeeping assets to scale them to growth in assets and growth in the underlying recordkeeping business. In effect, the fraction of assets traded is a measure of portfolio turnover.

In 2022, traders exchanged the dollar equivalent of 9.1% of average DC recordkeeping assets at Vanguard. On a net basis, about 1% of assets were shifted from equities to fixed income in 2022.

Since 2013, dollar-trading levels have generally remained stable, except for periods of high market volatility **(Figure 98)**. The most notable spike in dollars traded occurred in spring 2020 at the onset of the COVID-19 pandemic.

Figure 97. Participant trading summary

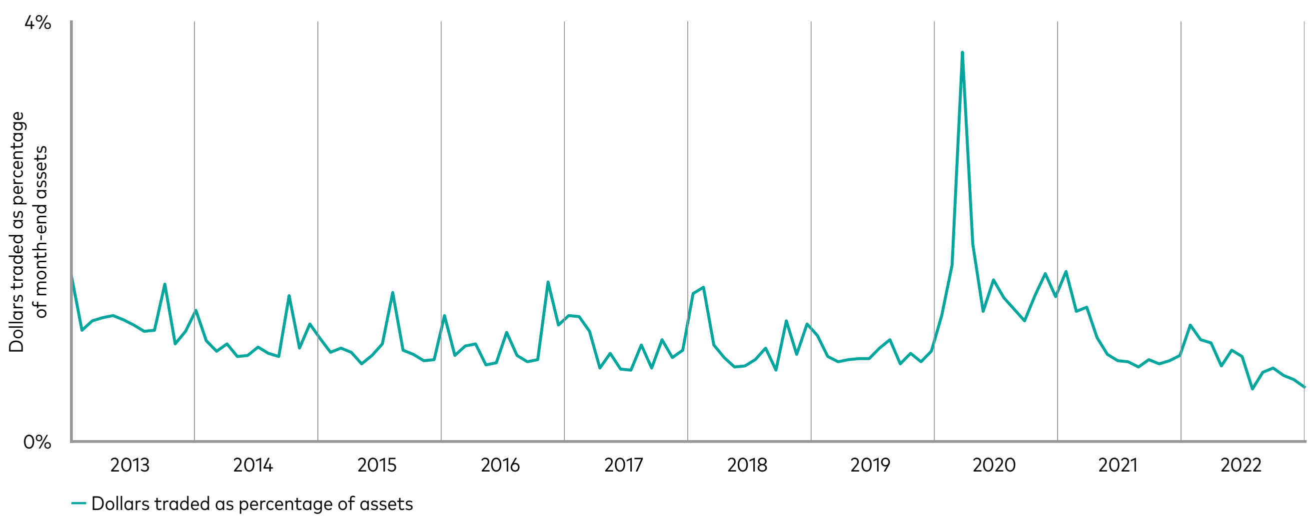
Vanguard defined contribution plans

	Percentage of participants		Percentage of average recordkeeping assets		Dollar flows (in billions)		S&P 500 Index volatility			
							Percentage of days			
	Percentage trading including managed account investors	Percentage with participant-directed exchanges	Percentage traded	Percentage moved to equities (fixed income)	Dollars traded	Dollars moved to equities (fixed income)	Up 3% or more	Down 3% or more	Up 1% or more	Down 1% or more
2022	12%	6%	9.1%	–0.9%	$53.0	–$5.0	1.6%	3.2%	23%	25%
2021	15%	8%	11.2%	–0.3%	$72.0	–$2.2	0.0%	0.0%	13%	8%
2020	16%	10%	19.3%	–3.0%	$102.4	–$16.2	4.8%	6.3%	25%	18%
2019	12%	7%	10.0%	–1.3%	$50.7	–$7.0	0.4%	0.0%	9%	6%
2018	12%	8%	11.6%	–1.1%	$56.3	–$5.6	0.4%	2.0%	13%	13%
2017	12%	8%	10.6%	–0.3%	$48.6	–$1.5	0.0%	0.0%	2%	2%
2016	12%	8%	11.4%	–1.5%	$44.7	–$6.0	0.4%	0.4%	10%	9%
2015	13%	9%	10.7%	–0.8%	$40.9	–$3.0	0.4%	0.8%	17%	12%
2014	14%	10%	11.6%	–0.6%	$41.8	–$2.3	0.0%	0.0%	8%	8%
2013	13%	10%	14.0%	0.2%	$44.8	$0.5	0.0%	0.0%	9%	7%
2012	12%	9%	12.6%	–1.7%	$36.2	–$4.9	0.0%	0.0%	12%	8%
2011	11%	10%	14.8%	–2.5%	$40.6	–$6.9	2.4%	2.4%	19%	18%
2010	12%	10%	13.4%	–1.1%	$32.5	–$2.8	1.2%	2.0%	15%	14%
2009	13%	11%	14.1%	–0.6%	$29.0	–$1.2	4.4%	4.4%	25%	21%
2008	16%	14%	16.6%	–3.9%	$39.7	–$9.3	9.1%	7.5%	24%	29%
2007	15%	14%	14.7%	–1.5%	$36.2	–$3.7	0.4%	0.0%	12%	13%
2006	14%	13%	12.7%	–0.6%	$27.0	–$1.3	0.0%	0.0%	6%	5%
2005	19%	18%	13.0%	–0.7%	$23.6	–$1.3	0.0%	0.0%	6%	6%
2004	20%	20%	14.6%	–0.2%	$22.5	–$0.3	0.0%	0.0%	8%	8%

Source: Vanguard 2023.

Figure 98. Trading activity, January 2013–December 2022

Vanguard defined contribution plan participants



Source: Vanguard 2023.

Direction of money movement

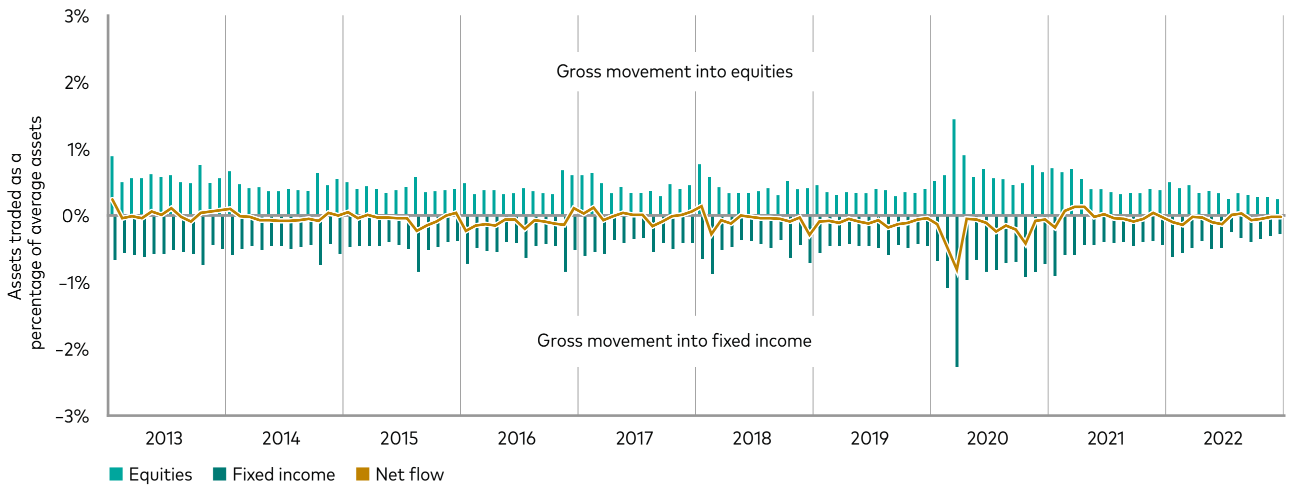
Summary statistics may sometimes portend that all participant trading is in one direction. However, in any given month, participants who trade are moving meaningful dollar amounts both in and out of equities **(Figure 99)**. Even in volatile markets, as some traders shift their portfolios toward fixed income assets, others shift toward equities.

During the past decade, the net movement of money among participants trading in their accounts has been generally toward fixed income investments. Nonetheless, even at the height of market volatility, there were significant gross flows toward equities among some participants. The growing reliance on single-fund investment programs, such as target-date funds, has likely contributed to lower trading levels by participants.

Figure 99. Direction of money movement, January 2013–December 2022

Vanguard defined contribution plan participants

Money movement as a percentage of average assets



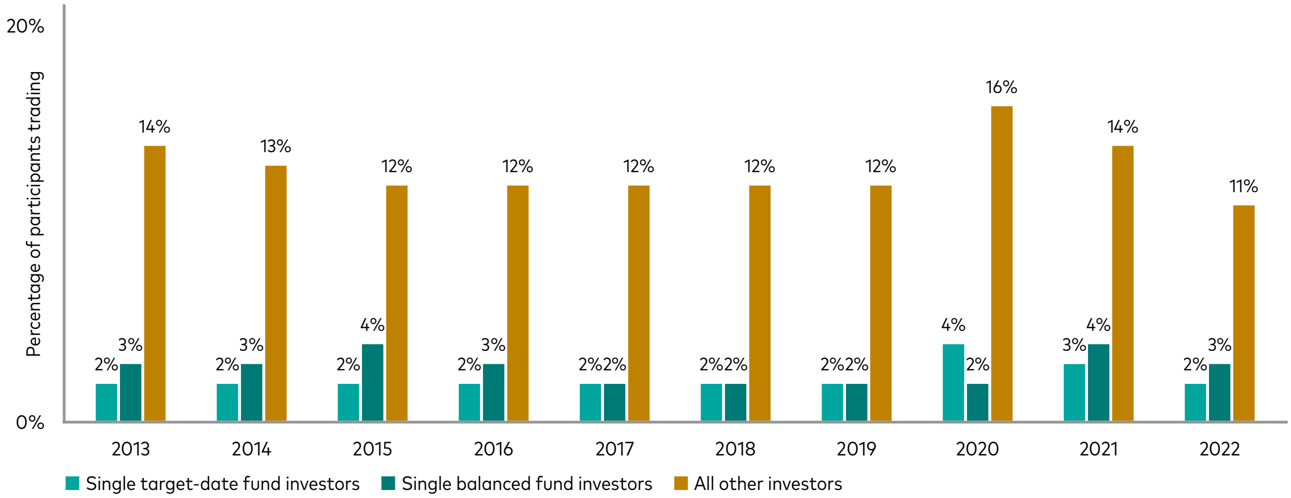
Source: Vanguard 2023.

Participants who are pure target-date fund investors not only benefit from continuous rebalancing but are also far less likely to trade when compared with all other investors. In 2022, only 2% of all pure target-date fund investors made an exchange, a rate five times lower than all other investors **(Figure 100)**.

Women traded about 30% less frequently than men **(Figure 101)**. Participants holding only target-date funds traded very infrequently, and women were more likely than men to hold a single target-date fund.

Figure 100. Participant trading by investor type

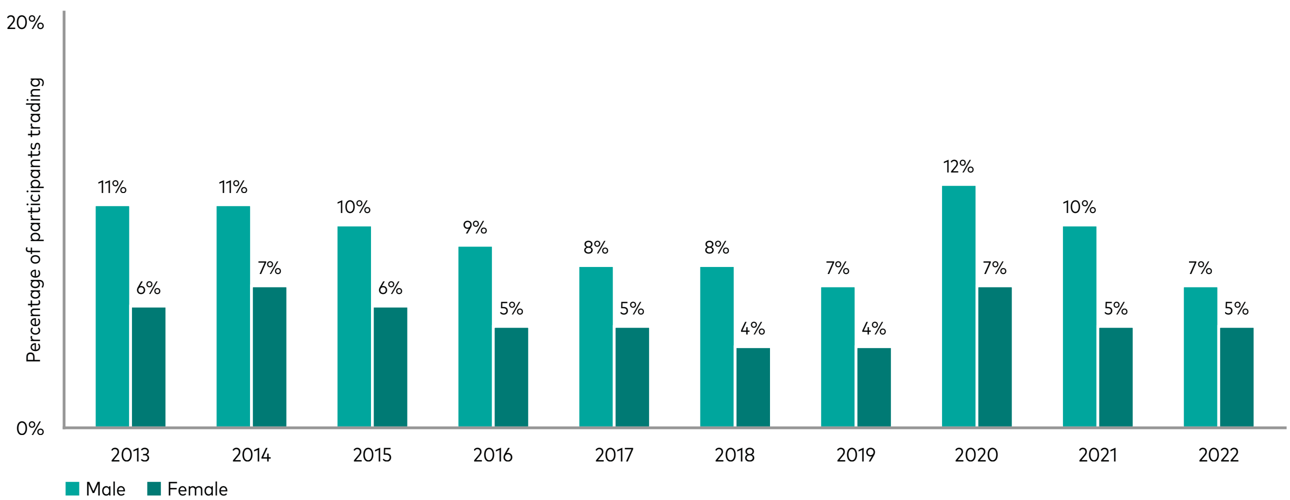
Vanguard defined contribution plan participants



Source: Vanguard 2023.

Figure 101. Participant trading by gender

Vanguard defined contribution plan participants



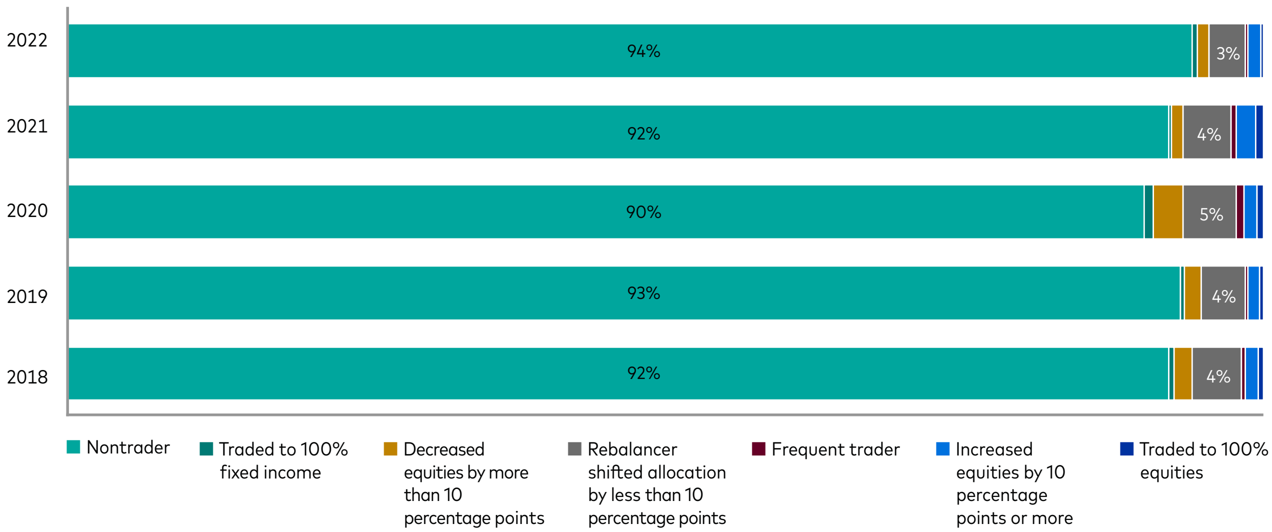
Source: Vanguard 2023.

Types of trading activity

The kinds of exchanges varied among participants who traded in their accounts in 2022. Ninety-four percent of nonmanaged account participants did not make an exchange, but of those who did, the most common action was rebalancing of their account **(Figure 102)**.

Figure 102. Participant trading decisions

Vanguard defined contribution plan participants (nonadvised)



Source: Vanguard 2023.

Section 3: Accessing plan assets

Participants can access their plan assets by taking a loan or a withdrawal while they are working or through a withdrawal or a rollover when they change jobs or retire.

Plan loans

Plan loans allow DC plan participants to access their plan savings before retirement without incurring income taxes or tax penalties. If permitted by the plan, participants can borrow up to 50% of their balance (up to a maximum of $50,000) from their DC plan account. Loans are more common in plans accepting employee contributions and less common in employer-funded DC plans, such as money purchase or profit-sharing plans.

Offering loans appears to beneficially affect retirement savings, raising contribution rates above what they would otherwise be. Yet loans also come with risks. Cash that has been borrowed earns fixed income rather than equity market returns. Also, participants who leave their employer usually must repay any loan balance immediately—or risk paying taxes as well as a penalty and incurring a reduction in retirement savings by the amount of the loan outstanding.

Loan availability

Loans are widely offered by employee-contributory DC plans. In 2022, 82% of Vanguard DC plans permitted participants to borrow from their plan, and 93% of active participants had access to a loan feature **(Figure 103)**. Loan availability depends on plan size. Large plans tend to offer loans; small plans often do not. Loans are expensive to administer, and loan origination and maintenance fees are increasing. With loan fees, sponsors can allocate costs directly to those participants incurring loan-related expenses. Most plans allow participants to have only one loan outstanding. In 2022, 54% of Vanguard DC plans offering loans permitted one loan at a time. Thirty-eight percent of plans allowed two, and 8% of plans allowed three or more.

Figure 103. Plan loans, 2022

Vanguard defined contribution plans

Percentage of plans offering loans	82%
Percentage of participants in plans offering loans	93%
Plans offering loans *(number of loans permitted)*	
1 loan	54%
2 loans	38%
3 or more loans	8%
Interest rate	
Prime	12%
Prime plus 1%	72%
Prime plus 2%	12%
Prime plus other rates	4%
Plans permitting terminated participants to continue loan repayment	39%

Source: Vanguard 2023.

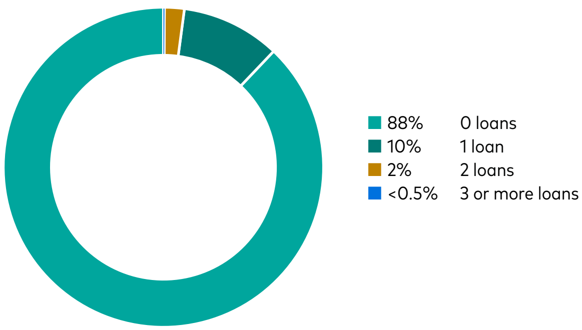
Some plan sponsors impose loan-issuance waiting periods to discourage repetitive loans. In 2022, 3% of plans required a waiting period—most commonly one month—after a loan was paid off before a new loan could be taken by the participant. Two percent of plans imposed a waiting period—most commonly one year—after loan issuance before another loan could be taken. Finally, nearly 4 in 10 plans permitted participants terminating with an outstanding loan to continue repayment.

Loan use by participant demographics

Twelve percent of participants had a loan outstanding at year-end 2022 **(Figure 104).**[5] On average, the outstanding loan account balance was 10% of the participant's account balance, excluding the loan, and the average participant had borrowed about $10,500 **(Figure 105)**. Outstanding loans are typically excluded from measures of plan and participant assets because these assets have, in effect, been withdrawn from the plan and are not currently available as a retirement resource.

Figure 104. Participant loan use, 2022

Vanguard defined contribution plans offering loans



Source: Vanguard 2023.

Loans are sometimes criticized as a form of revolving credit for younger, lower-income workers. While that may be partly true, loan use by age follows a hump-shaped profile, with use highest among participants in their prime working years. Among workers ages 45 to 54, 18% had a loan outstanding in 2022. Men and women used loans at similar rates.

Income appears to have a greater influence than age on loan use. In 2022, about 1 in 4 participants with a household income between $30,000 and $99,999 had a loan, while 12% of participants with an income of more than $150,000 did. This difference reflects liquidity constraints among those with low wealth and income—that is, higher-income households have less of a need to borrow.

Participants with an account balance of less than $10,000 were less likely to have a loan, yet they borrowed the largest percentage of their account balance. Seven percent of this group had a loan, but the loan accounted for 34% of their account balance, on average.

In 2022, participants with loans outstanding had saved slightly less for retirement than those without loans. Older, longer-tenured, higher-income participants with loans had saved less for retirement than participants without loans who shared those demographics. However, younger, newly hired, lower-income, lower-balance participants with loans had saved more for retirement than participants without loans in the same demographics. These differences in part reflect the interplay of demographic differences in terms of age, income, and tenure between borrowers and nonborrowers.

Eleven percent of participants who earned between $15,000 and $29,999 in 2022 had a loan outstanding. However, earlier in this report, we noted that participation rates are lowest among this group, with 60% of these workers joining their plan. Arguably, participants who earned between $15,000 and $29,999 but had borrowed from their retirement savings (7% of these workers) were better off than those who earned between $15,000 and $29,999 and did not participate in their employer's plan **(Figure 106)**.

Loan use by industry group

Loan use varied significantly by industry sector in 2022 **(Figure 107)**. Participants in the business, professional, and nonprofit group used loans at a lower rate than other participants, suggesting that more highly educated participants used loans less frequently.

5 Our analysis of the percentage of participants with loans considers all participants with an account balance in plans offering loans. Some of these participants no longer work for the plan sponsor and are not eligible for a new loan. Some participants with loans also no longer work for the plan sponsor but are repaying loans. Loan use would likely be about five percentage points higher if based solely on active employees.

Figure 105. Participant loan demographics, 2022

Vanguard defined contribution plans offering loans

		Participants with loans					Participants with no loans
		Percentage of participants with loans	Percentage of account balance in loans	Average loan amount	Average account balance	Total average account balance including loans	Average account balance
All		**12%**	**10%**	**$10,521**	**$99,731**	**$110,251**	**$115,700**
Income	<$15,000	8%	13%	$4,647	$32,330	$36,977	$18,495
	$15,000–$29,999	11%	18%	$3,315	$15,059	$18,374	$13,756
	$30,000–$49,999	23%	15%	$5,193	$30,010	$35,203	$28,353
	$50,000–$74,999	28%	12%	$8,639	$61,495	$70,134	$69,831
	$75,000–$99,999	25%	11%	$11,775	$100,124	$111,898	$120,251
	$100,000–$149,999	20%	9%	$15,391	$161,932	$177,324	$194,818
	$150,000+	12%	7%	$20,216	$281,211	$301,427	$349,660
	Terminated	1%	9%	$10,757	$104,732	$115,489	$119,345
Age	<25	2%	22%	$2,618	$9,324	$11,942	$5,175
	25–34	8%	19%	$6,746	$29,368	$36,114	$30,569
	35–44	15%	13%	$10,521	$68,514	$79,035	$79,406
	45–54	18%	9%	$12,018	$122,421	$134,439	$149,708
	55–64	13%	7%	$11,585	$164,822	$176,407	$218,030
	65+	4%	6%	$9,601	$155,011	$164,611	$239,704
Gender	Male	13%	9%	$11,225	$117,362	$128,587	$142,581
	Female	12%	10%	$9,766	$86,505	$96,271	$97,727
Job tenure (years)	0–1	3%	19%	$4,986	$20,978	$25,963	$13,446
	2–3	9%	19%	$5,922	$25,859	$31,781	$34,466
	4–6	14%	17%	$7,904	$39,007	$46,911	$59,518
	7–9	16%	14%	$10,153	$60,192	$70,345	$91,160
	10+	16%	8%	$13,189	$158,865	$172,055	$246,664
Account balance	<$10,000	7%	34%	$2,722	$5,231	$7,952	$3,259
	$10,000–$24,999	15%	26%	$5,971	$16,757	$22,727	$16,522
	$25,000–$49,999	16%	22%	$10,351	$36,160	$46,511	$36,022
	$50,000–$99,999	16%	16%	$13,896	$71,767	$85,663	$71,962
	$100,000–$149,999	15%	11%	$15,807	$122,656	$138,462	$122,951
	$150,000–$199,999	14%	9%	$16,653	$173,121	$189,775	$173,416
	$200,000–$249,999	14%	7%	$17,444	$223,303	$240,747	$223,644
	$250,000+	10%	4%	$18,453	$485,372	$503,825	$608,082

Source: Vanguard 2023.

Figure 106. Participation and loans, 2022

All employees earning between $15,000 and $29,999

Source: Vanguard 2023.

Figure 107. Participant loans by industry sector, 2022

Vanguard defined contribution plans offering loans

		Participants with loans					Participants with no loans
		Percentage of participants with loans	Percentage of account balance in loan	Average loan amount	Average account balance	Total average account balance including loans	Average account balance
All		**12%**	**10%**	**$10,521**	**$99,731**	**$110,251**	**$115,700**
Industry group	Transportation, utilities, and communications	17%	10%	$9,130	$79,740	$88,870	$92,194
	Agriculture, mining, and construction	15%	8%	$13,902	$157,925	$171,827	$171,869
	Manufacturing	15%	9%	$9,645	$100,995	$110,640	$119,641
	Finance, insurance, and real estate	14%	9%	$12,320	$129,687	$142,007	$147,518
	Wholesale and retail trade	13%	11%	$8,997	$73,028	$82,025	$76,712
	Education and health	12%	12%	$10,595	$77,758	$88,353	$83,808
	Media, entertainment, and leisure	8%	11%	$13,814	$115,871	$129,685	$146,485
	Business, professional, and nonprofit	7%	8%	$11,662	$128,643	$140,306	$134,690

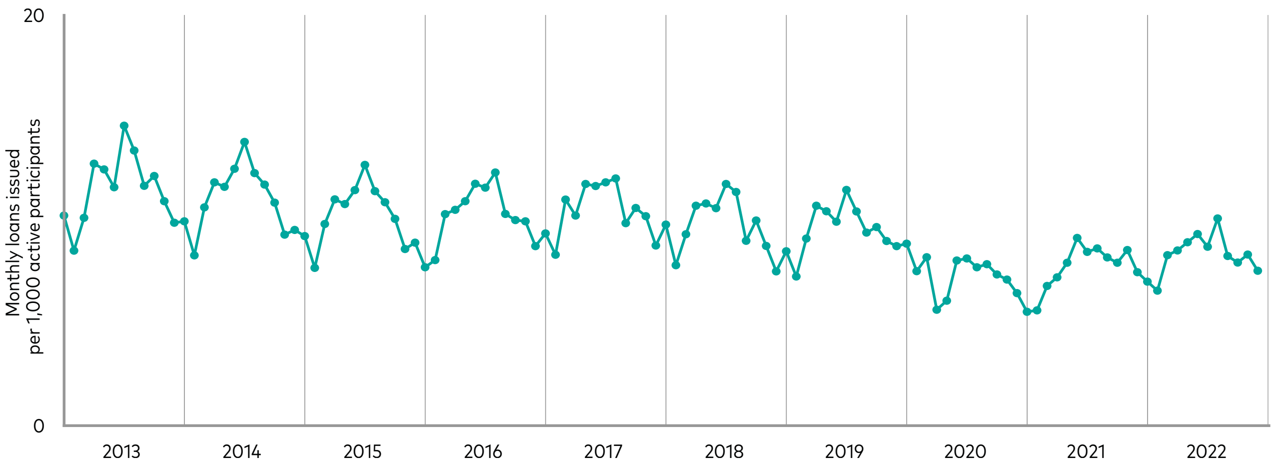
Source: Vanguard 2023.

Trends in new loan issuance

Among Vanguard plans, the fraction of participants taking loans from their DC plans has generally declined since 2013 **(Figure 108)**. In addition, for reasons not well understood, there appears to be a pronounced seasonality to taking loans, with borrowing typically peaking in the summer months. Throughout 2022, overall loan initiations increased modestly from 2021 but remained below the pre-pandemic rate.

Figure 108. Loan origination trend

Vanguard defined contribution active participants in plans offering loans



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Monthly average (per 1,000 participants)	11.5	11.0	10.2	10.2	10.5	9.8	9.6	7.4	7.6	8.3
Annual increase (decrease) in loans issued per 1,000 participants	4%	(4%)	(7%)	0%	3%	(7%)	(2%)	(22%)	3%	9%

Source: Vanguard 2023.

Plan withdrawals

Plan withdrawals allow participants to access their plan savings before a job change or retirement. Withdrawals are optional plan provisions and availability varies from plan to plan. They can be broadly classified into two categories—hardship and nonhardship withdrawals.

Hardship withdrawals allow participants to access a portion of their savings when they have a demonstrated financial hardship, such as receipt of an eviction or home foreclosure notice, but may also be used for such purposes as a college education, medical expenses, and the purchase of a home.

Nonhardship withdrawals include both post-age-59½ withdrawals and other withdrawals. Post-age-59½ withdrawals allow participants age 59½ and older to access their savings while they are working and are exempt from the 10% penalty on premature distributions. Some plans may also allow participants to withdraw employer profit-sharing contributions or after-tax contributions or roll over assets while they are working.

Among all Vanguard DC plans in 2022, 95% allowed hardship withdrawals and 89% allowed plan withdrawals for those age 59½ and older **(Figure 109)**. Of the participants permitted to take each type of withdrawal, 2.8% took a hardship withdrawal and 3.6% took a nonhardship withdrawal **(Figure 110)**.

Figure 109. Plan withdrawals, 2022
Vanguard defined contribution plans

Percentage of plans offering	
Hardship withdrawals	95%
Withdrawals after age 59½	89%

Source: Vanguard 2023.

Figure 110. Participant use of plan withdrawals
Vanguard defined contribution plans

	2018	2019	2020	2021	2022
Hardship withdrawals	1.9%	2.3%	1.7%	2.1%	2.8%
Nonhardship withdrawals	3.4%	3.3%	3.4%	4.0%	3.6%
Coronavirus distributions			5.7%		

Source: Vanguard 2023.

Beginning in 2013, the rate of new nonhardship withdrawals, such as post-age-59½ in-service or other withdrawals, was relatively consistent through 2019 **(Figure 111)**. The nonhardship withdrawal rate decreased in 2020, in part because of the availability of coronavirus-related distributions (CRDs), which were provided for in March 2020 when Congress passed the CARES Act. Incorporated within the bill were several provisions that provided flexibility for retirement savers, including CRDs. Individuals affected by COVID-19 were able to withdraw up to $100,000 from their retirement plan penalty free until December 30, 2020. In addition, the income tax due on these distributions could be spread over a three-year period, and investors had three years to return the funds to their account. As the availability of CRDs expired in 2020, nonhardship withdrawal activity has reverted to pre-pandemic levels.

From 2013 to 2018, the new hardship withdrawal rate remained relatively consistent while holding at a low absolute level. But in 2019, hardship withdrawal activity increased by nearly 50%. The Bipartisan Budget Act of 2019 introduced changes to hardship withdrawal provisions. These changes were designed to ease restrictions for participants who needed to access their qualified retirement plan assets because of an immediate financial need.

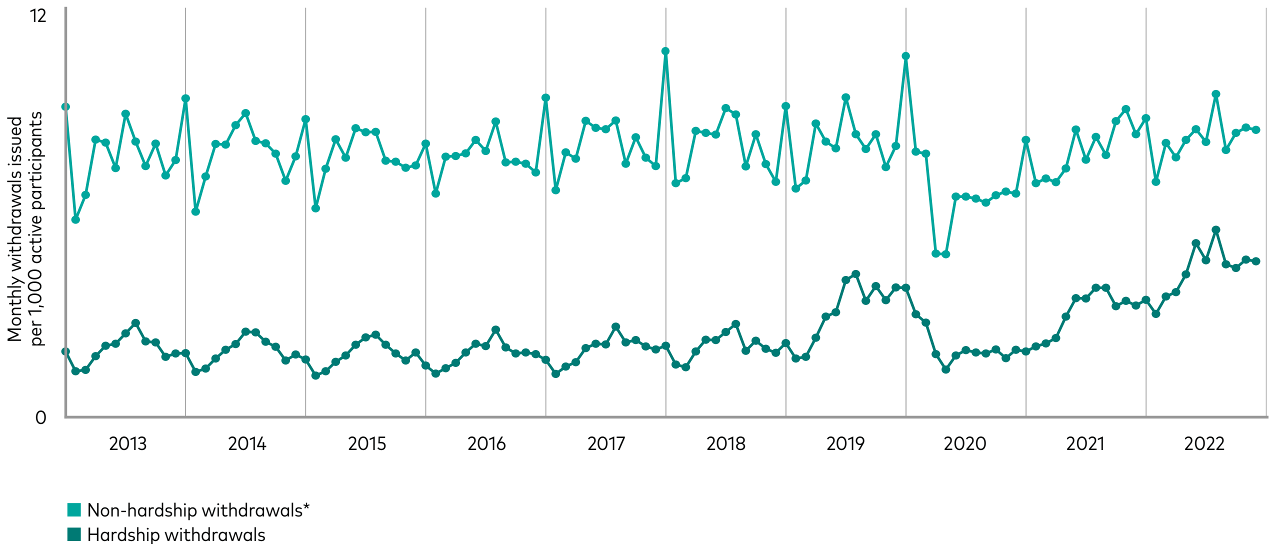
In 2020, the frequency of hardship withdrawals decreased by 16%. We speculate that the favorable treatment associated with CRDs led participants to utilize that withdrawal option if they met the criteria and their plan permitted it. In 2021, overall hardship withdrawal activity reverted to pre-pandemic levels from 2019, and in 2022, hardship withdrawal activity increased to a new high.

Given that it's now easier to request a hardship withdrawal and that automatic enrollment is helping more workers save for retirement, especially lower-income workers, a modest increase is not surprising. Although given the economic headwinds of 2022, the increase in hardship withdrawals may signal that some households faced additional financial stress.

In 2022, 36% of hardship withdrawals were used to avoid a home foreclosure or eviction, up from 31% of withdrawals in 2021 **(Figure 112)**. The second most common reason was medical expenses, as 1 in 3 hardship withdrawals were initiated for this purpose, in line with 2021.

Figure 111. In-service withdrawal trend

Vanguard defined contribution active participants in plans offering in-service withdrawals



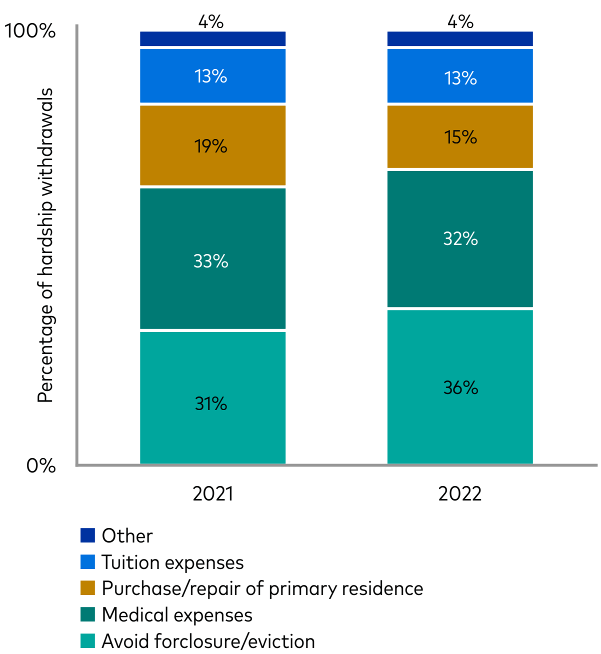
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Monthly average per 1,000 active participants	Nonhardship withdrawals	7.8	8.0	7.9	7.8	8.2	8.3	8.2	6.9	8.0	8.4
	Hardship withdrawals	2.0	2.0	1.9	1.9	2.0	2.1	3.1	2.2	3.0	4.3
Annual increase (decrease) per 1,000 active participants	Nonhardship withdrawals	11%	3%	(1%)	(1%)	5%	1%	(1%)	(16%)	16%	5%
	Hardship withdrawals	(5%)	0%	(5%)	0%	5%	5%	48%	(29%)	38%	42%

*Coronavirus-related distributions are excluded from this figure.

Source: Vanguard 2023.

Figure 112. Trend in hardship withdrawal reasons

Vanguard defined contribution plans



Source: Vanguard 2023.

Plan distributions and rollovers

When changing jobs or retiring, DC plan participants have the option of preserving their retirement savings (by retaining savings in the plan or rolling it over to an IRA or another DC plan) or taking a cash lump sum (and spending or investing it). If they choose to roll over their savings to an IRA or another qualified retirement plan, participants avoid paying taxes on the accumulated balance. If participants spend the lump-sum distribution or invest it in a taxable account, they incur a possible income tax liability (and a 10% penalty if they are younger than 59½).

Leakage from the retirement system—the spending of plan savings before retirement—is a concern for the future retirement security of participants. In the short run, they incur taxes and possible penalties on any amounts they spend. In the long run, because of the lost opportunity for compound earnings, participants significantly increase the amount they need to save during the remainder of their working years.

Policymakers have employed several methods to discourage leakage from participants who have terminated their employment. Generally, participants may keep plan savings in their employer's plan if their account balance is more than $5,000.

Also, plan distributions between $1,000 and $5,000 are generally rolled over automatically to an IRA unless the participant elects otherwise.

Balances of less than $1,000 may be distributed to the terminated participant. Most plans have adopted these provisions. Two percent of plans allowed participants with a balance of less than $1,000 to remain in the plan in 2022 **(Figure 113)**. In some cases, the sponsor may allow participants to retain a balance of $1,000 or more in the plan—15% of plans permitted these balances to remain in the plan.

Figure 113. Frequency of automatic distributions, 2022

Vanguard defined contribution plans

		Number of participants				
		All	**<500**	**500–999**	**1,000–4,999**	**5,000+**
Percentage of plans	Remain in plan (no automatic distribution)	2%	3%	1%	2%	2%
	Automatic cash-out if balance is <$1,000, remain in plan if balance is higher	15%	12%	13%	17%	22%
	Automatic cash-out if balance is <$1,000, rollover if balance is between $1,000 and <$5,000	83%	85%	86%	81%	76%
Percentage of participants offered	Remain in plan (no automatic distribution)	2%	2%	2%	3%	1%
	Automatic cash-out if balance is <$1,000, remain in plan if balance is higher	27%	11%	12%	16%	32%
	Automatic cash-out if balance is <$1,000, rollover if balance is between $1,000 and <$5,000	71%	87%	86%	81%	67%

Note: This analysis excludes approximately 80 403(b) plans and approximately 300,000 participants in those plans. Most 403(b) plan sponsors retain the right to execute these automatic distributions within their plan documents. However, because of the multiprovider environment many 403(b) plans operate within, and the coordination required to process these distributions, most 403(b) plan sponsors do not process these distributions.

Source: Vanguard 2023.

Most sponsors permitted indefinite deferral of savings, meaning that participant balances could remain in the employer plan if they were above the $5,000 (or $1,000) threshold. However, about 2% of sponsors required terminated participants to leave the plan by age 65 or age 70 **(Figure 114)**.

Nearly two-thirds of sponsors allowed participants to establish installment payments, and nearly 2 in 10 offered an annuity option for at least a portion of the plan assets. Eleven percent of plans offered an annuity as a general distribution option, while 7% of plans offered an annuity for a grandfathered source only. These annuity features are mostly associated with plan assets relating to a prior money purchase plan.

Finally, 39% of plans permitted terminated participants to take partial ad hoc cash distributions in 2022, up from 24% in 2017.[6] Seventy-four percent of participants can now take a partial ad hoc distribution. If a plan does not offer ad hoc distributions, it requires any terminated participant seeking to use any part of their retirement savings to withdraw or roll over the entire account balance. When it offers an ad hoc distribution feature, a plan can be used directly as a flexible source of income and withdrawals.

Figure 114. Distribution options, 2022

Vanguard defined contribution plans

		Number of participants				
		All	**<500**	**500–999**	**1,000–4,999**	**5,000+**
Percentage of plans	Deferral	100%	100%	100%	100%	100%
	Deferral only to age 65	2%	3%	4%	2%	2%
	Deferral only to age 70	<0.5%	<0.5%	1%	0%	1%
	Installments other than RMDs	65%	60%	64%	66%	85%
	Annuity	11%	12%	11%	8%	11%
	Annuity grandfathered source only	7%	7%	6%	6%	8%
	Ad hoc partial distributions	39%	23%	39%	53%	73%
Percentage of participants offered	Deferral	100%	100%	100%	100%	100%
	Deferral only to age 65	1%	3%	4%	2%	1%
	Deferral only to age 70	4%	<0.5%	1%	0%	5%
	Installments other than RMDs	81%	63%	64%	67%	86%
	Annuity	13%	12%	10%	8%	15%
	Annuity grandfathered source only	1%	1%	1%	1%	1%
	Ad hoc partial distributions	74%	28%	40%	56%	83%

Source: Vanguard 2023.

6 For a comprehensive analysis of distributions and the effect ad hoc distribution features have on participant behavior, see Jeffrey W. Clark and Joseph C. Walsh, ***Retirement Distribution Decisions Among DC Participants***. Vanguard research. February 2023.

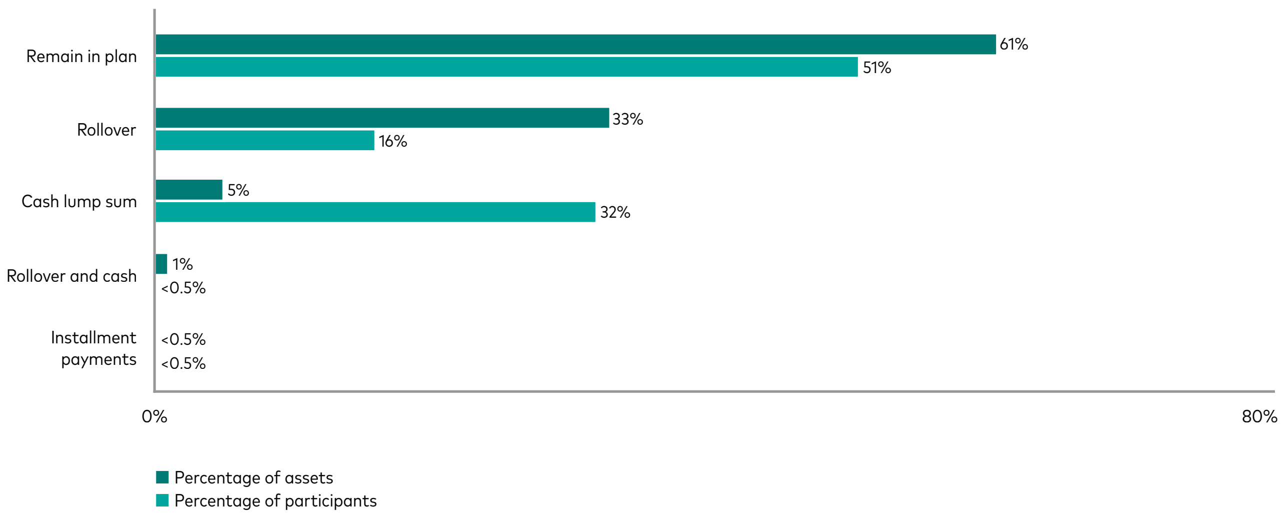
Participant and asset flows

Plan distributions are somewhat common when participants change jobs or retire, and they represent a large portion of total plan and participant assets. In 2022, 14% of participants left their employer and were eligible for a distribution. Their assets totaled 7% of Vanguard recordkeeping assets. Seven in 10 of these participants preserved their assets, either retained in the prior employer's plan, rolled over to an IRA, or rolled over to the new employer's plan **(Figure 115)**.

Figure 115. Plan distributions, 2022

Vanguard defined contribution plans

Participants with termination dates in 2022



Source: Vanguard 2023.

In 2022, 32% of participants took a cash distribution. Ninety-four percent of the assets available for distribution were preserved for retirement. The percentage of participants choosing to take cash and presumably spending their savings has remained stable over time **(Figure 116)**.

Figure 116. Trends in distribution of plan assets

Vanguard defined contribution plans

Participants with termination dates in the given year

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Percentage of participants choosing	Remain in plan	49%	49%	51%	50%	51%	48%	46%	49%	52%	51%
	Rollover	22%	22%	20%	19%	18%	18%	18%	19%	18%	16%
	Installment payments	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%	1%	<0.5%	<0.5%	<0.5%
	Participants preserving assets	71%	71%	71%	69%	69%	66%	65%	68%	70%	67%
	Cash lump sum	28%	28%	28%	30%	30%	33%	34%	31%	29%	32%
	Rollover and cash	1%	1%	1%	1%	1%	1%	1%	1%	1%	<0.5%
Percentage of assets available for distribution	Remain in plan	54%	53%	56%	59%	61%	56%	60%	63%	61%	61%
	Rollover	39%	40%	37%	35%	34%	37%	34%	32%	34%	33%
	Installment payments	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%	<0.5%
	Assets preserved for retirement	93%	93%	93%	94%	95%	93%	94%	95%	95%	94%
	Cash lump sum	5%	5%	5%	5%	4%	6%	5%	4%	4%	5%
	Rollover and cash	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%

Source: Vanguard 2023.

Determinants of distribution behavior

Age has a significant impact on distribution behavior. Younger participants are more likely than older participants to cash out, rather than save, their plan distributions. Yet most of the assets available for distribution are still preserved for retirement, even by younger individuals. In 2022, 36% of participants in their 20s chose to cash out their plan assets, compared with 24% of participants in their 60s **(Figure 117)**.

Figure 117. Plan distribution behavior by age, 2022

Vanguard defined contribution plans

Participants with termination dates in 2022

		20s	30s	40s	50s	60s	70s	Total
Percentage of participants choosing	Remain in plan	51%	52%	50%	51%	47%	28%	51%
	Rollover	13%	14%	15%	19%	28%	26%	16%
	Installment payments	0%	0%	0%	<0.5%	1%	16%	<0.5%
	Participants preserving assets	64%	66%	65%	70%	76%	70%	67%
	Cash lump sum	36%	33%	34%	29%	23%	29%	32%
	Rollover and cash	<0.5%	<0.5%	1%	1%	1%	1%	<0.5%
Percentage of assets available for distribution	Remain in plan	69%	70%	68%	64%	54%	41%	61%
	Rollover	19%	21%	24%	31%	42%	52%	33%
	Installment payments	0%	0%	0%	<0.5%	<0.5%	1%	<0.5%
	Assets preserved for retirement	91%	91%	92%	95%	96%	94%	94%
	Cash lump sum	11%	8%	7%	4%	3%	5%	5%
	Rollover and cash	<0.5%	<0.5%	1%	1%	1%	1%	1%

Source: Vanguard 2023.

In terms of assets, 91% of assets owned by participants in their 20s and 96% of assets owned by participants in their 60s were preserved. Account balances also had a significant impact on distribution behavior. Participants with smaller account balances were less likely to preserve their assets for retirement. Forty-one percent of participants with balances of less than $1,000 kept their balance in a tax-deferred account **(Figure 118)**. However, once balances reached $100,000, more than 90% of participants chose to preserve their assets.

A more nuanced view emerges when you consider both age and account balance. At most asset levels, younger participants are more likely to preserve their assets **(Figure 119)**. While participants in their 40s did overwhelmingly preserve their assets for retirement, at some asset levels they are slightly more likely than most other age groups to cash out their DC plan when changing jobs or retiring.

Our analysis thus far reflects the behavior of individuals who terminated employment in a given year, either by changing jobs or retiring. But it is also true that participants who terminated in previous years retain the right to withdraw their plan assets from their prior employer's plan at any time and roll over or spend the money.

Figure 118. Plan distribution behavior by account balance, 2022

Vanguard defined contribution plans

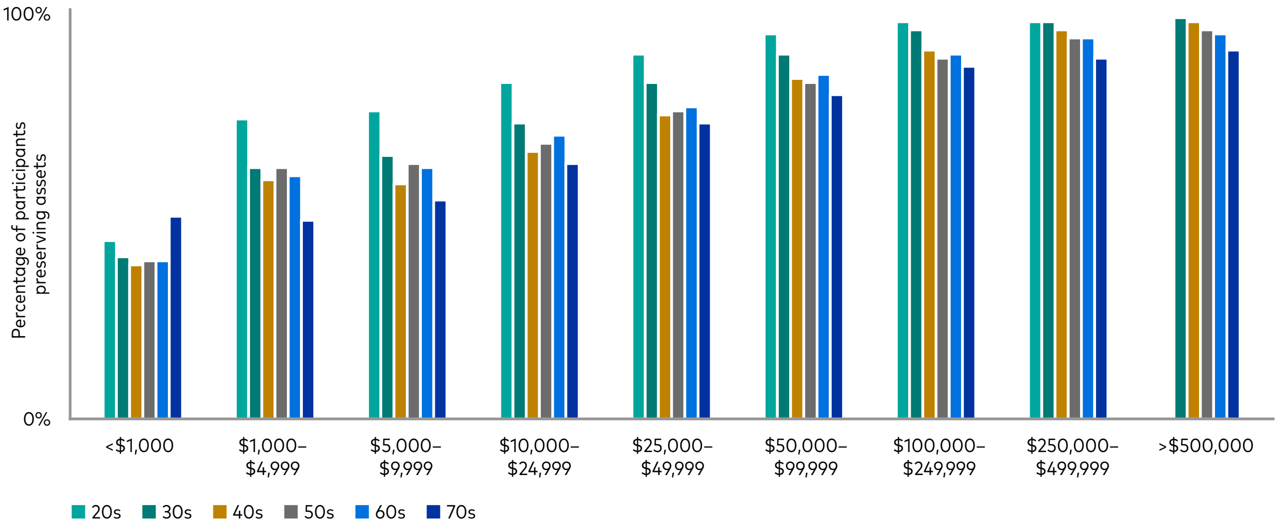
Participants with termination dates in 2022

Source: Vanguard 2023.

Figure 119. Plan distribution behavior by age and account balance, 2022

Vanguard defined contribution plans

Participants with termination dates in 2022



Source: Vanguard 2023.

A more optimistic picture of plan distribution behavior emerges if we analyze the total plan assets available for distribution at any given time. During 2022, more than one-quarter of all Vanguard qualified plan participants could have taken their plan account as a cash distribution because they had separated from service in the current year or prior years. However, just 19% of participants eligible for a cash distribution took one, while the vast majority (81%) continued to preserve their plan assets for retirement **(Figure 120)**. In terms of assets, 97% of all plan assets available for distribution were preserved—either rolled over to an IRA or other qualified plan or left in the former employer's plan. Only 3% of assets were distributed in cash.

Figure 120. Alternative view of distribution of plan assets

Vanguard defined contribution plans

All terminated participants with access to plan savings in the given year

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Percentage of participants choosing	Remain in plan	68%	68%	69%	67%	68%	65%	63%	67%	67%	66%
	Rollover	14%	14%	13%	12%	12%	12%	13%	13%	12%	11%
	Installment payments	3%	3%	3%	3%	4%	4%	4%	3%	4%	4%
	Participants preserving assets	85%	85%	85%	82%	84%	81%	80%	83%	83%	81%
	Cash lump sum	14%	14%	14%	17%	15%	18%	19%	17%	17%	19%
	Rollover and cash	1%	1%	1%	1%	1%	1%	1%	<0.5%	<0.5%	<0.5%
Percentage of assets available for distribution	Remain in plan	76%	76%	77%	78%	80%	76%	78%	82%	81%	80%
	Rollover	20%	20%	19%	18%	17%	19%	17%	15%	16%	16%
	Installment payments	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
	Assets preserved for retirement	97%	97%	97%	97%	98%	96%	96%	98%	98%	97%
	Cash lump sum	2%	2%	2%	2%	1%	3%	3%	2%	2%	3%
	Rollover and cash	1%	1%	1%	1%	1%	1%	1%	<0.5%	<0.5%	<0.5%

Source: Vanguard 2023.

Access methods

Within Vanguard DC plans, a variety of services have evolved to foster participant control of plan savings and to facilitate savings, investment, and withdrawal decisions—including telephone associates, voice-response systems, websites, and mobile applications. Participant access to retirement accounts is quite varied, ranging from those who did not contact their provider at all in a given year to those who did so multiple times a month.

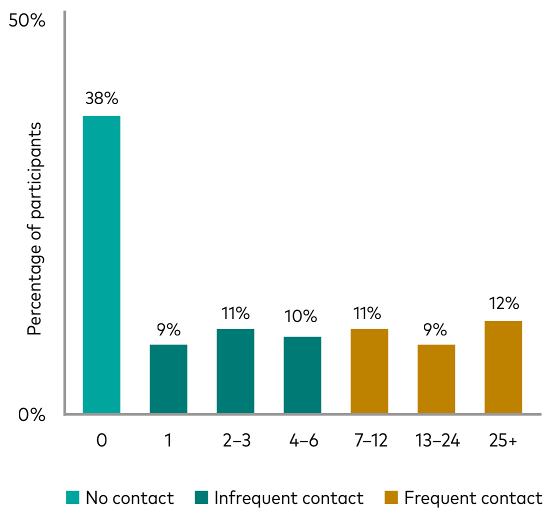
Frequency of account access

In 2022, 62% of plan participants contacted Vanguard regarding their plan account **(Figure 121)**. This ratio decreased in 2022 from 10-year highs in 2020 and 2021 **(Figure 122)**. For participants who did not contact Vanguard, their sole method for reviewing plan balances was quarterly account statements. These participants also received Vanguard's participant electronic newsletter, fee and other regulatory disclosures, and education or communication programs in print or via electronic means.

About one-third of participants contacted Vanguard intermittently. This group interacted with Vanguard between one and six times per year through a telephone associate, an automated voice-response system, a mobile application, or the website. Another one-third of participants contacted Vanguard frequently. This group, using all channels, contacted Vanguard at least monthly. This level of contact may seem high, but keep in mind that for those using a mobile application or the website, a brief login to examine account balances constitutes a unique contact event.

Figure 121. Participant contact frequency, 2022

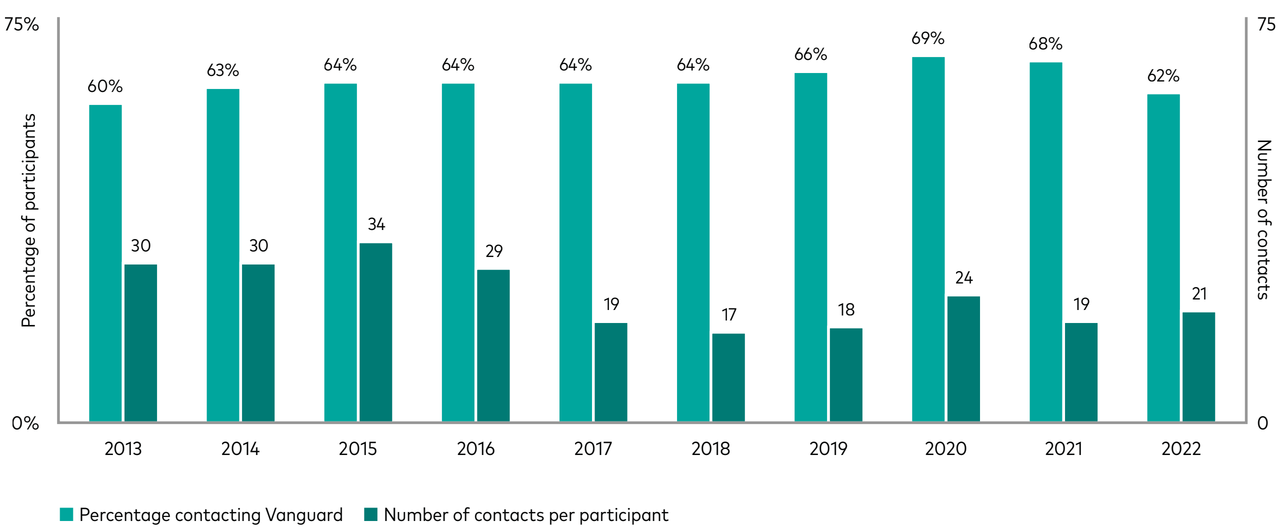
Vanguard defined contribution plans



Source: Vanguard 2023.

Figure 122. Participant contact trend

Vanguard defined contribution plans



Source: Vanguard 2023.

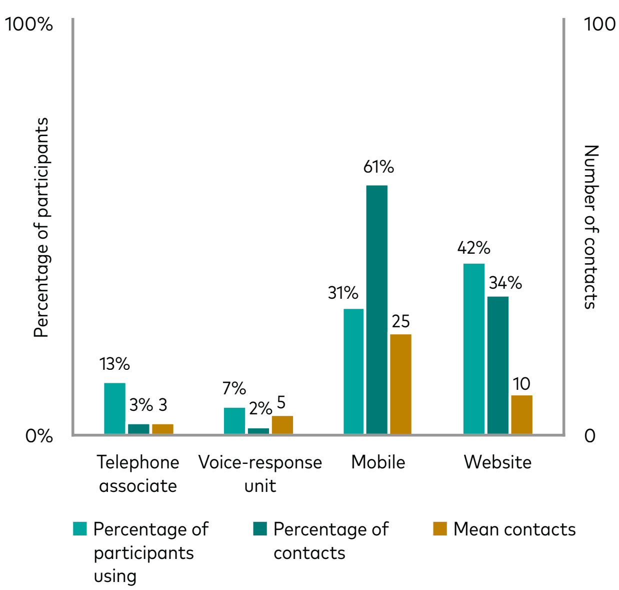
Account balances were a strong influence on contact behavior. The larger a participant's balance, the more likely they were to be proactive in obtaining information about their Vanguard plan account. Participants with account balances of more than $100,000 contacted Vanguard about 50% more often compared with the entire participant population.

Types of account access

Participants have four access channels at their disposal: toll-free phone calls to telephone associates, toll-free phone calls to an automated voice-response system, a mobile application, and the website. When measured in terms of total participant use, the website remained the most widely used channel in 2022—42% used the website, compared with 31% who used a mobile application **(Figure 123)**. In terms of total contacts, the website and mobile access dominated with 95% of total contacts. Website interactions accounted for 34% of all participant contacts and mobile access stood at 61%, an all-time high.

Figure 123. Account access methods, 2022

Vanguard defined contribution plans



Source: Vanguard 2023.

In addition, while participants using the website as a contact method averaged 10 interactions in 2022, participants using mobile applications averaged more than twice as many contacts. Each distinct login is counted as a unique contact event.

The portion of participants selecting a mobile access channel has significantly grown since 2013 **(Figure 124)**. Given current trends, the website and mobile applications are expected to continue as dominant contact channels, and the increasing adoption of mobile applications is likely to continue over the next few years.

Figure 124. Account access trend

Vanguard defined contribution plans

Percentage of participants contacting Vanguard via ...

	2013	2022	Change
Website, mobile, telephone associate, or voice response	60%	62%	3%
Website	53%	42%	-21%
Mobile	6%	31%	417%
Telephone associate	19%	13%	-32%
Voice-response unit	11%	7%	-36%
Participants registered for website access	70%	79%	13%

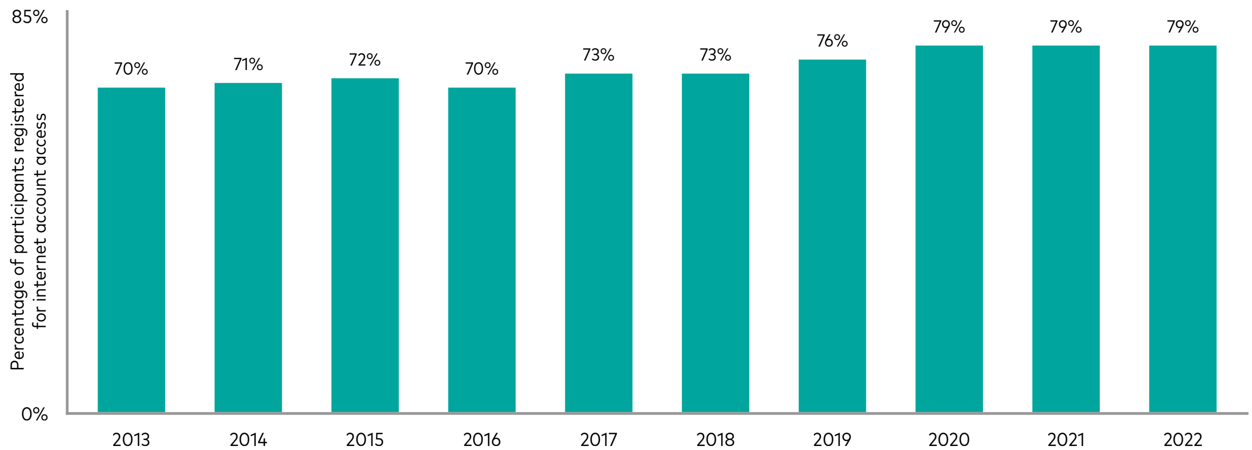
Source: Vanguard 2023.

Participant registration for website access to their DC plan account has fueled this growth. Seventy-nine percent of participants were registered for the website in 2022, 13% more than in 2013 **(Figure 125)**.

Participants are increasingly choosing mobile applications as the preferred access channel for transactions, as 36% of all transactions were processed via a mobile application in 2022, up from 16% in 2020 **(Figure 126)**.

Figure 125. Internet access trend

Vanguard defined contribution plans

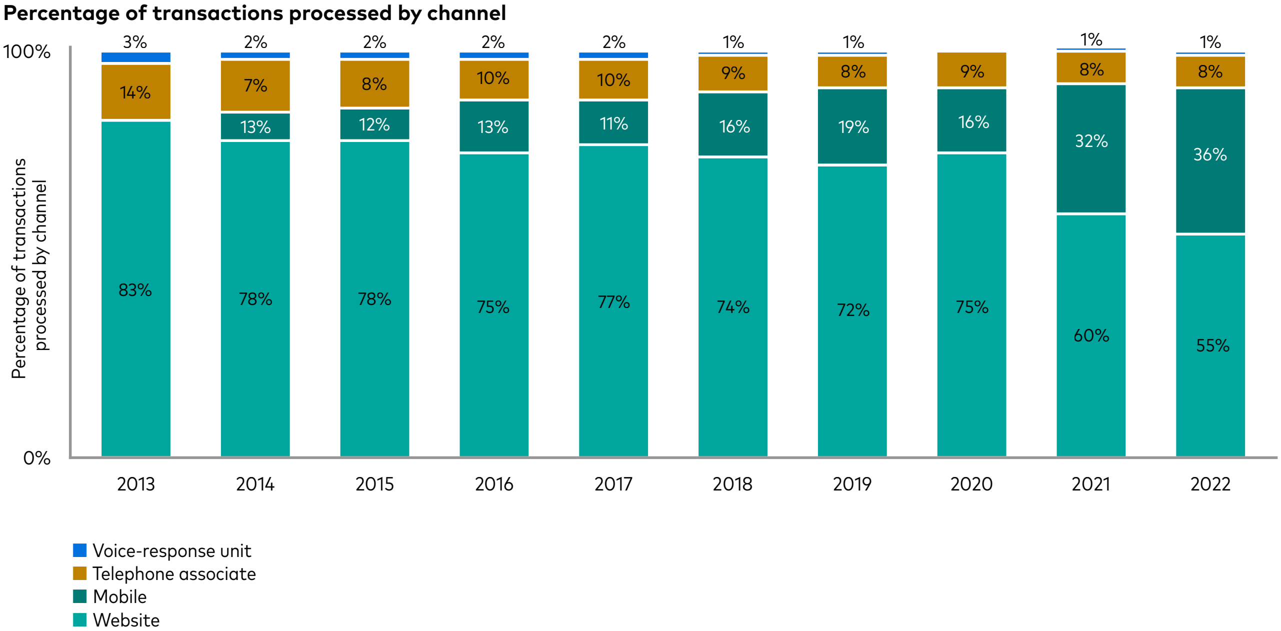


Source: Vanguard 2023.

Figure 126. Participant channel utilization trend

Vanguard defined contribution plans

Percentage of transactions processed by channel



Source: Vanguard 2023.

Methodology

The Vanguard data included in this report is drawn from several sources.

Defined contribution clients

This universe consists of approximately 1,700 qualified plans, 1,400 clients, and nearly 5 million participants for which Vanguard directly provides recordkeeping services. About 9 in 10 of these plans have a 401(k) or 403(b) employee-contributory feature; the other 1 in 10 is an employer-contributory DC plan, such as a profit-sharing or money purchase plan, in which investments are directed by participants. Unless otherwise noted, all references to "Vanguard" are to this universe, and all data is as of December 31, 2022.

Vanguard participation and deferral rates

Data on participation and deferral rates is drawn from a subset of Vanguard recordkeeping clients for whom we perform nondiscrimination testing. Selected plan design features are also derived from this data. For the 2022 analysis, the subset is composed of plans that complete their testing by March and represents approximately one-third of the clients for whom we perform testing. Plans that complete their testing by March generally have lower participation rates and generally include plans with concerns related to passing testing. When all plans have completed their testing by the end of 2022, the participation rates typically improve. Plan design features derived from this data will also most likely improve.

Based on the trends experienced over previous years, we have estimated participation and deferral rates for 2022. The estimations use a combination of linear extrapolation and subjective estimation. The same approach is applied to plan design features derived from this data. We will continue to restate these results in the following year based on the final compliance testing results.

The 2021 restated analysis includes approximately 900 plans and 2.1 million participants and eligible nonparticipants. Almost all of these plans are 401(k) or paired 401(k)/profit-sharing plans. Income data used in participation and deferral rate analyses also come from this subset of plans.

Our report for small businesses

Small businesses should think big when it comes to retirement plan design. Every other year, Vanguard brings you small business insights in ***DC Plan Comparison: Small Versus Large Employers.***

Industry benchmark data supplemental to *How America Saves 2023*

Industry benchmarking based on the data behind *How America Saves 2023* is available for the following industries on the **institutional.vanguard.com** website.

- Ambulatory health care services
- Architecture and engineering
- Construction
- Finance
- Information
- Insurance
- Legal services
- Manufacturing
- Mining, quarrying, and oil and gas extraction
- Professional, scientific, and technical services
- Retail trade
- Technology
- Transportation and warehousing
- Unions
- Utilities
- Wholesale trade

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