HOW AMERICA SAVES **2018**

Vanguard 2017 defined contribution plan data

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Defined contribution (DC) retirement plans are the centerpiece of the private-sector retirement system in the United States. More than 97 million Americans are covered by DC plan accounts, with assets now in excess of $7.5 trillion.[1]

Vanguard is among the leaders in the DC marketplace with more than $1.2 trillion in DC assets under management as of March 31, 2018. In our DC recordkeeping business, we serve more than 10,800 plan sponsors and more than 4.9 million participants. As an industry leader, Vanguard recognizes the importance of having a detailed understanding of DC plans and the role they play in the U.S. retirement system. Accordingly, we are pleased to present *How America Saves 2018: A report on Vanguard 2017 defined contribution plan data.* In this 17th edition of *How America Saves*, we update our analysis of DC plans and participant behavior based on 2017 Vanguard recordkeeping data.

Participants' adoption of professionally managed allocations continues to grow. In 2017, 58% of Vanguard participants had their entire account balance invested in either a single target-date fund, a single target-risk or traditional balanced fund, or a managed account advisory service. These professionally managed investment options have the potential to reshape retirement savings outcomes for these participants. They signal a shift in responsibility for investment decision-making away from the participant and back to employer-selected investment and advice programs.

The first edition of *How America Saves* was published in 2000. In 2011, we introduced a series of benchmark data supplements for selected industry sectors, which have been very well received. A list of the sectors covered is on page 112.

In 2014, we introduced a supplement dedicated to Vanguard Retirement Plan Access™ (VRPA) clients and are pleased to present our analysis of these small business plans again in 2018. VRPA is a comprehensive service for retirement plans with up to $20-plus million in assets.

We are confident this report will continue to serve as a valuable reference tool and that our observations will prove useful as your organization continues to develop its retirement programs.

Sincerely,

Martha

1 U.S. Department of Labor, Private Pension Plan Bulletin Historical Tables and Graphs, February 2018; and Investment Company Institute, Quarterly Retirement Market Data, Fourth Quarter 2017, April 2018.

CONTENTS

Executive summary

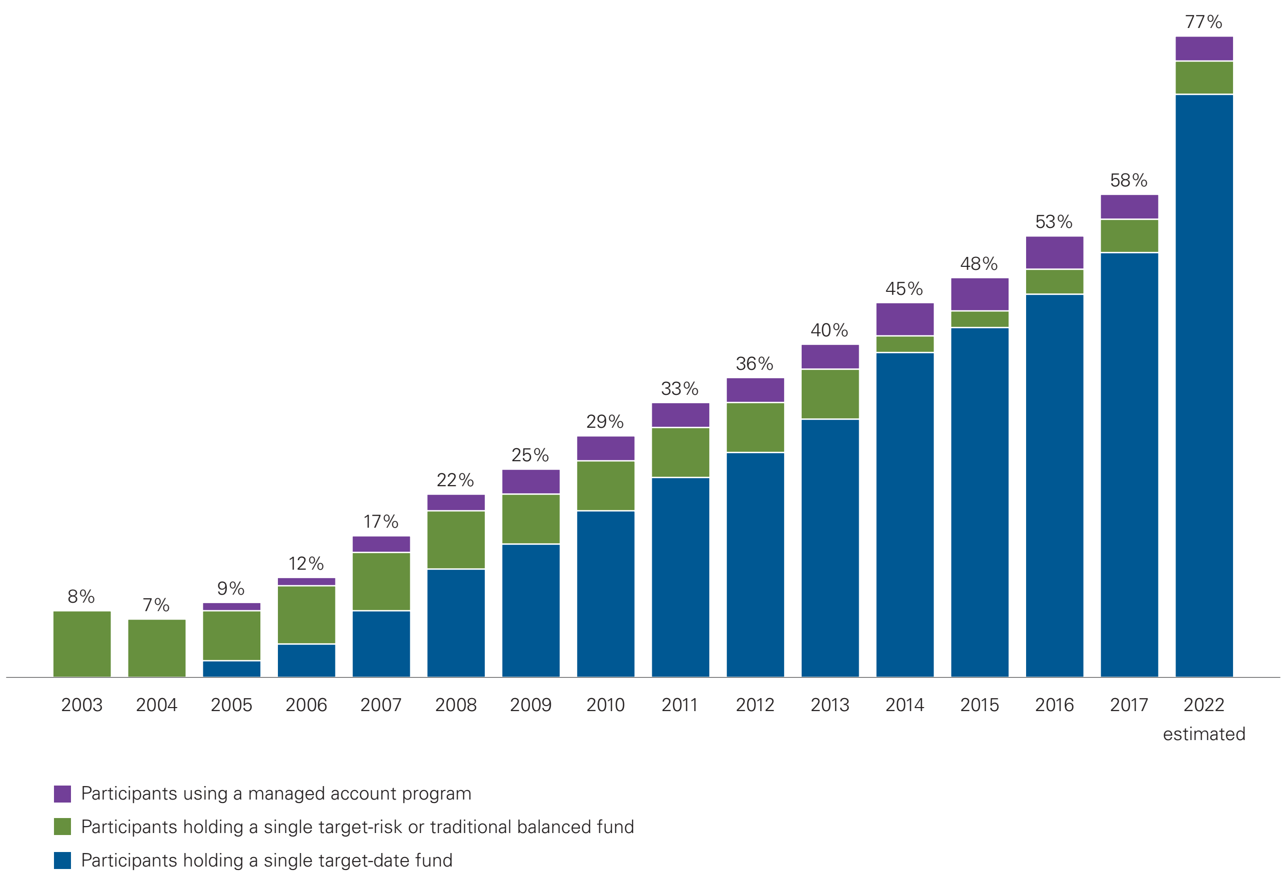
In 2006, Congress passed the Pension Protection Act (PPA), which introduced fiduciary and tax incentives to encourage broader adoption of automatic enrollment, automatic savings increases, and balanced investment approaches. Over the past decade, plan sponsors have increasingly turned to plan design to influence employee retirement savings behavior. As a result, plan participation rates have improved and participant portfolio construction has also improved. However, as we look to the future, the main concerns affecting retirement savings plans still remain largely the same—improving plan participation and contribution rates even further and continuing to enhance portfolio diversification—enabling more individuals to retire with sufficient assets.

This year, we are providing a 15-year look back highlighting automatic enrollment and the evolution of balanced investment strategies.

Professionally managed allocations

Underlying the improvements in portfolio construction is the rising prominence of professionally managed allocations. Participants with professionally managed allocations are those who have their entire account balance invested in a single target-date or balanced fund or a managed account advisory service. At year-end 2017, nearly 6 in 10 of all Vanguard participants were solely invested in an automatic investment program—compared with just 1 in 10 at the end of 2003 and just 2 in 10 at the end of 2007. Fifty-one percent of all participants were invested in a single target-date fund; another 4% held one other balanced fund; and 3% used a managed account program. These diversified, professionally managed investment portfolios dramatically improve portfolio diversification compared with participants making choices on their own. Among new plan entrants (participants entering the plan for the first time in 2017), nearly 9 in 10 were solely invested in a professionally managed allocation.

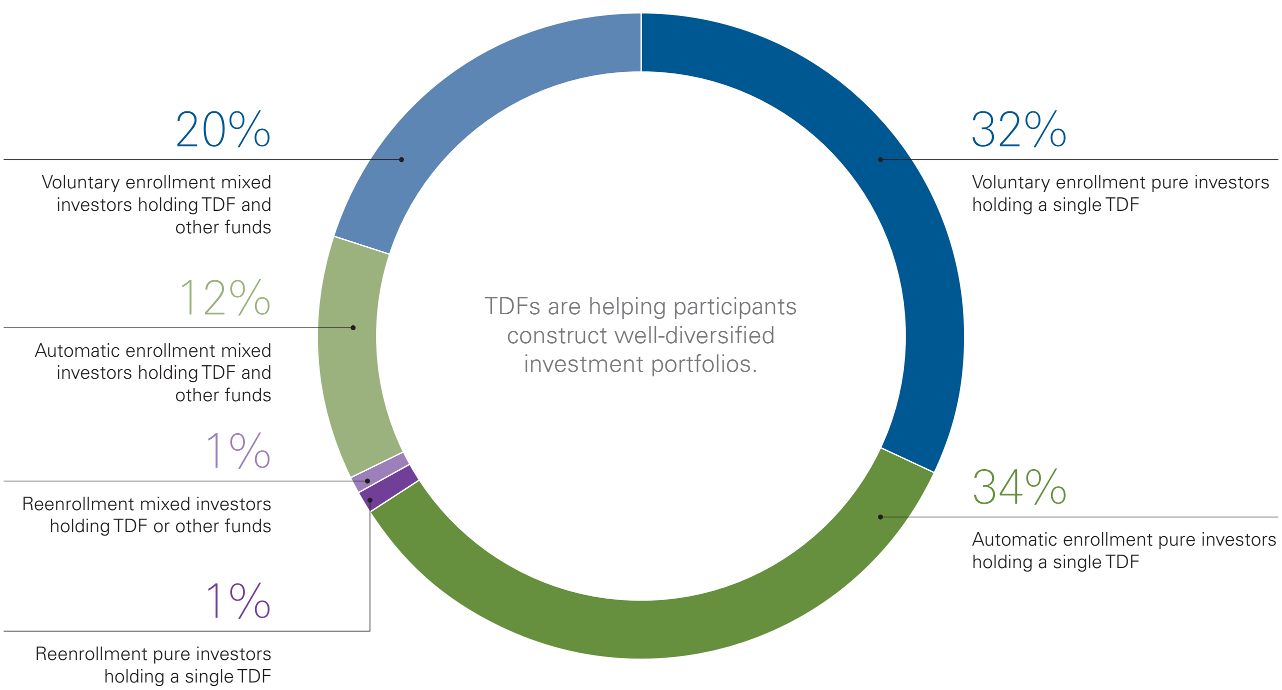
Because of the growing use of target-date options, we anticipate that by 2022 more than three-quarters of Vanguard participants will be solely invested in an automatic investment program.

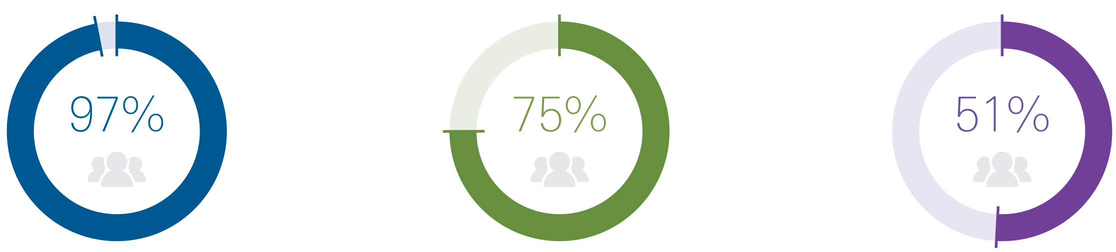


Growth in use of target-date funds

Use of target-date strategies in DC plans continues to grow. Nine in 10 plan sponsors offered target-date funds at year-end 2017, up more than 50% compared with year-end 2007. Nearly all Vanguard participants (97%) are in plans offering target-date funds. Seventy-five percent of all participants use target-date funds. Two-thirds of participants owning target-date funds have their entire account invested in a single target-date fund. Fifty-one percent of all Vanguard participants are wholly invested in a single target-date fund, either by voluntary choice or by default.

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. That said, voluntary choice is still important, with half of single target-date investors choosing the funds on their own, not through default.





Participants **offered target-date funds** at year-end 2017

Participants using target-date funds

Participants with **entire account invested** in a single target-date fund

Growth of automatic savings features

The adoption of automatic enrollment has tripled since year-end 2007. At year-end 2017, 46% of Vanguard plans had adopted automatic enrollment. In 2017, because larger plans were more likely to offer automatic enrollment, 63% of new plan entrants in 2017 were enrolled via automatic enrollment.

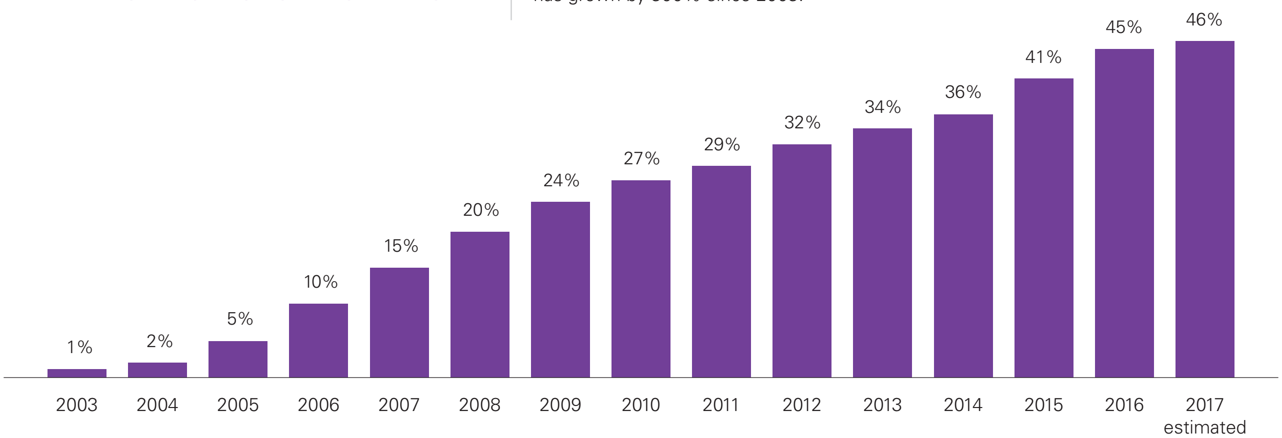
Slightly more than 60% of all contributing participants in 2017 were in plans with automatic enrollment. The automatic enrollment feature, while initially applied only to new hires, has now been applied to eligible nonparticipants in half of Vanguard plans with the feature. Thirty-seven percent of contributing participants in 2017 joined their plan under automatic enrollment.

Two-thirds of automatic enrollment plans have implemented automatic annual deferral rate increases. In 2017, automatic increases narrowed the spread between deferral rates for participants in voluntary enrollment plans as compared with automatic enrollment plans to 0.3 basis points. Participants in voluntary plans had a deferral rate of 7.0% compared with participants in automatic plans where the deferral rate was 6.7%. During the past ten years, this spread has ranged from no difference in 2016 to 2.5 percentage points in 2008.

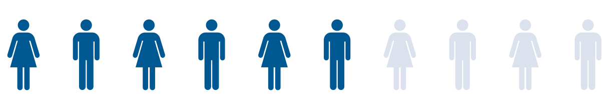
Ninety-nine percent of all plans with automatic enrollment default participants into a balanced investment strategy—with 97% choosing a target-date fund as the default.

Automatic enrollment

Adoption of automatic enrollment has grown by 300% since 2003.



Slightly more than 60% of all contributing participants hired in 2017 were in plans with automatic enrollment.



Two-thirds of automatic enrollment plans have implemented automatic annual deferral rate increases.

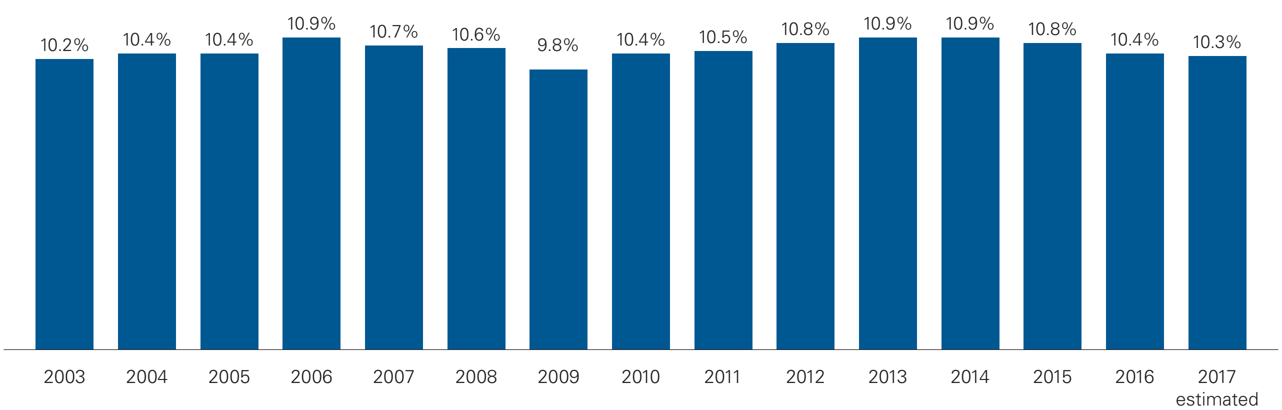
High-level savings metrics

High-level metrics of participant savings behavior were mixed in 2017. The estimated (see Methodology on page 112) plan-weighted participation rate was 81% in 2017, unchanged from 2016. The participant-weighted participation rate was 72% in 2017, essentially the same as compared with 2008. Plans with automatic enrollment have a 92% participation rate compared with a participation rate of just 57% for plans with voluntary enrollment. Between 2008 and 2017, plans with automatic enrollment have had steadily rising participation rates. However, as more plans adopt automatic enrollment, the remaining pool of plans with voluntary enrollment have seen participation rates deteriorate.

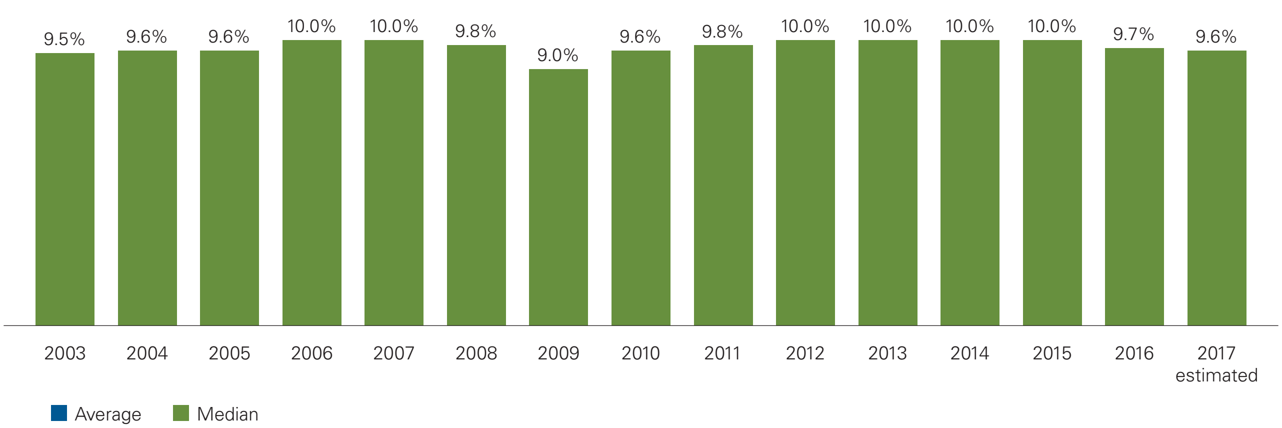
The average deferral rate was 6.8% in 2017, the same as it was in 2016. The median deferral rate was 6% in 2017—unchanged for as long as we have been tracking this metric.

These statistics reflect the level of employee-elective deferrals. Most Vanguard plans also make employer contributions. Including both employee and employer contributions, the average 15-year total participant contribution rate in 2017 was 10.5% and the median was 9.7%. These saving rates have remained fairly stable for the past 15 years.

10.5% 15-year average aggregate participant and employer contribution rates



9.7% 15-year average median aggregate participant and employer contribution rates



Roth 401(k) adoption

At year-end 2017, the Roth feature was adopted by 68% of Vanguard plans, and 12% of participants within these plans had elected the option. We anticipate steady growth in Roth adoption rates, given the feature's tax diversification benefits. However, all plan sponsors with automatic enrollment default to traditional pre-tax savings.

Account balances and returns

In 2017, the average account balance for Vanguard participants was $103,866; the median balance was $26,331. In 2017, Vanguard participants' average account balances rose by 8% compared with 2016 and median account balances rose by 7%. Two factors are driving the changes in participant account balances. The first is a changing business mix—new plans converting to Vanguard recently have had lower account balances. The second is the rising adoption of automatic enrollment, which results in more individuals saving, but also a growing number of smaller balances. As noted above, by the end of 2017, nearly 4 in 10 participants had joined their plan under automatic enrollment.

The median one-year participant total return was 18.0%. Five-year participant total returns averaged 10.2% per year. Among continuous participants—those with a balance at year-end 2012 and 2017—the median account balance rose by 128% over five years, reflecting both the effect of ongoing contributions and strong market returns during this period. More than 90% of continuous participants saw their account balances rise during the five-year period ended December 31, 2017.

Presence of index core options

Given the growing focus on plan fees, there is increased interest among plan sponsors in offering a wider range of low-cost passive or index funds. A "passive core" is a comprehensive set of low-cost index options that span the global capital markets. In 2017, 61% of Vanguard plans offered a set of options providing an index core. Over the past decade, the number of plans offering an index core has grown by 75%. Because large plans have adopted this approach more quickly, 70% of all Vanguard participants were offered an index core as part of the overall plan investment menu. Factoring in passive target-date funds, 8 in 10 participants hold index equity investments.

Shift in participant investment allocations

The percentage of plan assets invested in equities was 73% in 2017, essentially unchanged from 2016. Equity allocations continue to vary dramatically among participants. One in 10 participants has taken an extreme position, holding either 100% in equities (5% of participants) or no equities (3% of participants). These extreme allocations have fallen in recent years as a result of the rise of target-date funds and other professionally managed allocations.

Participant contributions to equities were unchanged in 2017 at 75%. In 2017, more than half (54%) of all new contributions to these plans were directed to target-date funds.

Participant trading muted

During 2017, only 8% of DC plan participants traded within their accounts, while 92% did not initiate any exchanges. On a net basis, there was a shift of 0.3% of assets to fixed income in 2017, with most traders making small changes to their portfolios. Less than 1% of all participants abandoned equities during the year—that is, shifted from a portfolio with some equity exposure to a portfolio with no equity exposure.

Over the past decade, we have observed a decline in participant trading. The decline in participant trading is partially attributable to participants' increased adoption of target-date funds. Only 2% of participants holding a single target-date fund traded in 2017.

Drop in company stock exposure

A shift away from company stock holdings first observed in 2006 continued into 2017. Among plans offering company stock, the number of participants holding a concentrated position of more than 20% of their account balance fell from 30% in 2008 to 19% in 2017. In addition, the number of plans actively offering company stock to participants declined to 9% in 2017 from 11% in 2008. As a result, only 5% of all Vanguard participants held concentrated company stock positions in 2017, compared with 11% at the end of 2008.

Loan activity flat

There was a modest change in new loans issued in 2017. In 2017, 15% of participants had a loan outstanding compared with 18% of participants in 2013. The average loan balance was $9,700. Only about 1% of aggregate plan assets were borrowed by participants.

In-service withdrawals

During 2017, 3% of participants took an in-service withdrawal, withdrawing about one-third of their account balances. All in-service withdrawals during 2017 amounted to 1% of aggregate plan assets.

Assets largely preserved for retirement

Participants separating from service largely preserved their assets for retirement. During 2017, about one-third of all participants could have taken their account as a distribution because they had separated from service in the current year or prior years. The majority of these participants (84%) 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, 98% of all plan assets available for distribution were preserved and only 2% were taken in cash.

Estimated data

Some charts in this edition contain "2017 estimated" data. For an explanation, please see the Methodology section on page 112.

Defined contribution (DC) retirement plans are the centerpiece of the private-sector retirement system in the United States. More than 97 million Americans are covered by DC plan accounts, with assets now in excess of $7.5 trillion.

Figure 1. Highlights at a glance

Vanguard recordkeeping statistics	*How America Saves 2018* reference	2013	2014	2015	2016	2017
Number of participant accounts (millions)		3.4	3.6	3.9	4.4	4.6
Number of plans (thousands)		1.9	1.9	1.9	1.9	1.9
Median participant age		46	46	46	45	45
Median participant tenure		8	7	7	6	6
Percentage male		59%	59%	59%	58%	58%
Median eligible employee income (thousands)		$63	$63	$66	$58	$59*
Median participant income (thousands)		$70	$70	$73	$69	$67*
Median nonparticipant income (thousands)		$45	$45	$44	$34	$33*

1. Accumulating

Plan design—page 17						
Plans offering immediate eligibility for employee contributions	Figure 3	61%	65%	66%	68%	67%*
Plans requiring one year of service for matching contributions	Figure 3	26%	26%	23%	24%	25%*
Plans providing an employer contribution	Figure 6	91%	94%	95%	96%	96%*
Plans with automatic enrollment	Figure 16	34%	36%	41%	45%	46%
Plans with automatic enrollment with automatic annual increases	Figure 19	69%	70%	70%	67%	66%
Plans offering catch-up contributions	Figure 42	97%	97%	97%	98%	98%
Plans offering Roth contributions	Figure 43	52%	56%	60%	65%	68%
Plans offering after-tax contributions	Figure 44	19%	18%	18%	18%	17%

Participation rates—page 32						
Plan-weighted participation rate	Figure 24	78%	79%	81%	81%	81%*
Participant-weighted participation rate	Figure 24	75%	77%	78%	71%	72%*
Voluntary enrollment participant-weighted participation rate	Figure 30	70%	64%	64%	56%	57%*
Automatic enrollment participant-weighted participation rate	Figure 30	89%	91%	92%	92%	92%*
Participants using catch-up contributions (when offered)	Figure 42	14%	14%	15%	14%	14%*
Participants using Roth (when offered)	Figure 43	12%	12%	13%	13%	12%*
Participants using after-tax (when offered)	Figure 44	7%	8%	8%	8%	7%*

Employee deferrals—page 37						
Average participant deferral rate	Figure 33	7.0%	6.8%	6.9%	6.8%	6.8%*
Median participant deferral rate	Figure 33	6.0%	6.0%	6.0%	6.0%	6.0%*
Percentage of participants deferring more than 10%	Figure 34	20%	19%	20%	20%	20%*
Voluntary enrollment plan average participant deferral rate	Figure 39	7.5%	7.3%	7.3%	6.8%	7.0%*
Automatic enrollment plan average participant deferral rate	Figure 39	5.6%	6.5%	6.7%	6.8%	6.7%*
Participants reaching 402(g) limit ($18,000 in 2017)	Figure 41	11%	11%	13%	13%	13%*
Average total contribution rate (participant and employer)	Figure 45	10.9%	10.9%	10.8%	10.4%	10.3%*
Median total contribution rate (participant and employer)	Figure 45	10.0%	10.0%	10.0%	9.7%	9.6%*

Account balances—page 48						
Average balance	Figure 48	$101,650	$102,682	$96,288	$96,495	$103,866
Median balance	Figure 48	$31,396	$29,603	$26,405	$24,713	$26,331

2. Managing

Asset and contribution allocations—page 55						
Average plan asset allocation to equities	Figure 55	71%	72%	71%	71%	73%
Average plan contribution allocation to equities	Figure 56	71%	74%	74%	74%	75%
Average plan asset allocation to target-date funds	Figure 55	19%	23%	26%	28%	33%

* Estimated, please see the Methodology section on page 112.

(Continued)

Figure 1.	Highlights at a glance

2. Managing (continued)

Asset and contribution allocations—page 55	*How America Saves 2018* reference	2013	2014	2015	2016	2017
Average plan contribution allocation to target-date funds	Figure 56	34%	41%	46%	49%	54%
Participants with balanced strategies	Figure 84	66%	69%	70%	71%	74%
Extreme participant asset allocations (100% fixed income or equity)	Figure 82	14%	13%	12%	10%	10%
Plan investment options—page 59						
Average number of funds offered	Figure 60	18.2	18.3	18.1	17.9	18.0
Average number of funds used	Figure 60	3.1	2.9	2.8	2.7	2.5
Plans offering an index core	Figure 64	49%	52%	54%	57%	61%
Participants offered an index core	Figure 65	59%	64%	67%	70%	72%
Percentage of plans designating a QDIA	Figure 66	70%	71%	77%	80%	79%
Among plans designating a QDIA, percentage target-date fund	Figure 66	91%	94%	95%	96%	96%
Plans offering target-date funds	Figure 74	86%	88%	90%	92%	92%
Participants using target-date funds (when offered)	Figure 77	61%	66%	70%	74%	77%
Plans offering managed account program	Figure 70	19%	22%	25%	27%	30%
Participants offered managed account program	Figure 70	52%	55%	57%	53%	55%
Participants with professionally managed allocations	Figure 71	40%	45%	48%	53%	58%
Participants using a single target-date fund	Figure 71	31%	39%	42%	46%	51%
Participants using a single risk-based balanced fund	Figure 71	6%	2%	2%	3%	4%
Participants using a managed account program	Figure 71	3%	4%	4%	4%	3%
Plans offering company stock	Figure 70	10%	10%	10%	9%	9%
Participants using company stock	Figure 70	15%	14%	14%	12%	10%
Participants with >20% company stock	Text page 82	9%	8%	7%	6%	5%
Investment returns—page 84						
Average 1-year participant total return rate	Figure 90	20.4%	7.0%	(0.4%)	8.3%	18.0%
Average 1-year participant personal return rate	Figure 90	19.9%	6.8%	(0.8%)	8.2%	17.4%
Trading activity—page 88						
Participant-directed trading	Figure 94	10%	10%	9%	8%	8%
Recordkeeping assets exchanged to equities (fixed income)	Figure 94	0.2%	(0.6%)	(0.8%)	(1.5%)	(0.3%)

3. Accessing

Plan loans—page 95						
Plans offering loans	Text page 95	77%	77%	78%	79%	80%
Participants with an outstanding loan (when offered)	Figure 101	18%	17%	16%	16%	15%
Recordkeeping assets borrowed	Text page 97	2%	1%	1%	1%	1%
Plan withdrawals—page 100						
Plans offering hardship withdrawals	Figure 106	83%	83%	84%	84%	85%
Participants using withdrawals (when offered)	Figure 107	4%	4%	3%	3%	3%
Recordkeeping assets withdrawn	Figure 107	1%	1%	1%	1%	1%
Participant account balance withdrawn	Figure 107	32%	31%	32%	32%	30%
Plan distributions and rollovers—page 102						
Terminated participants preserving assets	Figure 116	85%	85%	85%	82%	84%
Assets preserved that were available for distribution	Figure 116	97%	97%	97%	97%	98%
Participant access methods—page 108						
Participants not contacting Vanguard during the year	Figure 117	40%	37%	36%	36%	36%
Participants registered for internet account access	Figure 121	70%	71%	72%	70%	73%
Participant account transactions processed via the web	Figure 122	83%	85%	86%	88%	88%

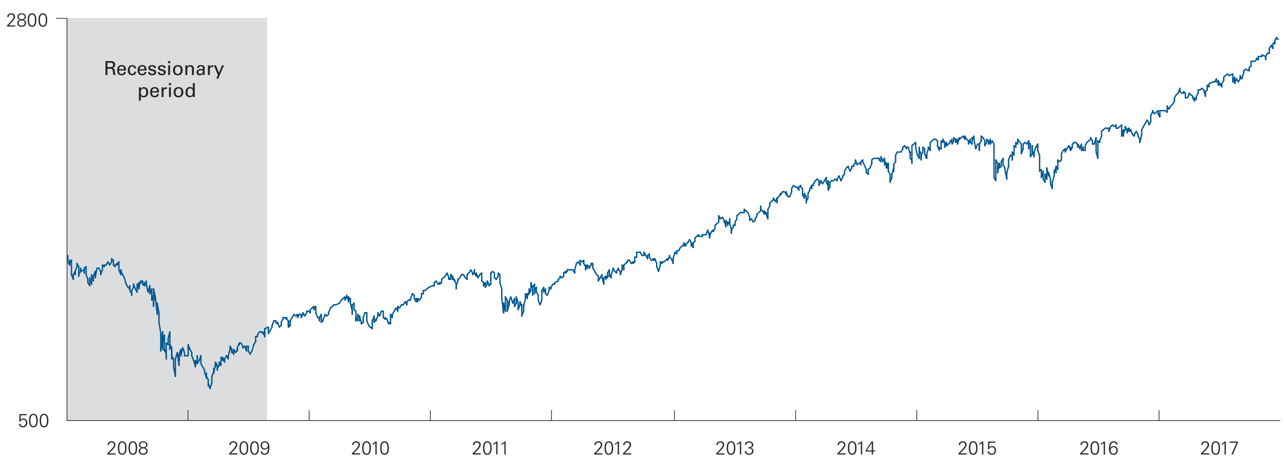
Source: Vanguard, 2018.

Market overview

In 2017, stock prices rose by 19% for the year (Figure 2).[2] The year 2017 was characterized by low volatility with only 19% of trading days having a change in stock prices of +/–1%. Similarly, less than 1% of trading days had a change in stock prices of +/–3%.

During the crisis, stock prices were exceptionally volatile. In 2008, 16.8% of trading days had a change in stock prices greater than +/–3%. The comparable figure was 8.7% in 2009, 3.2% in 2010, and 4.8% in 2011. However, in 2012, 2013, and 2014, no trading days exhibited this level of volatility. In 2015, 1.2% of trading days had a change in stock prices greater than +/–3%. Historically, 1% of stock market trading days are associated with a change in stock prices of greater than +/–3%.

Figure 2. S&P 500 daily close



Source: Standard & Poor's 500.

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.

2 These changes reflect the price-index level, the total return of buy-and-hold stock market investors would have also included reinvested dividends.

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. The level of plan contributions is fundamental to retirement savings adequacy. Plan contributions are affected by employee participation rates, participant deferral rates, and the value of employer 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 impact the employee contributions needed to accumulate sufficient retirement savings.

Managing participant accounts. After deciding to contribute to a retirement savings plan, participants' most important decision is how to allocate their holdings among the major asset classes.

As with deferral decisions, many such investment decisions are increasingly influenced by employer-established defaults, as well as the growing use of all-in-one portfolio strategies such as target-date funds and managed account programs. 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 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.

Our analysis shows that most Vanguard DC plan participants have seen their retirement savings grow over one- and five-year periods.

ONE

Accumulating plan assets

Historically, employees have had to decide whether to participate and at what rate to save. Increasingly, employers are making these decisions through automatic enrollment.

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Plan design

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

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 at all. 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

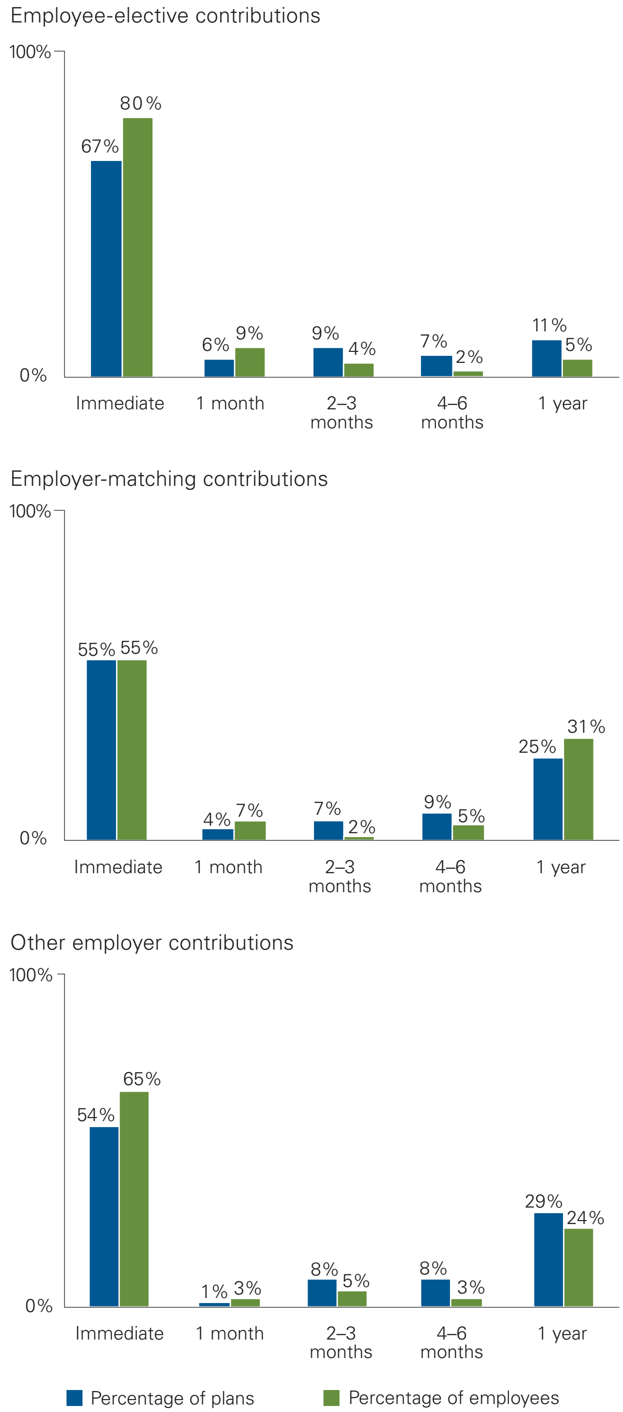
In 2017, two-thirds of Vanguard plans allowed employees to make voluntary contributions immediately after they joined their employer (Figure 3). Larger plans were more likely to offer immediate eligibility than smaller plans. As a result, 8 in 10 employees qualified for immediate eligibility in 2017.

At the other extreme, 11% of plan sponsors required eligible employees to have one year of service before they could make employee-elective contributions to their plan. Smaller plans were more likely to impose the one-year wait. As a result, only 5% of total eligible employees were subject to this restriction.

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

Figure 3. Eligibility, 2017 estimated

Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard, 2018.

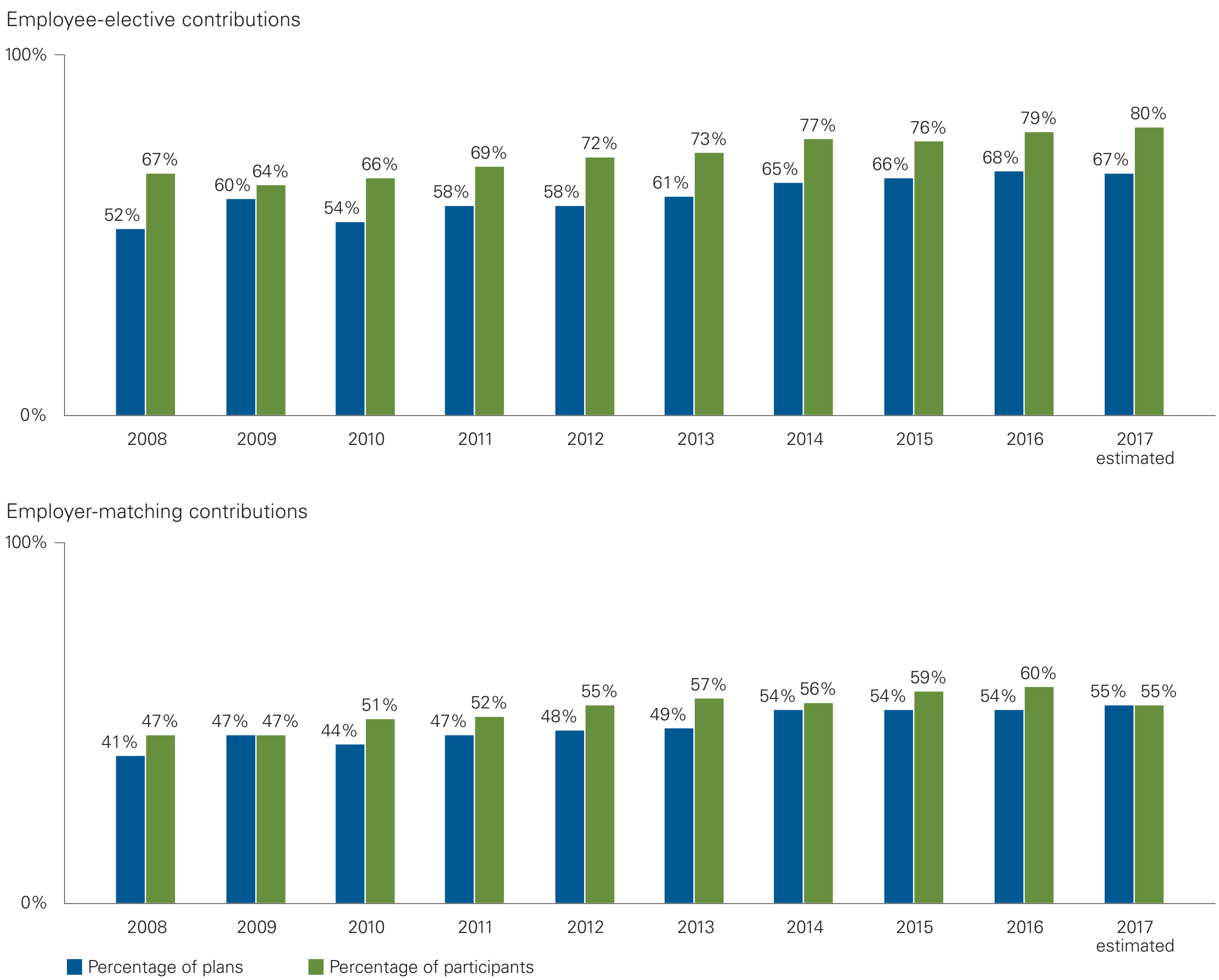
The proportion of plans permitting immediate eligibility for employee-elective contributions has risen over the past ten years (Figure 4). About half of plans offered immediate eligibility in 2008; in 2017, two-thirds did. Because larger plans are more likely to offer immediate eligibility for employee-elective deferrals, in 2017, 80% of employees were in plans offering immediate eligibility. Similar trends are observed for both employer-matching contributions and other employer contributions.

Vesting

In 2017, nearly half of plans immediately vested participants in employer-matching contributions (Figure 5). Four in 10 participants were in plans with immediate vesting of employer-matching contributions. Smaller plans are more likely to use longer vesting schedules. Three in 10 plans with employer-matching contributions use a 5- or 6-year graded vesting schedule. One in 5 participants with employer-matching contributions is in a plan with a longer vesting schedule.

Figure 4. Immediate plan eligibility trend

Vanguard defined contribution plans permitting employee-elective deferrals

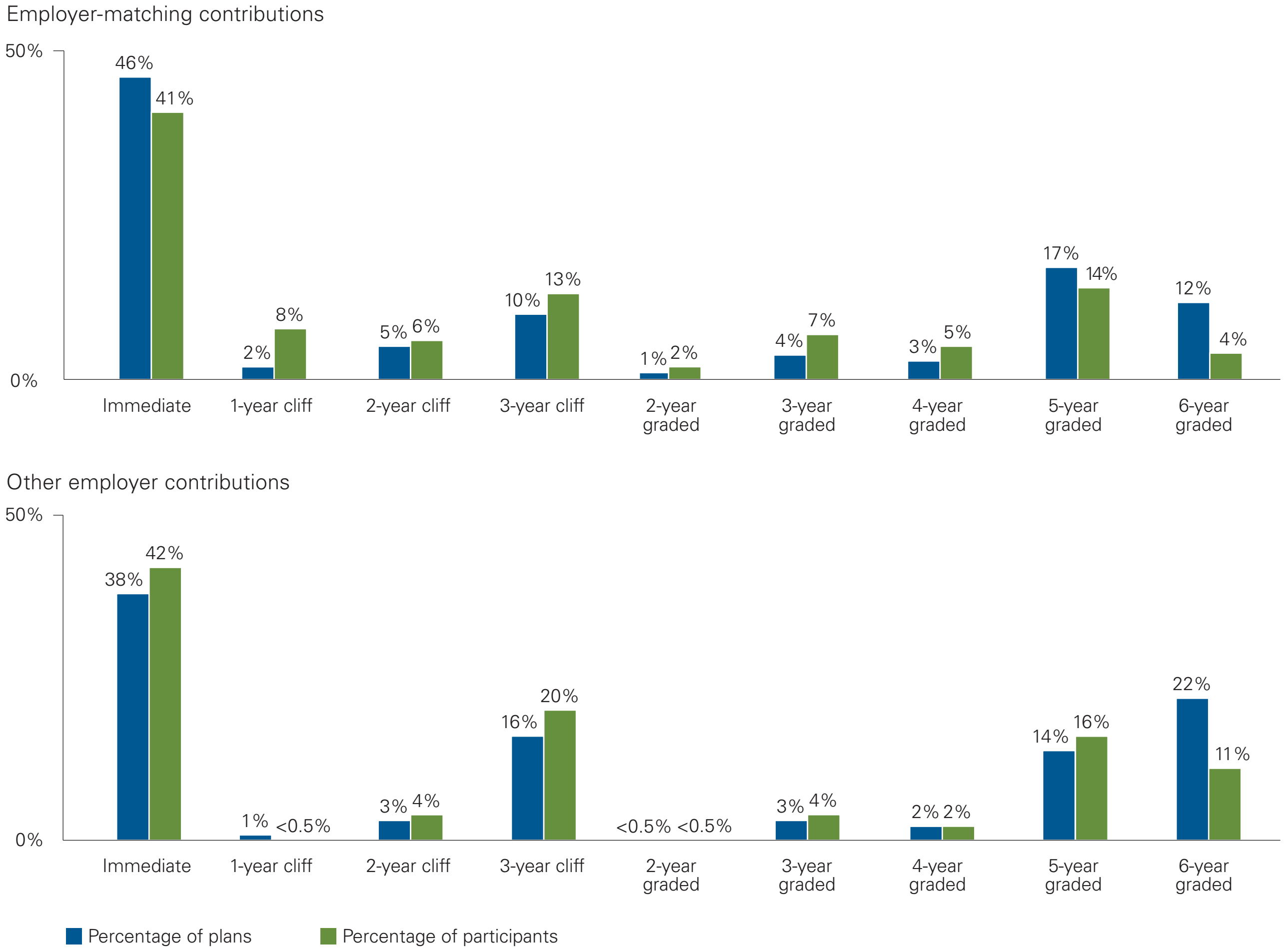


Source: Vanguard, 2018.

In 2017, 4 in 10 plans immediately vested participants for other employer contributions, such as profit-sharing or ESOP contributions. On the other hand, 4 in 10 plans (36%) with other employer contributions use a 5- or 6-year graded vesting schedule and 3 in 10 participants receiving other employer contributions are in plans with these longer vesting schedules.

Figure 5. Vesting, 2017

Vanguard defined contribution plans with employer contributions



Source: Vanguard, 2018.

Employer contributions

Four in 10 Vanguard plans provided only a matching contribution in 2017. This type of design covered half of participants (Figure 6).

Four in 10 plans, covering nearly half of participants, provided both a matching and a nonmatching employer contribution. Eleven percent of plans provided only a nonmatching employer contribution, and 3% of participants were in this type of design. Finally, 4% of plans made no employer contributions of any kind in 2017, and 1% of participants were in this category.

As noted previously, eligibility for employer contributions is typically more restrictive than eligibility for employee-elective deferrals. In 2017, a higher proportion of plans imposed a one-year waiting period on employer contributions, whether in the form of a matching or other type of contribution, than imposed a one-year waiting period on employee-elective deferrals.

These statistics summarize the incidence of employer contributions to a DC plan that accepts employee deferrals. They do 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, an ESOP, or a money-purchase DC plan—in addition to an employee-contributory DC plan.

Figure 6. Types of employer contributions, 2017 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

Type of employer contribution	Percentage of plans	Percentage of participants
Matching contribution only	44%	50%
Nonmatching contribution only	11	3
Both matching and nonmatching contribution	41	46
Subtotal	96%	99%
No employer contribution	4%	1%

Source: Vanguard, 2018.

Matching contributions

The wide variation in employer contributions is most evident in the design of employer-matching formulas. In 2017, Vanguard administered more than 150 distinct match formulas for plans offering an employer match. Among plans offering a matching contribution in 2017, 7 in 10 (covering 6 in 10 participants) provided a single-tier match formula, such as $0.50 on the dollar on the first 6% of pay (Figure 7). Less common, used by 22% of plans (covering one-third of participants), were multi-tier 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 6% of participants) had a single- or multi-tier formula but imposed a maximum dollar cap on the employer contribution, such as $2,000. Finally, a very small percentage of plans used a match formula that varied by age, tenure, or other variables.

Figure 7. Types of matching contributions, 2017 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%	60%
Multi-tier formula	$1.00 per dollar on first 3% of pay; $0.50 per dollar on next 2% of pay	22	33
Dollar cap	Single- or multi-tier formula with $2,000 maximum	6	6
Other	Variable formulas based on age, tenure, or similar variables	2	1

Source: Vanguard, 2018.

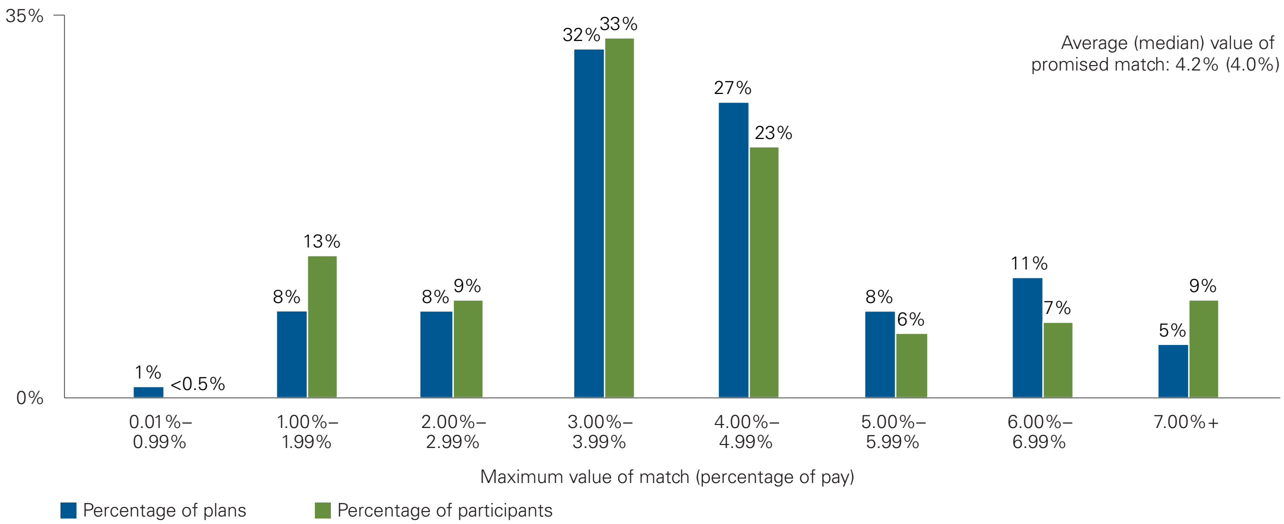
The matching formula most commonly cited as a typical employer match is $0.50 on the dollar on the first 6% of pay. This is the match most commonly offered among Vanguard DC plans and most commonly received by Vanguard DC plan participants. Among plans offering a match, about 1 in 5 provided exactly this match formula in 2017, covering 13% of participants. The second most common matching formula, reflecting a common safe harbor design, was $1.00 on the dollar on the first 3% of pay and $0.50 on the dollar on the next 2% of pay. This match was used by 1 in 10 plans in 2017, also covering 13% of participants.

Given the multiplicity of 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 on the 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 the match varies substantially from plan to plan. Among plans with single- or multi-tier match formulas, two-thirds of plans (covering 6 in 10 participants) promised a match of between 3% and 6% of pay (Figure 8). Most promised matches ranged from 1% to 6% of pay. The average value of the promised match was 4.2% of pay; the median value, 4.0%.

Figure 8. Distribution of promised matching contributions, 2017 estimated

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



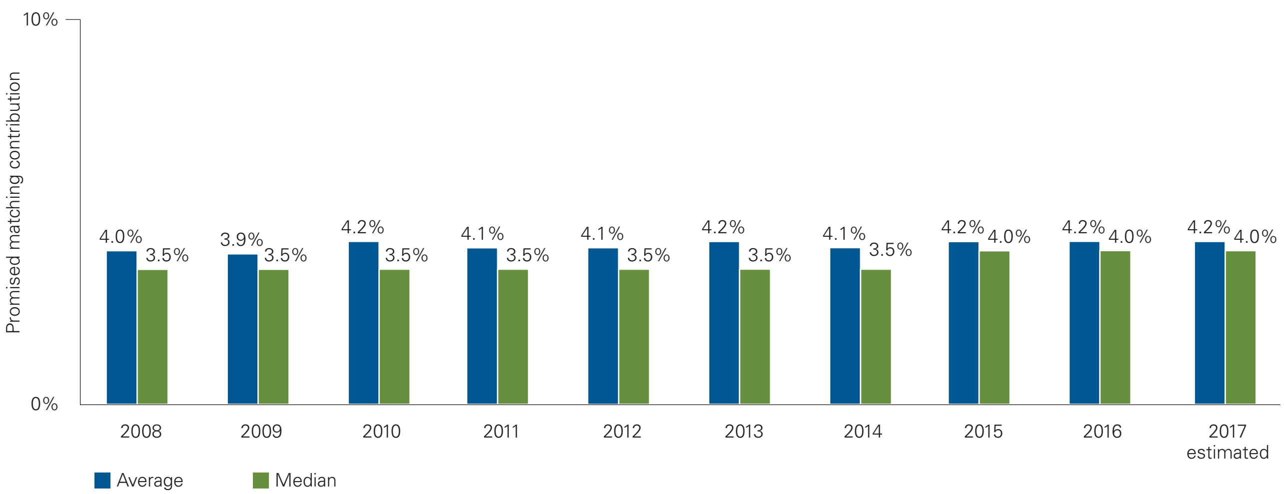
Source: Vanguard, 2018.

Average promised matches dipped slightly in 2009 following the recession, as some sponsors reduced matches. Average and median promised matches have remained fairly stable between 2008 and 2017 (Figure 9).

Another way to assess matching formulas is to calculate the employee-elective deferral needed to realize the maximum value of the match. In 2017, about 8 in 10 plans (covering three-quarters of participants) required participants to defer between 4% and 7% of their pay to receive the maximum employer-matching contribution (Figure 10). The average employee-elective deferral required to maximize the match was 7.0% of pay; the median value, 6.0%.

Figure 9. Promised matching contributions

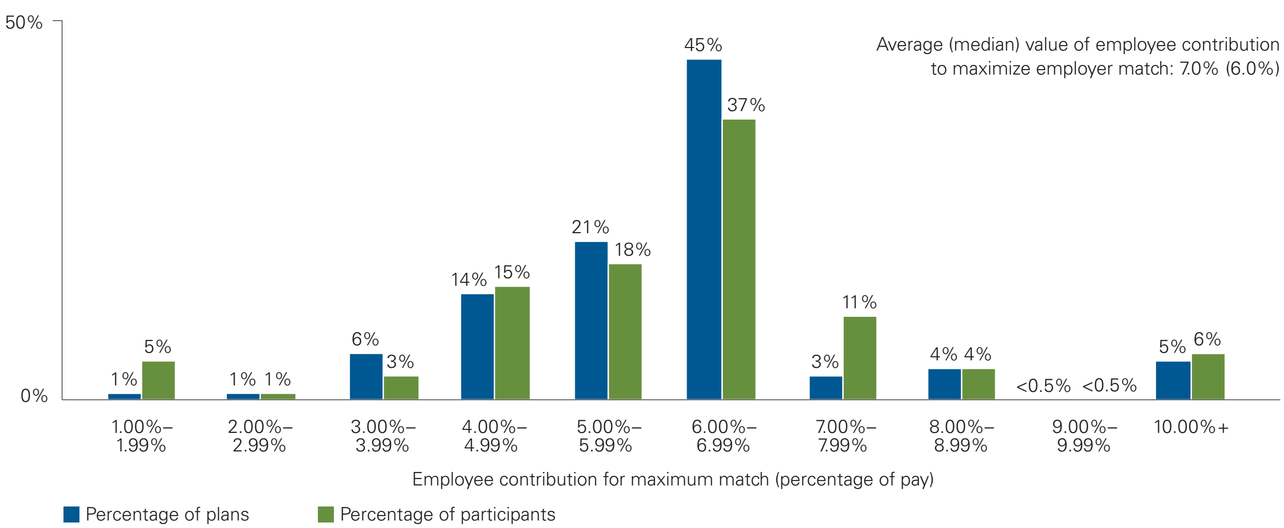
Vanguard defined contribution plans permitting employee-elective deferrals with a single- or multi-tier match formula



Source: Vanguard, 2018.

Figure 10. Employee contributions for maximum match, 2017 estimated

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



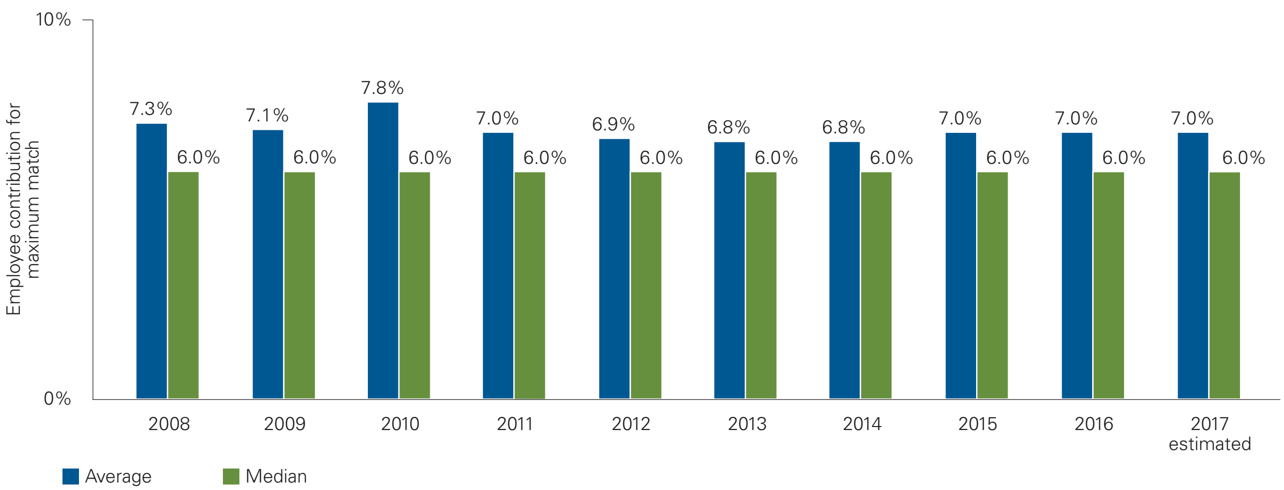
Source: Vanguard, 2018.

The average employee-elective deferral required to maximize the match rose in 2010, but generally has been around 7% between 2008 and 2017 (Figure 11). The median deferral required remained constant at 6.0%.

In 2017, nearly two-thirds of participants received the full employer-matching contribution (Figure 12). Participants in voluntary enrollment designs were more likely to receive the full employer match than participants subjected to automatic enrollment. However, after three years of automatic annual increases, participants subjected to automatic enrollment are more likely to receive the full employer match. After three years of annual increases, three-quarters of all participants will be receiving the full employer match.

Figure 11. Employee contributions for maximum match

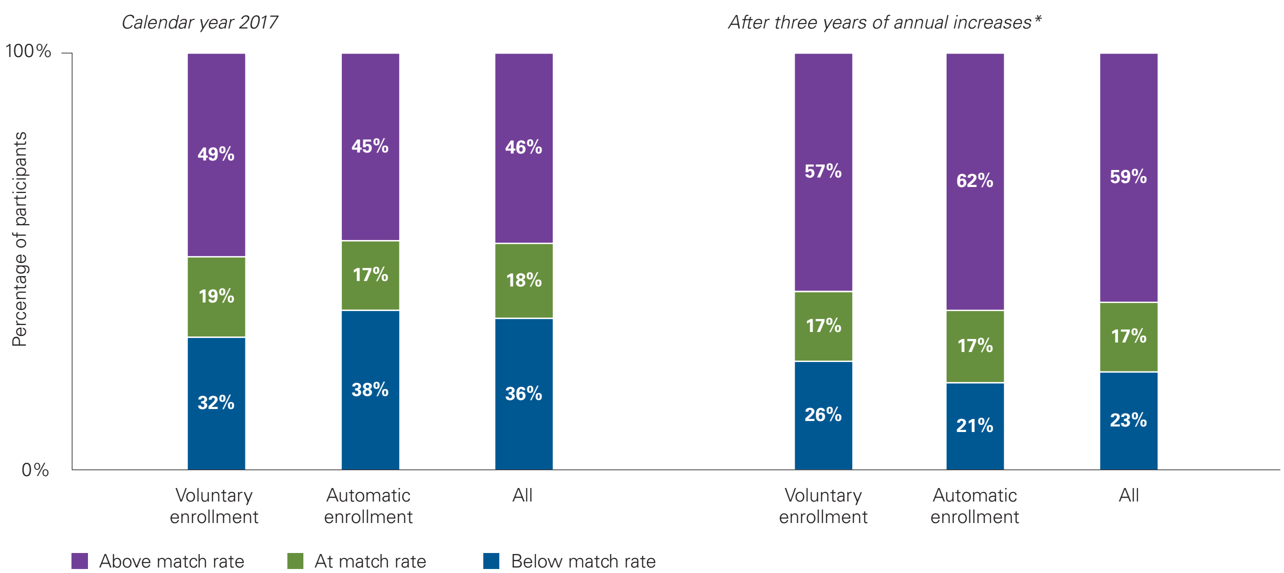
Vanguard defined contribution plans permitting employee-elective deferrals with a single- or multi-tier match formula



Source: Vanguard, 2018.

Figure 12. 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, 2018.

Other employer contributions

As noted previously, in a minority of plan designs, employers may make another contribution to the accounts of eligible employees in the form of a variable or fixed profit-sharing contribution or an ESOP contribution. These contributions, unlike matching contributions, may be made on behalf of eligible employees whether or not they actually 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 contributions until they complete one year of service.

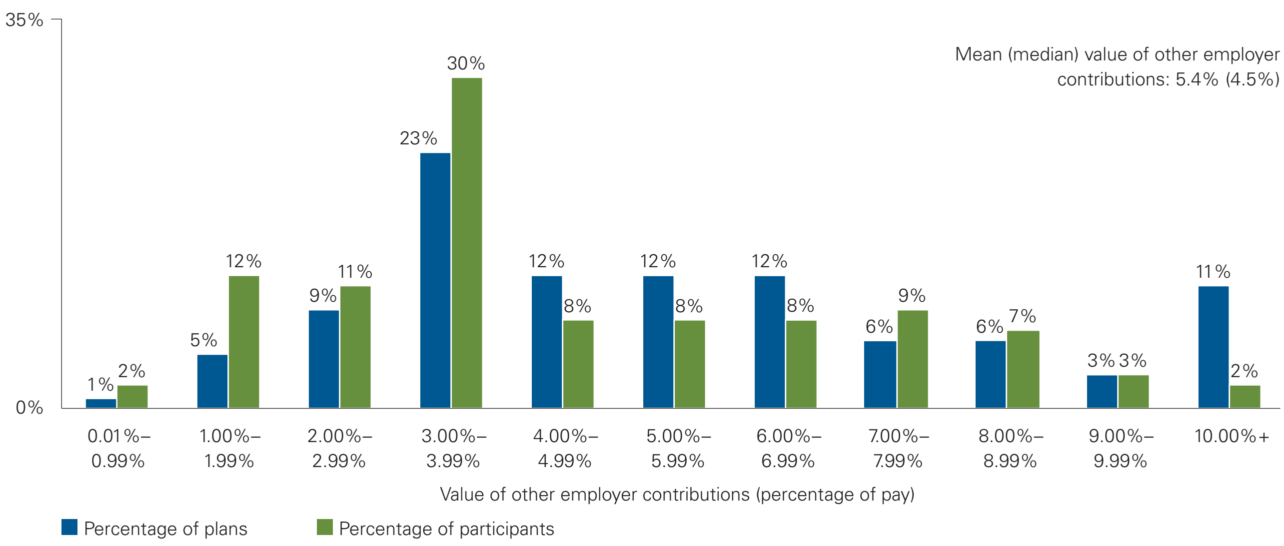
The value of other employer contributions also varies significantly from plan to plan. Among plans offering such contributions in 2017, half provided all participants with a contribution based on the same percentage of pay, while the other half varied the contribution by age and/or tenure. These nonmatching contributions varied in value from about 1% of pay to more than 10% of pay (Figure 13). Among plans with a nonmatching employer contribution, the average contribution was equivalent to 5.4% of pay; the median contribution, 4.5% of pay.

In 2008 and 2009, the average value of other employer contributions was about 30% lower than in 2010. We attribute this to reductions in variable profit-sharing contributions—consistent with the economic environment during the period. Between 2010 and 2017, the average value of other employer contributions rebounded and surpassed prerecession levels (Figure 14).

As noted previously, 4 in 10 plans, covering nearly half of the participants, provided both a matching and a nonmatching employer contribution. In 2017 the median combined value of the promised match and the other employer contribution was 8.0% (Figure 15).

Figure 13. Other employer contributions, 2017 estimated

Vanguard defined contribution plans with other employer contributions



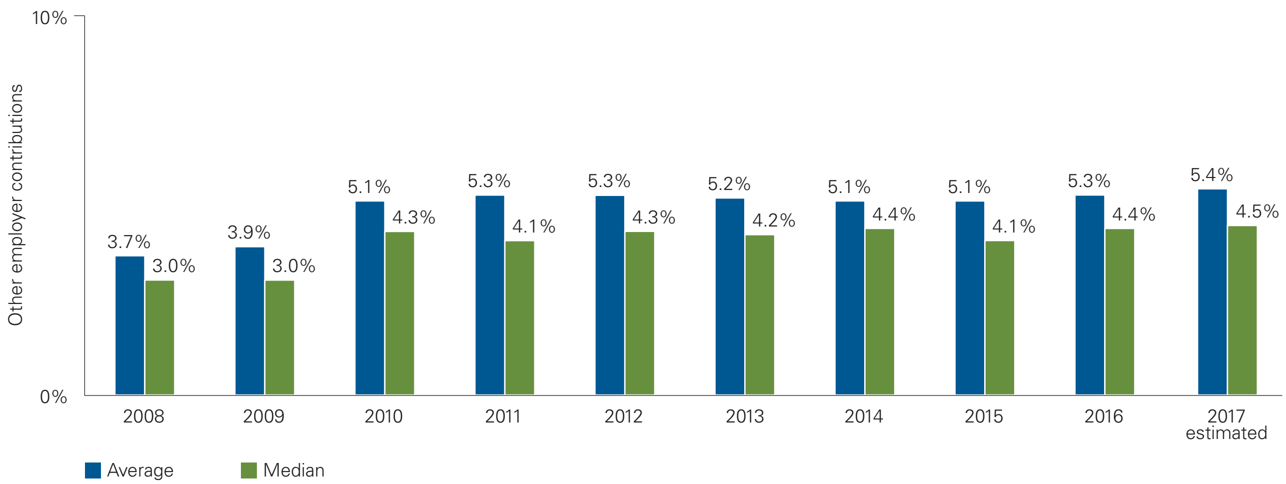
Source: Vanguard, 2018.

Maximum employee contribution limit
Many plans have incorporated expanded contribution limits authorized in the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA).

More than 90% of DC plans have raised to 50% or more the maximum percentage of pay that employees can contribute to their plans.

Figure 14. Other employer contributions

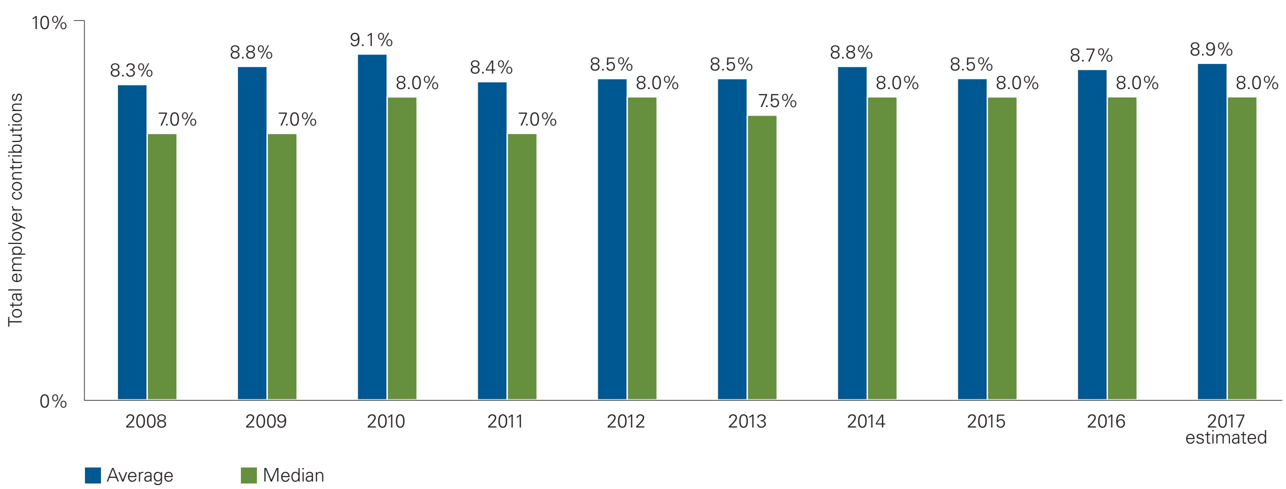
Vanguard defined contribution plans with other employer contributions



Source: Vanguard, 2018.

Figure 15. Match and other employer contributions

Vanguard defined contribution plans with both match and other employer contributions



Source: Vanguard, 2018.

Automatic enrollment designs

In a typical 401(k) or 403(b) plan, employees must make an active choice to join the plan. The enrollment decision is framed as a positive election: "Decide if you'd like to join the plan." Why do employees fail to take advantage of their employers' plans? Research in the field of behavioral finance provides a number of explanations:

- Lack of planning skills. Some employees are not active, motivated decision-makers when it comes to retirement planning. They have weak planning skills and find it difficult to defer gratification.

- Default decisions. Faced with a complex choice and unsure what to do, many individuals often take the default or "no decision" choice. In the case of a voluntary savings plan, which requires that a participant take action to sign up, the "no decision" choice is a decision not to 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, decide to 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, if they do join, to increasing their contribution rates over time.

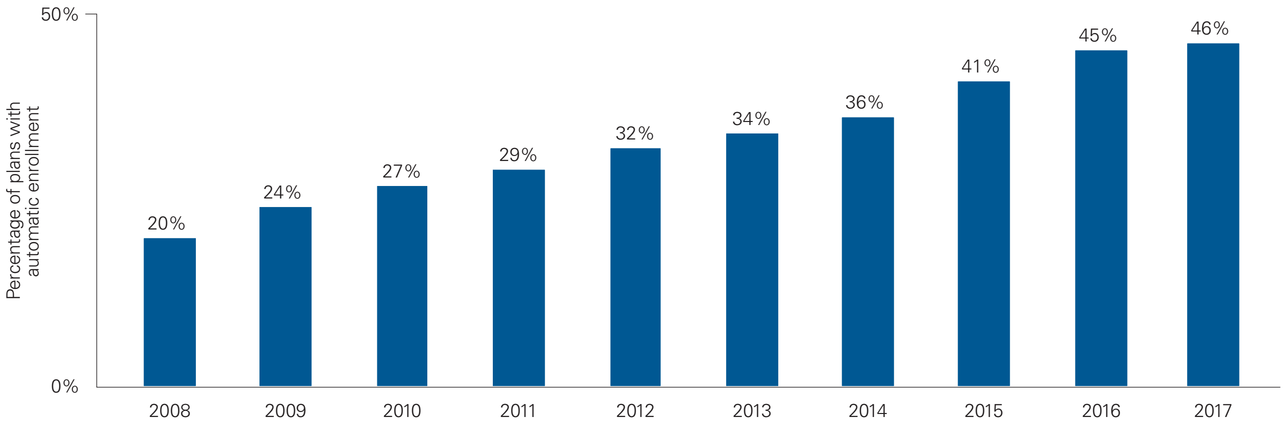
Automatic enrollment or autopilot plan designs reframe the savings decision. With an autopilot design, individuals are automatically enrolled into the plan, their deferral rates are automatically increased each year, and their contributions are automatically invested in a balanced investment strategy. Under an autopilot plan, the decision to save is framed negatively: "Quit the plan if you 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 December 2017, 46% of Vanguard plans permitting employee-elective deferrals had adopted components of an autopilot design (Figure 16). Larger plans are more likely to implement automatic enrollment, with more than half of midsized and large plans using the feature. As a result, slightly more than 6 in 10 participants are now in plans with autopilot designs, although automatic enrollment itself may only apply to newly eligible participants (Figure 17).

Approximately half of these plans have now "swept" eligible nonparticipants—they implemented automatic enrollment for all nonparticipating employees. The remaining half have implemented automatic enrollment for new hires only. Adoption of automatic enrollment designs grew only modestly in 2017, and by the end of 2017, nearly two-thirds of plans with more than 500 participants had added the feature.

Figure 16. Automatic enrollment adoption

Vanguard defined contribution plans with employee-elective contributions



Source: Vanguard, 2018.

Figure 17. Automatic enrollment design by plan size, 2017

Vanguard defined contribution plans with automatic enrollment

	Number of participants				
	All	<500	500–999	1,000–4,999	>5,000
Percentage of plans with elective employee contributions offering	46%	30%	58%	68%	65%
Percentage of participants in plans offering	63%	40%	57%	70%	62%
For plans offering automatic enrollment					
Percentage of plans with automatic enrollment, automatic savings rate increases, and a balanced default fund	66%	58%	74%	68%	70%
Percentage of plans with automatic enrollment and a balanced default fund	33	40	26	32	30
Percentage of plans with automatic enrollment and a money market or stable value default fund	1	2	0	0	0

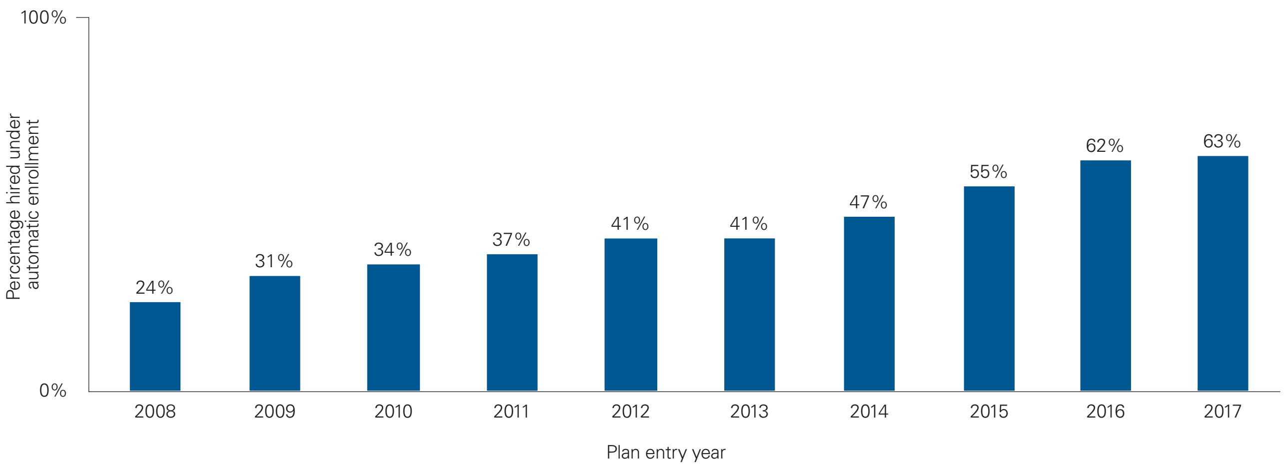
Source: Vanguard, 2018.

Among plans automatically enrolling employees, two-thirds use all three features of an autopilot design. These plan sponsors automatically enroll employees, automatically increase the deferral rate annually, and invest participants' assets in a balanced fund. Another one-third of plan sponsors automatically enroll employees and invest participants' assets in a balanced fund but do not automatically increase participant deferral rates. In 2017, nearly two-thirds of new plan entrants—participants contributing to the plan for the first time in 2017—were in plans that had adopted automatic enrollment (Figure 18).

Forty-one percent of these plans automatically enroll participants at a 3% contribution rate (Figure 19). Two-thirds of plans automatically increase the contribution rate annually. Ninety-nine percent of these plans use a target-date or other balanced investment strategy as the default fund, with 97% choosing a target-date fund as the default. The design of automatic enrollment plans is improving. In 2017, half of plans chose a default of 4% or higher, compared with 2008 when only one-quarter did. In fact, 21% of plans chose a default of 6% or more—more than double the proportion of plans choosing 6% or more in 2008.

Figure 18. Participants hired under automatic enrollment, 2017

Vanguard defined contribution plans with employee-elective contributions



Source: Vanguard, 2018.

Figure 19.	Automatic enrollment design trends

Vanguard defined contribution plans with automatic enrollment

Default automatic enrollment rate	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1 percent	2%	3%	2%	2%	2%	2%	2%	1%	1%	1%
2 percent	13	14	13	13	13	12	10	8	7	8
3 percent	60	56	57	55	53	51	49	48	44	41
4 percent	10	11	11	11	12	13	15	16	15	15
5 percent	7	7	7	8	8	9	9	11	13	14
6 percent or more	8	9	10	11	12	13	15	16	20	21
Default automatic increase rate										
1 percent	73%	68%	68%	67%	67%	67%	68%	68%	65%	64%
2 percent	2	1	1	2	2	2	2	2	2	2
Voluntary election	16	15	16	16	17	17	18	20	24	25
Service feature not offered	9	16	15	15	14	14	12	10	9	9
Default automatic increase cap										
<6 percent	5%	6%	6%	5%	3%	3%	3%	2%	2%	3%
6 percent	17	24	22	22	21	20	18	16	14	14
7 to 9 percent	5	6	7	8	8	8	9	11	10	9
10 percent	30	36	37	38	39	41	42	42	44	44
11 to 20 percent	20	20	20	19	21	21	21	22	23	23
>20 percent	7	4	4	4	3	3	2	2	2	2
No cap	16	4	4	4	5	4	5	5	5	5
Default fund										
Target-date fund	87%	87%	89%	90%	91%	93%	95%	97%	97%	97%
Other balanced fund	11	10	8	7	6	5	3	2	2	2
Subtotal	98%	97%	97%	97%	97%	98%	98%	99%	99%	99%
Money market or stable value fund	2%	3%	3%	3%	3%	2%	2%	1%	1%	1%

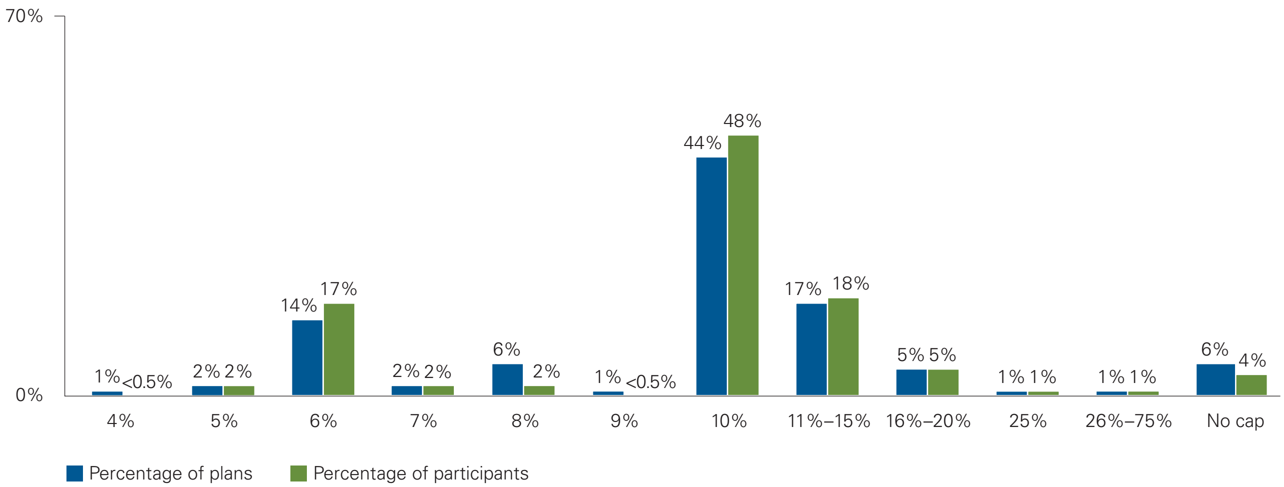
Source: Vanguard, 2018.

Forty-four percent of plans with automatic enrollment and annual increases cap the annual increase at 10% and nearly half of annual-increase participants are capped at 10% (Figure 20). However, about one-quarter of plans use caps between 11% and 25%. Six percent of plans have no cap—likely an error. We recommend plan sponsors set the cap at a level where participants are saving 12% to 15% or more, factoring in employer contributions.

Plan sponsors may also elect to offer automatic annual increases in plans with voluntary enrollment designs. Participants are then presented with the annual increase election at enrollment and when they change their employee-elective deferral rate. In 2017, 3 in 10 plans with voluntary enrollment offered an automatic annual increase option and 6 in 10 participants in these designs had access to the option (Figure 21). Three in 10 participants in these plans had elected automatic annual increases.

Figure 20. Automatic increase plan caps

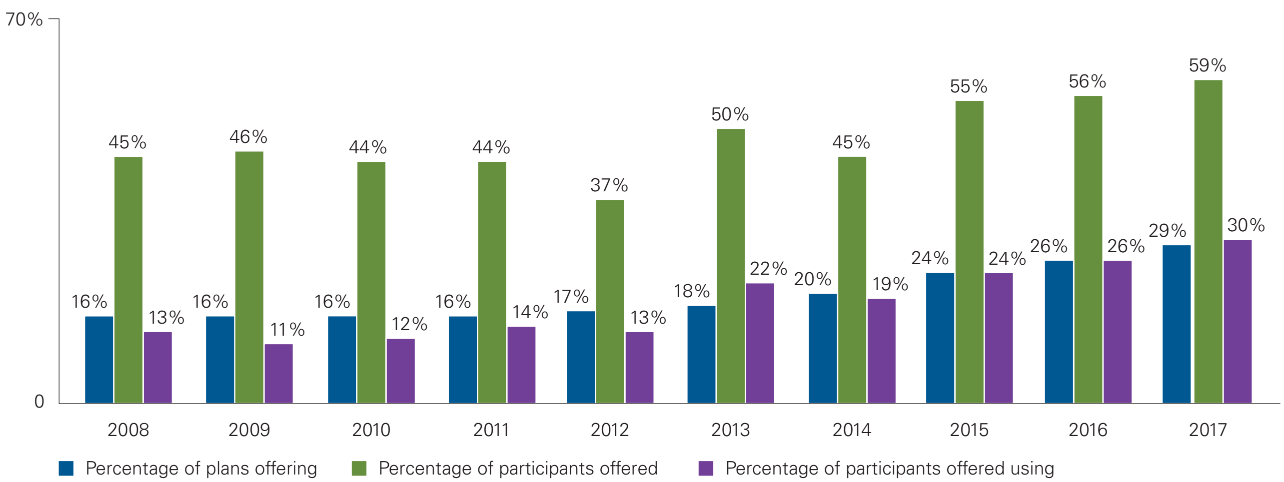
Automatic enrollment plans with an automatic annual increase as of December 31, 2017



Source: Vanguard, 2018.

Figure 21. Voluntary annual increase adoption

Vanguard enrollment plans with voluntary annual increase



Source: Vanguard, 2018.

Industry group

The proportion of employees by industry group has evolved over time (Figure 22). Most notably, the proportion of eligible employees in the wholesale and retail trade has more than doubled while the proportion in the manufacturing group has declined by 25% (Figure 23). Industry groups have different benefit and wage profiles. Both wages and employer contribution generosity impact plan participation and employee-elective deferral rates.

Figure 22. Distribution of eligible employees by industry group by year

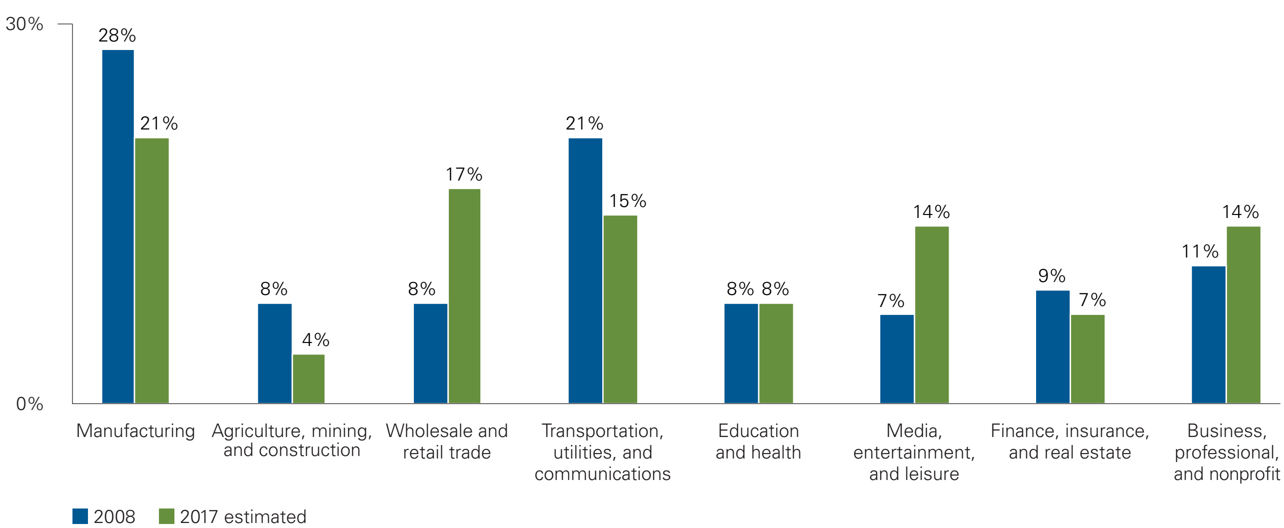
Vanguard defined contribution plans permitting employee-elective deferrals

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017 estimated
Manufacturing	28%	27%	27%	25%	23%	25%	27%	23%	21%	21%
Agriculture, mining, and construction	8	5	6	7	6	6	5	5	3	4
Wholesale and retail trade	8	8	9	8	8	11	6	6	20	17
Transportation, utilities, and communications	21	22	21	21	22	22	22	21	14	15
Education and health	8	9	9	9	9	9	9	9	8	8
Media, entertainment, and leisure	7	6	6	7	8	6	9	15	13	14
Finance, insurance, and real estate	9	10	9	9	9	8	9	8	7	7
Business, professional, and nonprofit	11	13	13	14	15	13	13	13	14	14

Source: Vanguard, 2018.

Figure 23. Distribution of eligible employees by industry group trend

Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard, 2018.

Participation rates

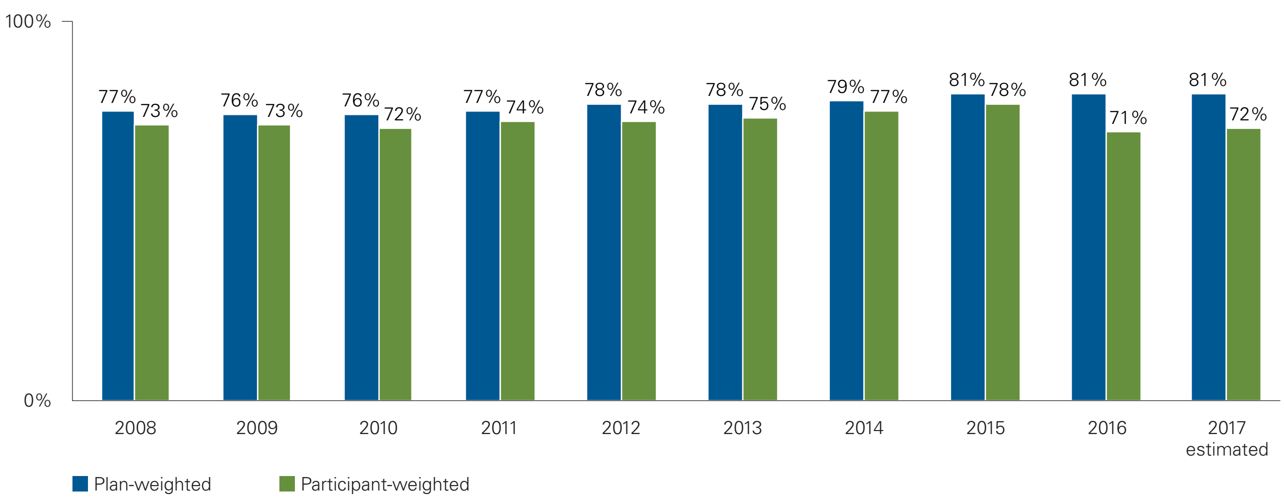
A plan's participation rate—the percentage of eligible employees who choose to make voluntary contributions—remains the broadest metric for gauging 401(k) plan performance. The most common measure of participation rates is calculated by taking the average of participation rates among a group of plans. We refer to this as the plan-weighted participation rate. In 2017, Vanguard's plan-weighted participation rate was 81% (estimated, see the Methodology section on page 112) and has risen modestly since 2008 (Figure 24).

A second measure of participation rates 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, 72% of eligible employees are enrolled in their employer's voluntary savings program. This broader measure of plan participation rose between 2008 and 2015 from 73% to 78%. This increase reflects the adoption of automatic enrollment by larger plan sponsors. However, this measure fell in 2016 to 71%. This decline reflects a change in the underlying sectors these plans represent—specifically an increase in the proportion of retail plans with voluntary enrollment.

These two measures provide different views of employee participation in their retirement savings plans. The first measure indicates that, in the average plan, about one-fifth of eligible employees fail to contribute. The second measure, however, shows that within the entire employee universe, about 3 in 10 employees fail 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 as a whole because it looks at all eligible employees across all plans.

Figure 24. Plan participation rates

Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard, 2018.

Distribution of participation rates

Participation rates vary considerably across plans (Figure 25). In 2017, two-thirds of plans had a participation rate of 80% or higher, while less than 10% of plans had a participation rate of less than 50%. Participation rates also vary by plan size, with larger plans historically having lower participation rates than other plans (Figure 26). One reason for lower participation rates at large companies may be the presence of another retirement plan benefit, such as an employer-funded DB plan, employer profit-sharing, or ESOP contributions to a DC plan.

Other possible reasons include the inherent difficulty of communicating across many locations in a large firm and the fact that large firms often outsource the enrollment process to their provider, while small firms may tend to rely on an in-house human resources representative. With larger plans most likely to add automatic enrollment, there is now less variation in participation rates by plan size.

Figure 25. Distribution of participation rates

Vanguard defined contribution plans permitting employee-elective deferrals

Percentage of plans

Plan participation rate	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017 estimated
90%–100%	24%	23%	21%	24%	29%	31%	35%	40%	41%	42%
80%–89%	30	29	31	31	28	30	28	25	24	24
70%–79%	20	20	19	17	17	14	14	14	13	12
60%–69%	11	11	12	12	10	9	9	8	9	9
50%–59%	8	7	7	7	7	7	6	5	5	5
<50%	7	10	10	9	9	9	8	8	8	8
Average plan participation rate	**77%**	**76%**	**76%**	**77%**	**78%**	**78%**	**79%**	**81%**	**81%**	**81%**

Source: Vanguard, 2018.

Figure 26. Participation rates by plan size

Vanguard defined contribution plans permitting employee-elective deferrals

Number of participants

Plan-weighted participation rate	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017 estimated
<500	77%	75%	74%	75%	76%	76%	77%	79%	79%	80%
500–999	79	78	78	79	80	82	82	83	84	84
1,000–4,999	78	79	78	79	80	81	80	84	85	84
5,000+	78	76	78	80	81	81	74	82	77	77
All plans	**77%**	**76%**	**76%**	**77%**	**78%**	**78%**	**79%**	**81%**	**81%**	**81%**
Participant-weighted participation rate										
<500	72%	69%	68%	70%	70%	69%	72%	75%	73%	74%
500–999	76	74	74	76	77	78	77	77	73	77
1,000–4,999	71	72	69	70	72	72	73	80	78	79
5,000+	74	73	75	76	76	77	67	77	67	68
All participants	**73%**	**73%**	**72%**	**74%**	**74%**	**75%**	**77%**	**78%**	**71%**	**72%**

Source: Vanguard, 2018.

Participation rates by employee demographics
Participation rates also vary considerably by employee demographics (Figure 27). Income is one of the primary determinants of plan participation rates. Only 54% of eligible employees with income of less than $30,000 contributed to their employer's DC plan in 2017, while 92% of employees with income of more than $100,000 elected to participate. Even among the highest-paid employees, 8% of eligible workers still failed to take advantage of their employer's DC plan.

Participation rates were lowest for employees younger than 25. Only 4 in 10 employees younger than 25 made employee-elective deferrals to their employer's plan in 2017, while more than three-quarters of eligible employees between ages 35 and 64 saved for retirement in their employer's plan. Tenure had a significant influence on plan participation. In 2017, only 56% of eligible employees with less than two years on the job participated in their employer's plan, while 8 in 10 employees with tenure of ten years or more participated.

Men and women appear to participate at about the same level. But these overall averages fail to account for the income differences between men and women. At most income levels, women are more likely than men to join their employer's plan (Figure 28). For example, in 2017, 86% of women earning $50,000 to $74,999 participated in their employer's plan—compared with 74% of men in the same income group.

Figure 27. Participation rates by participant demographics

Vanguard defined contribution plans permitting employee-elective deferrals

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017 estimated
All	73%	73%	72%	74%	74%	75%	77%	78%	71%	72%
Income										
<$30,000	56%	55%	53%	56%	57%	57%	62%	58%	52%	54%
$30,000–$49,999	71	70	69	70	71	71	75	75	69	70
$50,000–$74,999	78	76	76	75	75	76	79	80	77	78
$75,000–$99,999	85	84	83	82	82	82	83	84	85	85
$100,000+	91	90	91	90	90	91	92	92	92	92
Age										
<25	49%	49%	44%	51%	52%	53%	57%	54%	42%	42%
25–34	68	68	68	69	70	71	74	74	69	70
35–44	75	74	74	74	75	76	79	79	75	76
45–54	78	77	77	78	78	79	81	81	76	77
55–64	77	76	76	78	79	80	82	83	77	78
65+	67	68	67	71	74	74	75	77	69	69
Gender										
Male	75%	73%	73%	74%	73%	75%	76%	77%	71%	72%
Female	73	72	71	75	74	77	77	79	71	72
Job tenure (years)										
0–1	58%	55%	56%	61%	61%	62%	67%	61%	56%	56%
2–3	69	69	66	69	71	72	75	78	72	72
4–6	73	72	72	72	73	75	79	81	76	77
7–9	79	77	76	76	78	78	79	81	76	78
10+	82	81	81	81	82	83	84	85	80	81

Source: Vanguard, 2018.

Participation rates also vary by industry group (Figure 29). Employees in the agriculture, mining, and construction and the finance, insurance, and real estate industry groups had the highest participation rates, with about 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 45%.

Figure 28. Participation by income and gender, 2017 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

	Female	Male	All
<$30,000	57%	51%	54%
$30,000–$49,999	74	68	70
$50,000–$74,999	86	74	78
$75,000–$99,999	90	83	85
$100,000+	94	92	92

Source: Vanguard, 2018.

Figure 29. Participation rates by industry sector, 2017 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

	Plan-weighted	Participant-weighted
Overall	81%	72%
Industry group		
Agriculture, mining, and construction	83%	92%
Finance, insurance, and real estate	88	91
Manufacturing	82	84
Education and health	76	79
Transportation, utilities, and communications	82	77
Business, professional, and nonprofit	81	70
Media, entertainment, and leisure	75	68
Wholesale and retail trade	74	45

Source: Vanguard, 2018.

Impact of automatic enrollment on plan design

Reflecting increased adoption of automatic enrollment designs, there has been an improvement in participation rates between 2008 and 2017 among demographic groups that traditionally have lower voluntary participation rates. Employees subjected to an automatic enrollment feature have an overall participation rate of 92%, compared with a participation rate of only 57% for employees hired under plans with voluntary enrollment (Figure 30).

Plans with automatic enrollment have higher participation rates across all demographic variables. For individuals earning less than $30,000 in plans with automatic enrollment, the participation rate is more than double that of individuals with voluntary enrollment.

Figure 30. Participation rates by plan design, 2017 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

	Voluntary enrollment	Automatic enrollment	All
All	57%	92%	72%
Income			
<$30,000	37%	84%	54%
$30,000–$49,999	54	91	70
$50,000–$74,999	66	94	78
$75,000–$99,999	76	95	85
$100,000+	88	97	92
Age			
<25	21%	83%	42%
25–34	52	92	70
35–44	62	92	76
45–54	65	93	77
55–64	67	93	78
65+	59	90	69
Gender			
Male	56%	92%	72%
Female	60	91	72
Job tenure (years)			
0–1	31%	87%	56%
2–3	53	94	72
4–6	64	94	77
7–9	68	91	78
10+	74	94	81

Source: Vanguard, 2018.

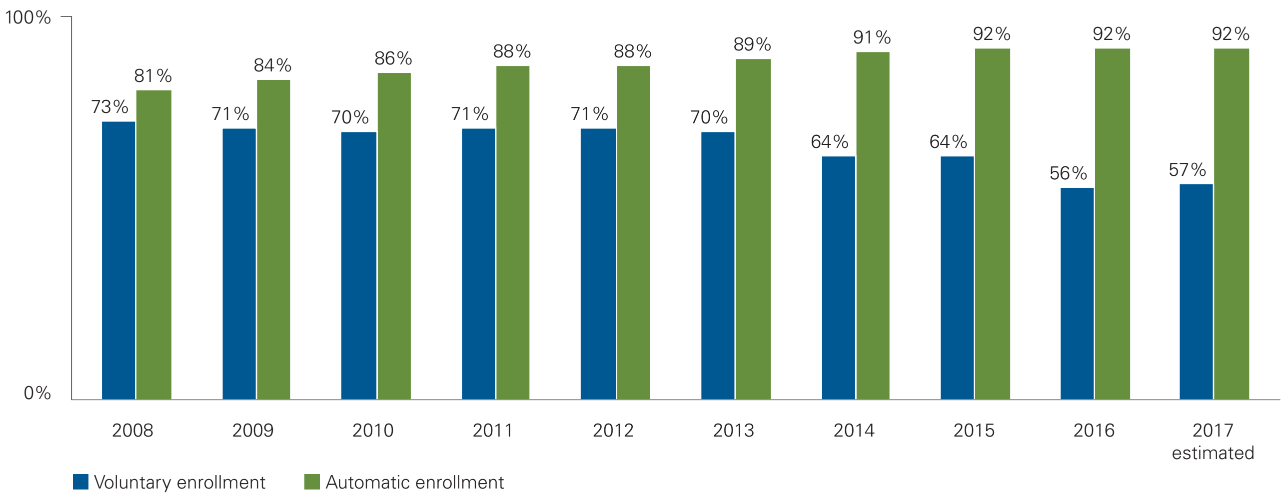
Between 2008 and 2017 plans with automatic enrollment have had steadily rising participation rates (Figure 31). However, as more plans adopt automatic enrollment, the remaining pool of plans with voluntary enrollment have seen participation rates deteriorate.

Aggregate plan participation rates

As noted previously, some plan sponsors make other nonmatching contributions for all eligible employees, whether or not these employees actually defer any part of their pay to the plan. When these contributions are factored in, both the plan- and participant-weighted participation rates improve. The plan-weighted participation rate rises to 87% and the participant-weighted rate to 76% (Figure 32). In other words, across all Vanguard plans, three-quarters of employees either make their own contributions, receive an employer contribution, or both.

Figure 31. Plan participation rates by plan design, participant-weighted trend

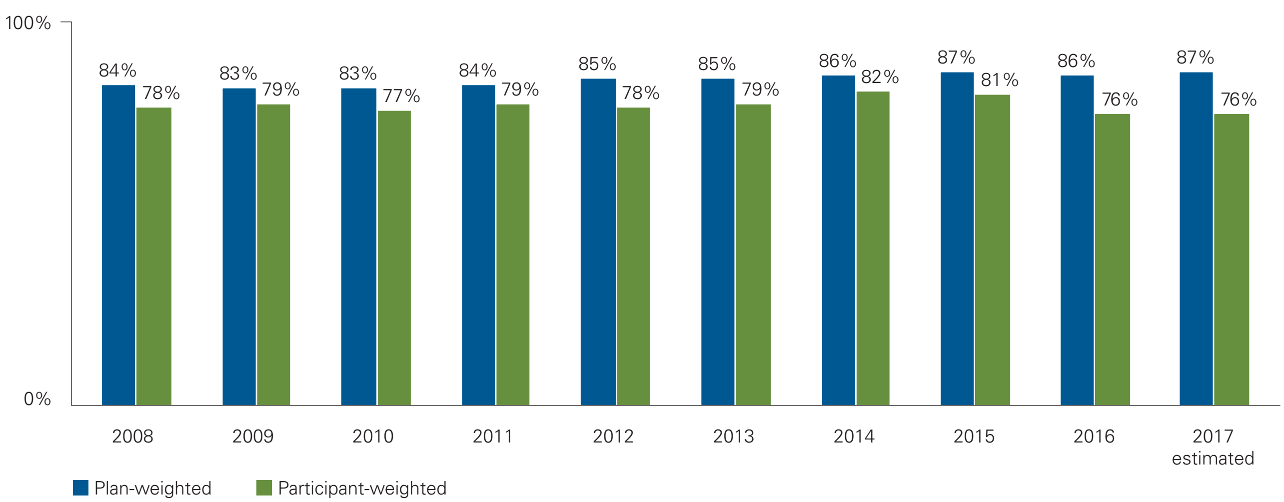
Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard, 2018.

Figure 32. Aggregate plan participation rates

Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard, 2018.

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 savings for retirement. Vanguard participants saved 6.8% of their income on average in their employer's plan in 2017 **(Figure 33)**. The median participant deferral rate was 6.0%, 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 plan and are generally self-reported by plan sponsors.

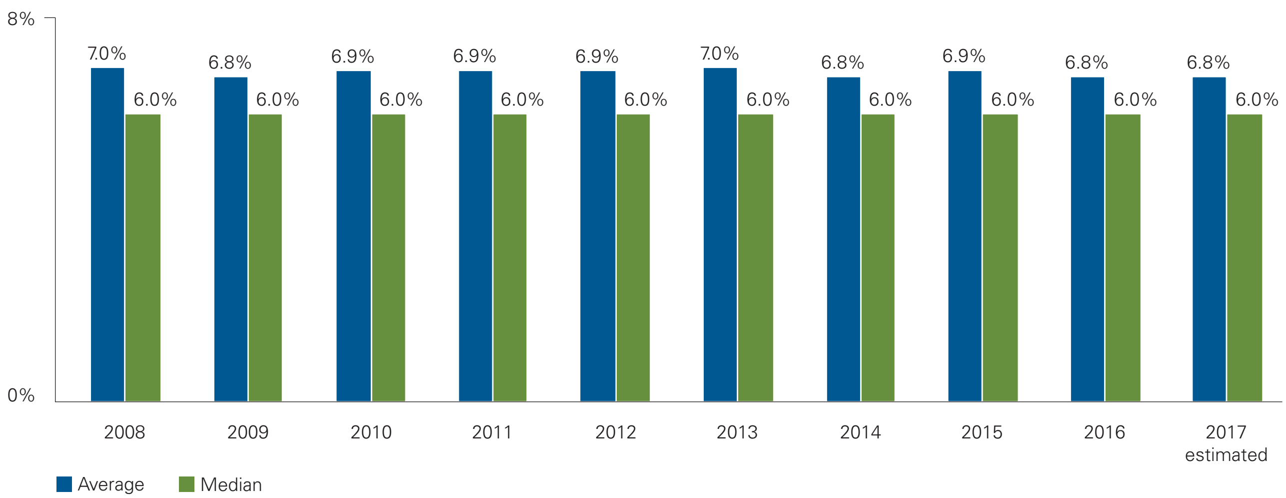
Average and median deferral rates were fairly steady between 2008 and 2017.

Distribution of deferral rates

Individual deferral rates vary considerably among participants **(Figure 34)**. One in 5 participants had a deferral rate of 10% or higher in 2017, while 3 in 10 had a deferral rate of less than 4%. During 2017, only 13% of participants saved the statutory maximum of $18,000 ($24,000 for participants age 50 or older) (see page 43). In plans offering catch-up contributions, only 14% of participants age 50 or older took advantage of this feature in 2017 (see page 44).

Figure 33. Participant employee-elective deferral rates

Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard, 2018.

Figure 34. Distribution of participant employee-elective deferral rates

Vanguard defined contribution plans permitting employee-elective deferrals

Percentage of participants

Deferral rate	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017 estimated
0.1%–3.9%	30%	32%	28%	28%	29%	28%	30%	29%	30%	30%
4.0%–6.0%	22	22	23	25	23	23	23	22	22	22
6.1%–9.9%	26	25	27	27	28	29	28	29	28	28
10.0%–14.9%	15	14	15	14	14	14	13	14	14	14
15.0%+	7	7	7	6	6	6	6	6	6	6

Source: Vanguard, 2018.

Plan size has little effect on participant deferral rates (Figure 35). In 2017, plans with 5,000 or more participants had an average deferral rate of 6.8%—the same as the overall average rate of 6.8%. 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 automatic enrollment and other employer-funded retirement benefits as part of that package may dilute this effect.

Deferral rates by employee demographics

As with plan participation rates, employee demographics have a strong influence on deferral rates (Figure 36). Income is the primary determinant of deferral rates, which generally rise with income. The statutory maximum contribution was $18,000 ($24,000 for participants age 50 and older), and a highly compensated employee was one who earned $120,000 or more in 2016 (based on the prior year for 2017).

In 2017, participants with income of less than $30,000 had deferral rates averaging 4.5%, while participants earning $75,000 to $99,999 had deferral rates of 8.1%—a savings rate that is nearly double. Deferral rates were 8.3% for participants earning $100,000 or more.

Age is another important variable influencing savings. In 2017, deferral rates were lowest for participants younger than 25. This group saved only 4.7% of income. Deferral rates for participants ages 55 to 64 were nearly twice as high, averaging 8.4%. Deferral rates also rose directly with employee tenure.

Figure 35. Participant employee-elective deferral rates by plan size

Vanguard defined contribution plans permitting employee-elective deferrals

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017 estimated
Average—all plans	7.0%	6.8%	6.9%	6.9%	6.9%	7.0%	6.8%	6.9%	6.8%	6.8%
Median	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Average by plan size (number of participants)										
<500	7.2%	7.0%	7.0%	6.9%	7.0%	7.0%	6.9%	7.1%	7.2%	7.2%
500–999	7.1	6.9	6.8	6.9	6.8	6.8	7.1	6.8	7.0	7.1
1,000–4,999	7.0	6.9	6.8	6.8	6.8	6.9	6.7	6.9	6.8	6.8
5,000+	6.9	6.7	7.0	6.9	6.8	7.0	6.8	7.0	6.8	6.8

Source: Vanguard, 2018.

Figure 36. Employee-elective deferral rates by participant demographics

Vanguard defined contribution plans permitting employee-elective deferrals

Average deferral rate	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017 estimated
All	7.0%	6.8%	6.9%	6.9%	6.9%	7.0%	6.8%	6.9%	6.8%	6.8%
Income										
<$30,000	4.8%	4.7%	4.8%	4.8%	4.7%	4.8%	5.0%	4.6%	4.6%	4.5%
$30,000–$49,999	5.9	5.6	5.8	5.8	5.7	5.8	5.8	5.7	5.7	5.7
$50,000–$74,999	7.4	7.0	7.1	7.0	6.9	7.0	6.9	6.9	6.9	6.9
$75,000–$99,999	8.6	8.4	8.4	8.2	8.1	8.1	7.9	8.0	8.0	8.1
$100,000+	8.1	8.2	8.2	8.1	8.1	8.3	8.1	8.4	8.3	8.3
Age										
<25	4.1%	4.0%	4.2%	4.2%	4.0%	4.4%	4.1%	4.7%	4.8%	4.7%
25–34	5.6	5.5	5.7	5.6	5.4	5.8	5.5	5.9	5.9	5.9
35–44	6.4	6.2	6.4	6.1	6.3	6.4	6.3	6.4	6.3	6.4
45–54	7.5	7.2	7.3	7.2	7.2	7.3	7.2	7.3	7.0	7.1
55–64	8.9	8.5	8.6	8.6	8.5	8.6	8.5	8.6	8.3	8.4
65+	10.4	9.8	9.9	9.8	9.8	9.8	9.7	9.7	9.0	9.1
Gender										
Male	7.0%	6.7%	6.9%	6.9%	6.9%	7.0%	6.9%	6.9%	6.9%	6.9%
Female	6.9	6.8	6.9	6.9	6.8	7.0	6.8	6.9	6.6	6.7
Job tenure (years)										
0–1	5.0%	4.9%	4.8%	4.8%	4.7%	4.9%	4.6%	5.0%	5.0%	5.0%
2–3	6.3	6.1	6.3	6.3	6.0	6.3	6.2	6.5	6.3	6.3
4–6	6.8	6.5	6.8	6.8	6.8	7.0	7.0	7.1	6.9	7.0
7–9	7.1	6.9	7.0	7.0	7.0	7.2	7.2	7.4	7.2	7.4
10+	8.0	7.7	7.8	7.8	7.9	8.0	8.0	8.0	7.9	8.0
Account balance										
<$10,000	4.1%	3.6%	3.8%	3.9%	3.8%	3.8%	3.8%	3.9%	3.9%	3.8%
$10,000–$24,999	6.8	5.8	5.7	5.9	5.8	5.9	6.1	6.4	6.4	6.4
$25,000–$49,999	7.9	7.1	6.8	6.8	6.7	6.9	6.9	7.4	7.5	7.5
$50,000–$99,999	9.1	8.4	8.2	8.1	7.8	7.7	7.7	8.1	8.2	8.3
$100,000–$249,999	10.5	10.0	9.8	9.8	9.6	9.2	9.1	9.3	9.1	9.3
$250,000+	10.1	10.6	10.4	10.3	10.4	10.4	10.2	10.4	10.2	10.3

Source: Vanguard, 2018.

Deferral rates also are correlated with account balances. Participants with account balances of less than $10,000 had the lowest average deferral rate, 3.8% in 2017. As account balances rose, average deferral rates also rose. Overall, men and women appear to save at similar rates, with women generally saving at slightly higher rates (**Figure 37**).

Deferral rates also vary—by about half—by industry group (**Figure 38**). Participants in the agriculture, mining, and construction industry group had the highest median deferral rates in 2017, while participants in the wholesale and retail trade group had the lowest deferral rates.

Impact of automatic enrollment

Plan design, specifically the predominant use of a 3% default deferral rate, means participants in plans with automatic enrollment were saving less.

Participants joining a plan under an automatic enrollment feature have an average deferral rate of 6.7%, compared with 7.0% for participants under plans with voluntary enrollment—a spread of only 0.3 percentage points (**Figure 39**).

Figure 37. Deferral rates by income and gender, 2017

Vanguard defined contribution plans permitting employee-elective deferrals

Average deferral rate

	Female	Male	All
<$30,000	4.5%	4.7%	4.5%
$30,000–$49,999	5.8	5.7	5.7
$50,000–$74,999	7.0	6.8	6.9
$75,000–$99,999	8.4	7.9	8.1
$100,000+	8.6	8.1	8.3

Source: Vanguard, 2018.

Figure 38. Deferral rates by industry sector, 2017 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

Average deferral rate

	Mean	Median
Overall	6.8%	6.0%
Industry group		
Agriculture, mining, and construction	7.9%	7.0%
Business, professional, and nonprofit	7.2	6.2
Manufacturing	7.0	6.0
Media, entertainment, and leisure	7.0	6.0
Finance, insurance, and real estate	6.7	6.0
Transportation, utilities, and communications	6.5	5.8
Education and health	6.9	5.0
Wholesale and retail trade	5.5	4.6

Source: Vanguard, 2018.

Figure 39. Participant deferral rates by plan design, 2017 estimated

Vanguard defined contribution plans permitting employee-elective deferrals

Average deferral rate

	Voluntary enrollment	Automatic enrollment	All
All	7.0%	6.7%	6.8%
Income			
<$30,000	5.0%	4.2%	4.5%
$30,000–$49,999	5.9	5.7	5.7
$50,000–$74,999	6.8	6.9	6.9
$75,000–$99,999	8.0	8.1	8.1
$100,000+	8.2	8.5	8.3
Age			
<25	5.4%	4.4%	4.7%
25–34	6.0	5.9	5.9
35–44	6.4	6.3	6.4
45–54	7.1	7.1	7.1
55–64	8.3	8.5	8.4
65+	9.0	9.1	9.1
Gender			
Male	7.0%	6.9%	6.9%
Female	6.9	6.5	6.7
Job tenure (years)			
0–1	5.7%	4.7%	5.0%
2–3	6.2	6.4	6.3
4–6	6.6	7.3	7.0
7–9	7.0	7.8	7.4
10+	7.7	8.3	8.0
Account balance			
<$10,000	4.0%	3.7%	3.8%
$10,000–$24,999	6.2	6.5	6.4
$25,000–$49,999	7.0	7.8	7.5
$50,000–$99,999	8.0	8.4	8.3
$100,000–$249,999	9.3	9.2	9.3
$250,000+	10.2	10.4	10.3

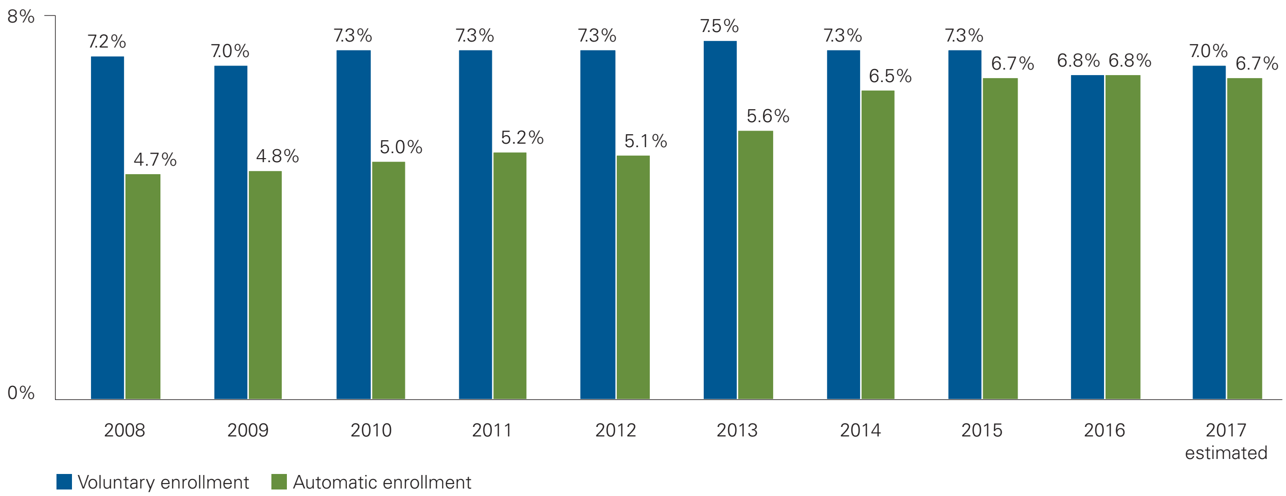
Source: Vanguard, 2018.

In prior years this gap was wider (Figure 40). In 2008 this spread was 2.5 percentage points. However, it appears that automatic annual increases as well as higher default deferral rates are beginning to cause deferral rates to converge.

This suggests that higher default deferral rates would be amenable to plan participants in automatic enrollment designs. Our research on automatic enrollment indicates that "quit rates" do not deteriorate when higher default percentages are used to enroll employees.[3]

Figure 40. **Participant employee-elective deferral rates by plan design, average trend**

Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard, 2018.

3 For an in-depth analysis of automatic enrollment, see Clark, Jeffrey W., and Jean A. Young *Automatic enrollment: The power of the default*, February 2018, Vanguard research, institutional.vanguard.com.

Maximum contributors

During 2017, only 13% of participants saved the statutory maximum dollar amount of $18,000 ($24,000 for participants age 50 or older) (Figure 41). 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.

Four in 10 participants with incomes of more than $100,000 contributed the maximum allowed. Similarly, nearly half of participants with account balances of more than $250,000 contributed the maximum allowed in 2017. One-fifth of participants older than 65 contributed the maximum.

Figure 41. **Participants contributing the maximum by participant demographics, 2017 estimated**

Vanguard defined contribution plans permitting employee-elective deferrals

All	13%
Income	
<$30,000	1%
$30,000–$49,999	2
$50,000–$74,999	3
$75,000–$99,999	7
$100,000+	40
Age	
<25	3%
25–34	8
35–44	13
45–54	15
55–64	18
65+	19
Gender	
Male	14%
Female	10
Job tenure (years)	
0–1	6%
2–3	11
4–6	14
7–9	16
10+	17
Account balance	
<$10,000	1%
$10,000–$24,999	3
$25,000–$49,999	8
$50,000–$99,999	15
$100,000–$249,999	22
$250,000+	48
Industry group	
Media, entertainment, and leisure	24%
Agriculture, mining, and construction	24
Business, professional, and nonprofit	20
Finance, insurance, and real estate	13
Education and health	12
Manufacturing	10
Transportation, utilities, and communications	6
Wholesale and retail trade	4

Source: Vanguard, 2018.

Catch-up contributions

Nearly all Vanguard plans offered catch-up contributions in 2017. Catch-up contributions permit participants age 50 and older to contribute more than permitted for participants under age 50. Fourteen percent of age-50-and-older participants eligible for catch-up contributions took advantage of this feature in 2017 (Figure 42). Participants earning less than $100,000 would need deferral rates higher than 20% of income in order to make catch-up contributions, suggesting that adoption of catch-up contributions by participants is actually quite strong.

The characteristics of participants making catch-up contributions are similar to those of participants making the maximum contribution to their plan. They tended to have higher incomes and had accumulated substantially higher account balances.

Four in 10 participants with incomes of more than $100,000 made catch-up contributions. Similarly, 4 in 10 participants with account balances of more than $250,000 made catch-up contributions in 2017.

Roth contributions

At year-end 2017, the Roth feature was offered by 68% of Vanguard plans and had been adopted by 12% of participants in plans offering the feature (Figure 43). Those who used this feature tended to be younger and shorter-tenured participants or higher income participants.

Fourteen percent of plans offered Roth in-plan conversions, and 1% of participants with access to the option converted assets between 2010 and 2017.

After-tax contributions

After-tax employee-elective deferrals are available to participants in 17% of Vanguard plans. The after-tax feature is more likely to be offered by large plans and 3 in 10 participants have access to this feature. In 2017, only 7% of employees offered the after-tax deferral feature took advantage of it (Figure 44). Those who used the feature also tended to have higher incomes and were older, longer-tenured employees.

Figure 42. Catch-up contribution participation rates by participant demographics, 2017 estimated

Vanguard defined contribution plans permitting catch-up contributions

Percentage of plans offering	98%
Percentage of participants offered	99%
Percentage of participants using if offered	14%
Income	
<$30,000	<0.5%
$30,000–$49,999	1
$50,000–$74,999	2
$75,000–$99,999	7
$100,000+	40
Gender	
Male	16%
Female	10
Job tenure (years)	
0–1	6%
2–3	11
4–6	13
7–9	14
10+	15
Account balance	
<$10,000	<0.5%
$10,000–$24,999	1
$25,000–$49,999	5
$50,000–$99,999	9
$100,000–$249,999	13
$250,000+	38
Industry group	
Agriculture, mining, and construction	28%
Education and health	21
Business, professional, and nonprofit	21
Media, entertainment, and leisure	18
Finance, insurance, and real estate	16
Manufacturing	11
Transportation, utilities, and communications	9
Wholesale and retail trade	6

Source: Vanguard, 2018.

Figure 43. Roth participation rates by participant demographics, 2017 estimated

Vanguard defined contribution plans permitting Roth contributions

Percentage of plans offering	68%
Percentage of participants offered	78%
Percentage of participants using if offered	12%

Income	
<$30,000	7%
$30,000–$49,999	9
$50,000–$74,999	12
$75,000–$99,999	15
$100,000+	13

Age	
<25	15%
25–34	16
35–44	12
45–54	10
55–64	8
65+	5

Gender	
Male	13%
Female	10

Job tenure (years)	
0–1	12%
2–3	14
4–6	15
7–9	13
10+	9

Account balance	
<$10,000	9%
$10,000–$24,999	14
$25,000–$49,999	13
$50,000–$99,999	13
$100,000–$249,999	12
$250,000+	12

Industry group	
Business, professional, and nonprofit	18%
Transportation, utilities, and communications	17
Agriculture, mining, and construction	16
Media, entertainment, and leisure	12
Finance, insurance, and real estate	12
Manufacturing	10
Education and health	6
Wholesale and retail trade	5

Source: Vanguard, 2018.

Figure 44. After-tax participation rates by participant demographics, 2017 estimated

Vanguard defined contribution plans permitting after-tax contributions

Percentage of plans offering	17%
Percentage of participants offered	31%
Percentage of participants using if offered	7%

Income	
<$30,000	2%
$30,000–$49,999	5
$50,000–$74,999	6
$75,000–$99,999	7
$100,000+	11

Age	
<25	2%
25–34	6
35–44	7
45–54	8
55–64	9
65+	8

Gender	
Male	7%
Female	7

Job tenure (years)	
0–1	3%
2–3	5
4–6	7
7–9	9
10+	10

Industry group	
Agriculture, mining, and construction	25%
Finance, insurance, and real estate	10
Media, entertainment, and leisure	8
Education and health	7
Manufacturing	5
Transportation, utilities, and communications	5
Wholesale and retail trade	4
Business, professional, and nonprofit	4

Source: Vanguard, 2018.

Aggregate contributions

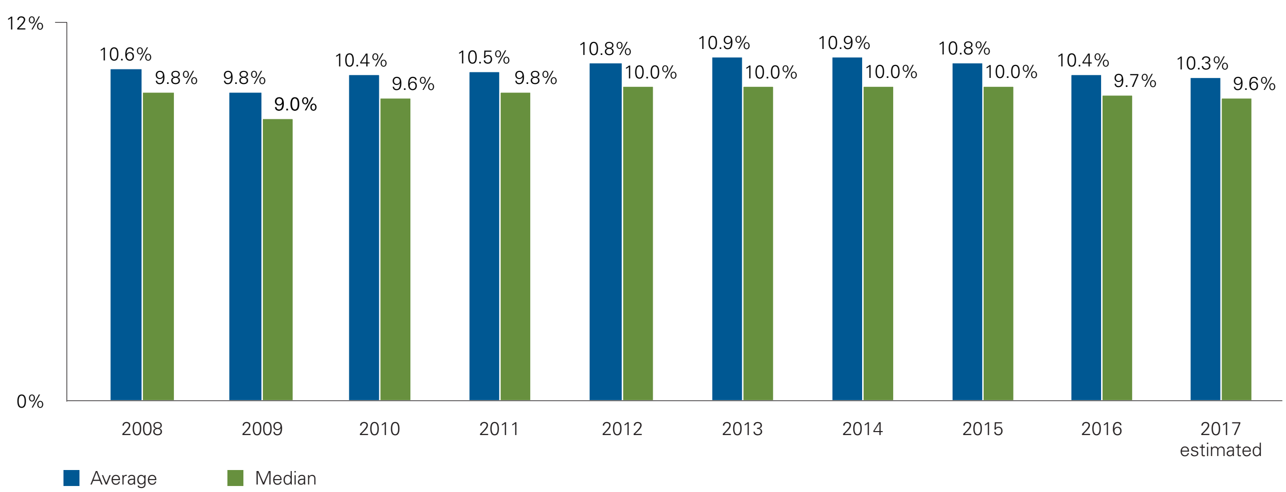
Taking into account both employee and employer contributions, the average total participant contribution rate in 2017 was 10.3% (estimated, see the Methodology section on page 112) and the median was 9.6% (Figure 45). These rates exclude eligible nonparticipants. Aggregate participant and employer contribution rates have been fairly stable between 2008 and 2017—with the exception of the slight dip during the Great Financial Crisis. When eligible nonparticipants, with their 0% contribution rate, are included, the average aggregate contribution rate was 7.9% and the median was 7.1% (Figure 46). Aggregate employee and employer contribution rates generally rose between 2008 and 2015, reflecting the rising adoption of automatic enrollment, which results in fewer individuals deferring zero. The recent decline reflects a change in the underlying sectors these plans represent—specifically an increase in the proportion of retail plans with voluntary enrollment.

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. Four in 10 participants in 2017 had total employee and employer savings rates that met those thresholds or reached the statutory contribution limit (Figure 47). For participants with lower wages, Social Security is expected to replace a higher percentage of income and so a lower retirement savings rate may be appropriate. For higher-wage participants, Social Security replaces a lower percentage of income and savings rates may need to be higher. In fact, higher-wage participants may not be able to achieve sufficient savings rates within the plan because of statutory contribution limits.

Figure 45. Aggregate participant and employer contribution rates

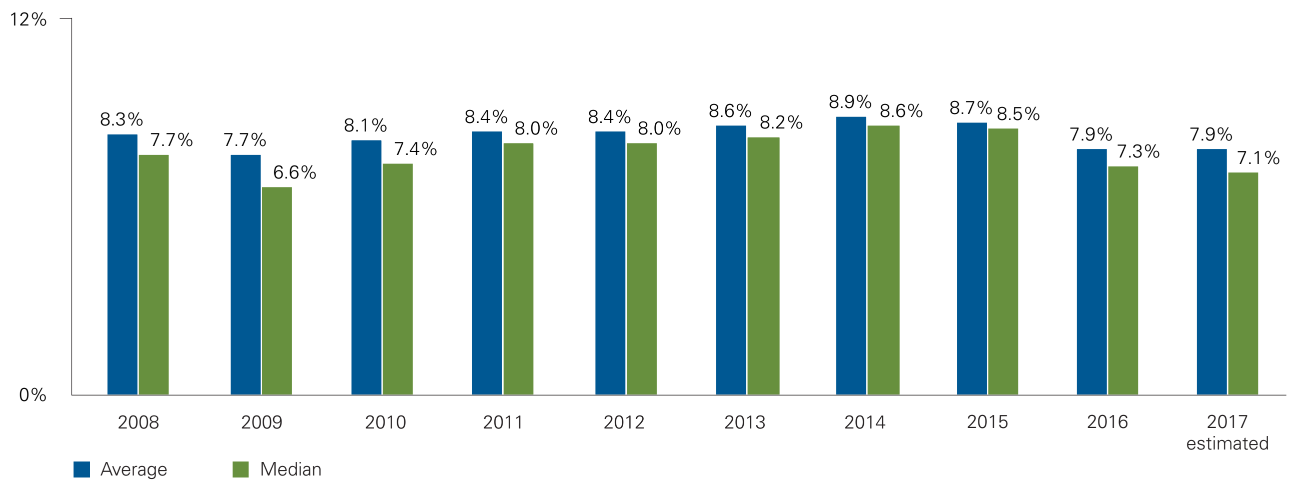
Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard, 2018.

Figure 46. Aggregate employee and employer contribution rates

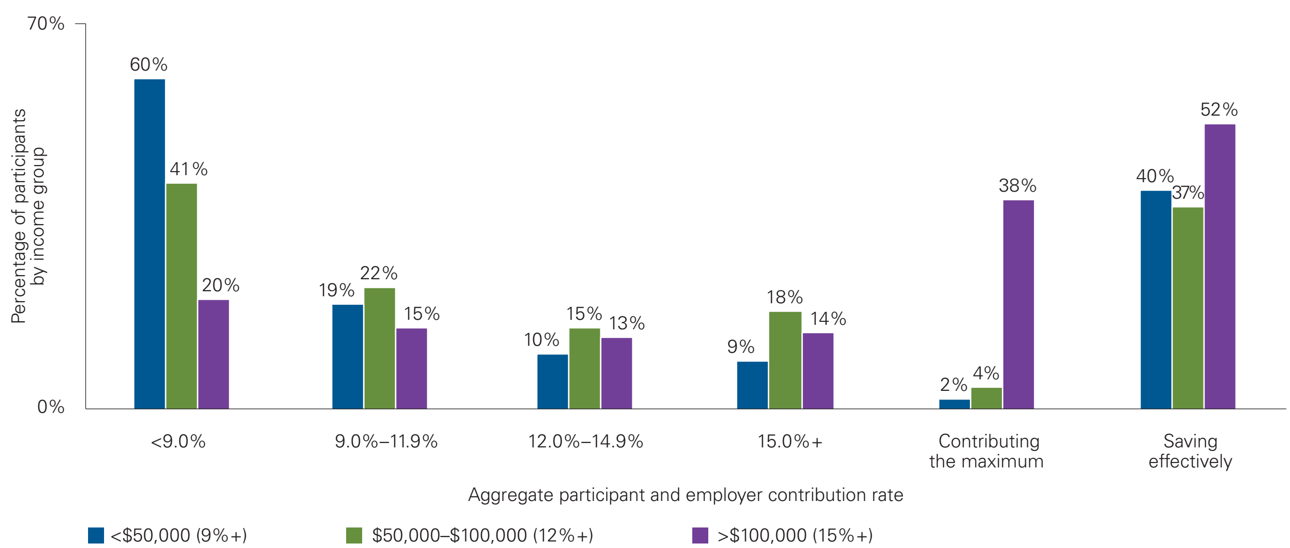
Vanguard defined contribution plans permitting employee-elective deferrals



Source: Vanguard, 2018.

Figure 47. Distribution of aggregate participant and employer contribution rates, 2017 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, 2018.

Account balances

Account balances are a widely cited measure of the overall effectiveness of DC plans and 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 2017, the average account balance for Vanguard participants was $103,866; the median balance was $26,331 (Figure 48). In 2017, Vanguard participants' average and median account balances rose by 8% and 7%, respectively. The average one-year participant total return was 18.0% in 2017 (see page 84).

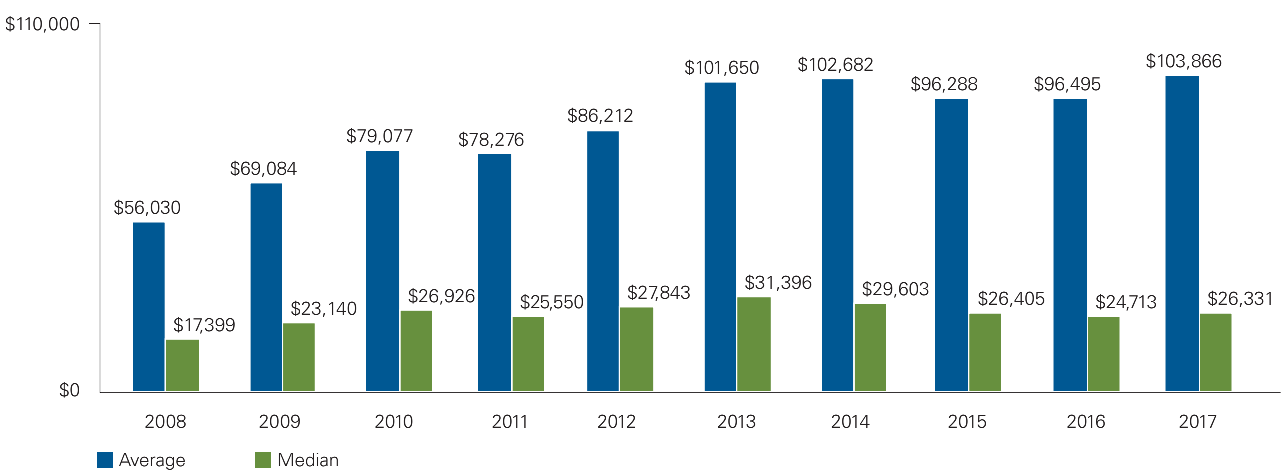
The wide divergence between the median and the average balance is due to a small number of very large accounts that significantly raises the average above the median (Figure 49). One-third of participants had a 2017 account balance of less than $10,000, while one-quarter had balances in excess of $100,000.

Because of the skewed distribution of assets, average balances are indicative of participants at about the 75th percentile (i.e., about 75% of all participants have balances below the average, and 25% have 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 have balances above the median, and half have balances below.

Average account balances also vary somewhat by plan size, with smaller plans having higher balances than larger plans (Figure 50). Automatic enrollment is one factor driving differences in average balances—larger plans have been much more likely to adopt automatic enrollment.

Figure 48. Account balances

Vanguard defined contribution plans



Source: Vanguard, 2018.

Figure 49.	Distribution of account balances

Vanguard defined contribution plans

Percentage of accounts

Range of balance	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<$10,000	39%	34%	31%	32%	31%	30%	31%	33%	34%	33%
$10,000–$19,999	14	13	13	13	12	12	11	12	12	11
$20,000–$39,999	14	15	15	14	14	14	13	13	13	13
$40,000–$59,999	8	9	9	9	9	8	8	8	8	8
$60,000–$79,999	6	6	6	6	6	6	6	5	5	5
$80,000–$99,999	4	4	5	4	4	4	4	4	4	4
$100,000+	15	19	21	22	24	26	27	25	24	26

Source: Vanguard, 2018.

Figure 50.	Account balance by plan size

Vanguard defined contribution plans

Number of participants

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Average										
<500	$68,635	$86,550	$98,825	$100,806	$111,799	$133,126	$141,332	$136,610	$143,869	$162,703
500–999	$56,109	$68,230	$76,219	$76,679	$86,615	$101,835	$104,972	$99,203	$103,460	$120,009
1,000–4,999	$52,516	$66,210	$75,038	$76,613	$85,385	$99,389	$101,376	$98,101	$100,827	$110,189
>5,000	$56,331	$68,648	$79,178	$77,030	$84,285	$99,883	$100,070	$92,679	$81,786	$97,722
All plans	$56,030	$69,084	$79,077	$78,276	$86,212	$101,650	$102,682	$96,288	$96,495	$103,866
Median										
<500	$20,682	$27,957	$33,129	$33,225	$36,388	$41,195	$41,848	$37,792	$38,685	$42,705
500–999	$20,028	$25,491	$28,582	$28,345	$30,627	$34,348	$33,447	$29,147	$29,789	$34,943
1,000–4,999	$16,834	$22,824	$26,427	$23,217	$29,283	$32,603	$30,710	$28,425	$27,768	$29,678
>5,000	$17,102	$22,593	$26,401	$24,414	$26,453	$30,024	$28,197	$24,943	$22,850	$24,280
All plans	$17,399	$23,140	$26,926	$25,550	$27,843	$31,396	$29,603	$26,405	$24,713	$26,331

Source: Vanguard, 2018.

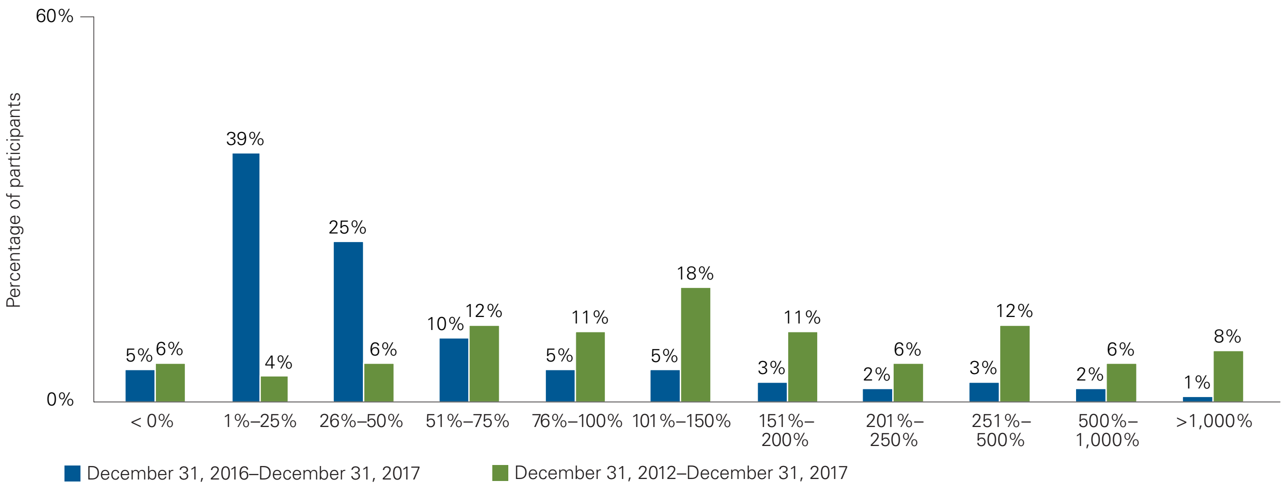
Change in account balances

The change in average and median account balances in 2017 is the result of evolution in the participant base and market performance. When we examine continuous participants—those with an account balance in both December 2016 and December 2017—the median account balance rose by 29% (**Figure 51**). More than 90% of these continuous participants saw their balances rise because of equity-oriented asset allocations and/or ongoing contributions. Among continuous participants with a balance in both December 2012 and December 2017—the median account balance rose 128%, and 94% of continuous participants had a higher account balance in 2017 than in 2012.

Account balances are widely available on statements and websites and are often cited as participants' principal 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 51. Change in account balances, continuous participants

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



	December 31, 2016–December 31, 2017	December 31, 2012–December 31, 2017
Median change	29%	128%
Percentage of participants with positive changes	95	94

Source: Vanguard, 2018.

Account balances by participant demographics

Median and average account balances vary considerably by participant demographics (Figure 52). Among the factors influencing account balances are income, age, and job tenure. These three factors are intertwined. Not only do incomes, 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 the employee is 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. Sixty percent of Vanguard participants are male, and men have average and median balances that are about 50% higher than those of women. Gender is often a proxy for other factors, such as income and job tenure. Women in our sample tend to have lower incomes and shorter job tenure than men. However, as noted earlier in this report, women tend to save more than men at the same income level.

Figure 52. Account balances by participant demographics, 2017

Vanguard defined contribution plans

	All participants	
	Average	Median
All	**$103,866**	**$26,331**
Income		
<$30,000	$10,491	$1,236
$30,000–$49,999	$28,945	$8,881
$50,000–$74,999	$62,450	$25,149
$75,000–$99,999	$108,613	$51,527
$100,000+	$246,171	$130,678
Age		
<25	$4,773	$1,509
25–34	$24,728	$9,227
35–44	$68,935	$25,800
45–54	$129,051	$46,837
55–64	$190,505	$71,105
65+	$209,984	$64,811
Gender		
Male	$126,362	$33,302
Female	$83,375	$21,994
Job tenure (years)		
0–1	$12,659	$2,471
2–3	$28,356	$11,555
4–6	$52,872	$25,887
7–9	$87,759	$44,896
10+	$210,306	$102,754

Source: Vanguard, 2018.

A different picture emerges when account balances are compared based on income. When income is less than $100,000, women generally have median account balances higher than those of men (Figure 53). For example, female participants with income between $30,000 and $49,999 have average account balances that are 7% higher than their male counterparts and median balances that are 26% higher.

Balances by industry group

There are significant variations in account balances by industry sector, which reflect a complex mixture of firm characteristics (influencing employer contributions) and workforce demographics (influencing participant savings rates). Participants employed in the agriculture, mining, and construction industry group have average and median account balances that are about two to three times higher than other participants (Figure 54). Participants employed in the wholesale and retail trade industry group have the lowest average and median account balances.

Figure 53. Account balances by income and gender, 2017

Vanguard defined contribution plans permitting employee-elective deferrals

Average	Female	Male	All
<$30,000	$9,711	$11,427	$10,491
$30,000–$49,999	$30,519	$28,505	$28,945
$50,000–$74,999	$62,188	$62,608	$62,450
$75,000–$99,999	$106,835	$109,483	$108,613
$100,000+	$218,308	$258,289	$246,171
Median			
<$30,000	$1,342	$1,140	$1,236
$30,000–$49,999	$10,170	$8,069	$8,881
$50,000–$74,999	$26,143	$24,870	$25,149
$75,000–$99,999	$52,046	$51,711	$51,527
$100,000+	$120,725	$137,125	$130,678

Source: Vanguard, 2018.

Figure 54. Balances by industry sector, 2017

Vanguard defined contribution plans

	Average	Median
All	**$103,866**	**$26,331**
Agriculture, mining, and construction	$187,326	$52,602
Manufacturing	$117,357	$36,182
Finance, insurance, and real estate	$114,811	$33,720
Business, professional, and nonprofit	$120,798	$27,626
Transportation, utilities, and communications	$100,522	$26,927
Media, entertainment, and leisure	$87,456	$26,164
Education and health	$75,547	$17,044
Wholesale and retail trade	$63,294	$11,411

Source: Vanguard, 2018.

TWO

Managing participant accounts

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

TWO

Managing participant accounts

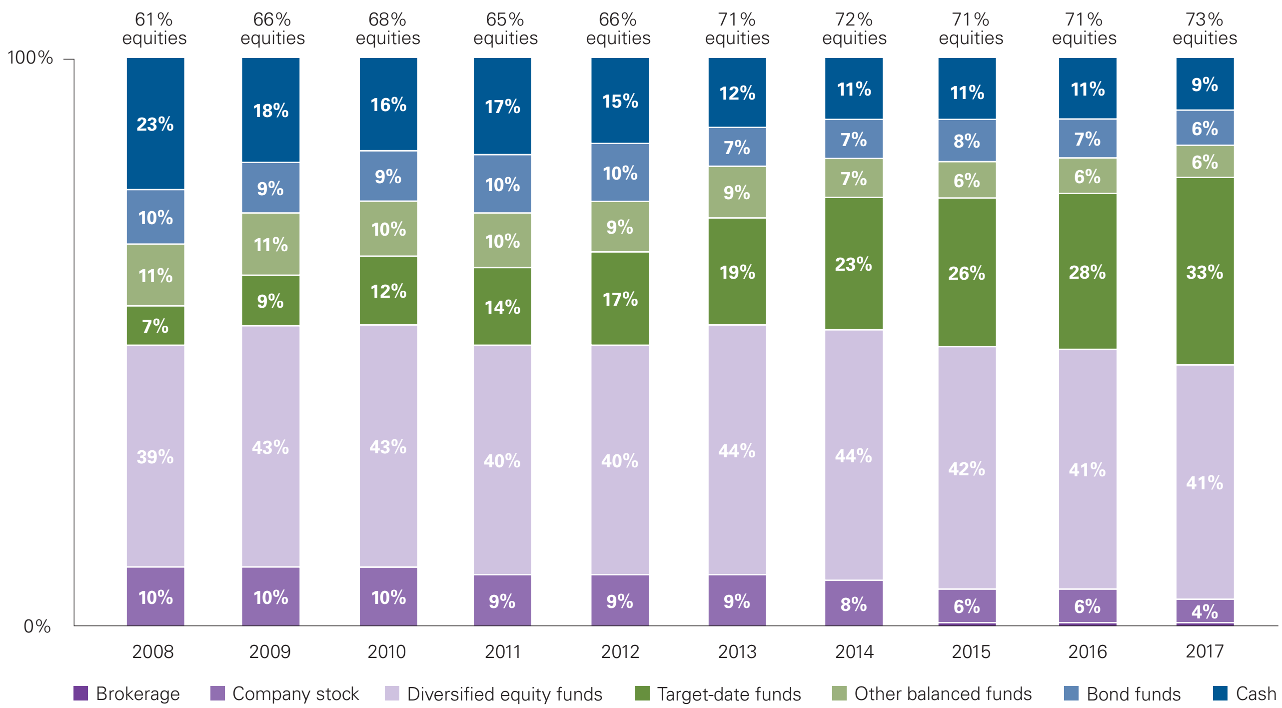
Participant investment decisions are a critical determinant of long-term retirement savings growth.

Asset and contribution allocations

The percentage of plan assets invested in equities stood at 73% in 2017 (Figure 55). The allocation to equities includes the equity component of balanced strategies. The overall equity allocation is up from 61% in 2008, a shift of 12 percentage points. This is due to the rise in equity markets from the 2008–2009 downturn as well as improved participant portfolio construction. Equity allocations have returned to their prerecession peak of 73%. In 2017, investments in balanced strategies reached 39%, including 33% in target-date funds and 6% in other balanced options. The growth of target-date funds in particular is dramatically reshaping investment patterns in DC plans, increasing age-appropriate

Figure 55. Plan asset allocation summary

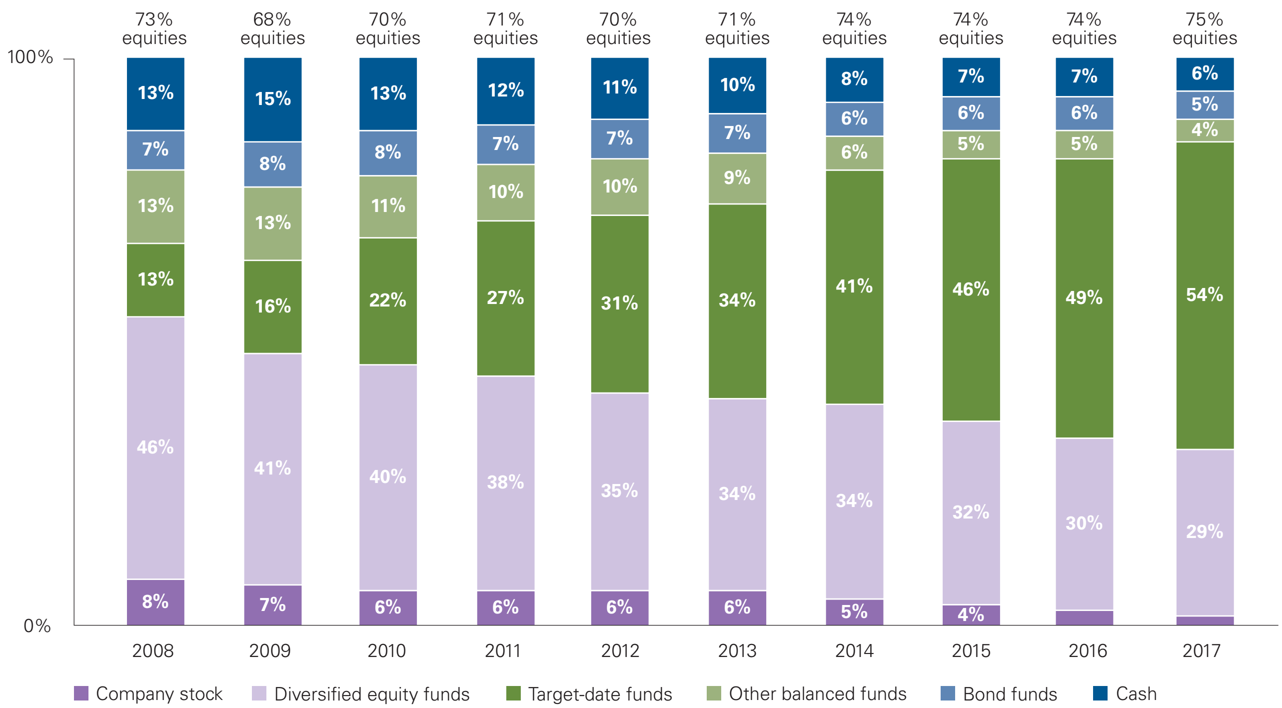
Vanguard defined contribution plans



Source: Vanguard, 2018.

Figure 56. Plan contribution allocation summary

Vanguard defined contribution plans



Source: Vanguard, 2018.

equity allocations and reducing extreme allocations. Three-quarters of plan contribution dollars were invested in equities during 2017, and more than half (54%) of plan contribution dollars were invested in target-date funds (Figure 56). Participant contribution allocations to equities are now above their prerecession peak of 74%.

Asset allocation by participant demographics

The average participant-weighted asset allocation to equities was 75% in 2017, and asset allocation decisions vary somewhat by participant demographics (Figure 57). In the past, higher-income participants tended to take on somewhat more equity market risk on average than lower-income participants. However, with the rising adoption of target-date funds, the differences are no longer discernible. In 2017, all participants, no matter what the household income level, had about 74% of their average account balance allocated to equities; at the median, participants allocated slightly more than 80% to equities.

Participants younger than 45 had the highest equity exposure, with nearly 90% of plan assets, at the median, invested in equities in 2017. Equity allocations were lowest for participants older than 65, many of whom are currently retired or who will soon retire. Participants older than 65 had a median equity allocation of 43%. The age-related variation in equity exposure has changed markedly due to the rising use of target-date funds (see page 68).

Figure 57. Asset allocation by participant demographics, 2017

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%	4%	41%	33%	6%	6%	9%		
Average participant-weighted	<0.5%	3%	22%	58%	6%	4%	7%	75%	85%
Household income									
<$30,000	1%	4%	36%	36%	7%	6%	10%	72%	82%
$30,000–$49,999	<0.5	4	37	37	7	6	9	74	84
$50,000–$74,999	<0.5	4	40	35	7	6	8	74	83
$75,000–$99,999	<0.5	4	43	32	6	7	8	74	81
$100,000+	1	3	46	28	7	7	8	74	81
Age									
<25	<0.5%	2%	12%	82%	2%	1%	1%	88%	90%
25–34	<0.5	3	23	67	3	2	2	86	90
35–44	1	3	39	45	4	4	4	82	87
45–54	1	4	47	32	6	5	5	73	79
55–64	1	4	42	27	7	8	11	62	64
65+	1	5	37	21	8	9	19	47	43
Gender									
Male	1%	4%	43%	31%	6%	6%	9%	75%	85%
Female	<0.5	3	40	36	6	7	8	74	83
Job tenure (years)									
0–1	<0.5%	2%	27%	59%	4%	4%	4%	81%	90%
2–3	<0.5	3	27	60	4	3	3	80	90
4–6	<0.5	3	31	53	5	4	4	78	86
7–9	<0.5	3	36	46	5	5	5	75	82
10+	1	4	45	26	7	7	10	68	76
Account balance									
<$10,000	<0.5%	2%	8%	80%	5%	1%	4%	77%	89%
$10,000–$24,999	<0.5	3	15	70	5	2	5	76	86
$25,000–$49,999	<0.5	3	21	61	5	3	7	74	84
$50,000–$99,999	<0.5	3	28	52	5	4	8	73	81
$100,000–$149,999	<0.5	3	34	44	6	5	8	73	80
$150,000–$199,999	<0.5	3	38	38	6	6	9	73	79
$200,000–$249,999	<0.5	3	41	35	6	6	9	73	79
$250,000+	1	4	48	24	6	8	9	72	79

Source: Vanguard, 2018.

Asset allocation by plan size and industry sector

The average allocation to equities does not vary by plan size (Figure 58). However, among larger plans, there is a modest substitution of company stock holdings for other asset classes and a slightly larger allocation to equities overall. Large plans are more likely than small plans to offer company stock and are more likely to make employer-matching or other contributions in stock. As a result, certain large firms have significantly higher exposure to company stock as an asset class.

Company stock accounted for 4% of assets for all DC plans at Vanguard in 2017. Among large plans, 5% of assets were allocated to company stock at year-end 2017, compared with a 1%-or-less allocation among small plans. These averages include plans offering—and plans not offering—company stock. The averages for those plans actively offering company stock to participants were higher (see page 82).

Balanced funds, including target-date funds, accounted for 39% of assets for all DC plans at Vanguard in 2017. Among smaller plans, only about one-third of assets were allocated to balanced funds at year-end 2017, compared with nearly 40% among larger plans.

Overall, asset allocations vary by industry group (Figure 59). Participants in the business, professional, and nonprofit and education and health industry groups have the most conservative allocations, while participants in the media, entertainment, and leisure industry group have the most aggressive allocations. Participants in the agriculture, mining, and construction industry group also have more aggressive allocations, including the highest allocations to company stock.

Figure 58. Asset allocation by plan size, 2017

Vanguard defined contribution plans

	Plan participants				
	<500	500–999	1,000–4,999	5,000+	All plans
Total equity asset-weighted	72%	72%	72%	73%	73%
Brokerage	2	2	1	1	1
Company stock	<0.5	1	2	5	4
Diversified equity	47	42	42	41	41
Target-date funds	26	33	33	33	33
Other balanced funds	9	7	6	5	6
Bond funds	8	7	7	6	6
Cash	8	8	9	9	9

Source: Vanguard, 2018.

Figure 59. Asset allocation by industry sector, 2017

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%	4%	41%	33%	6%	6%	9%		
Average participant-weighted	<0.5%	3%	22%	58%	6%	4%	7%	75%	85%
Industry group									
Media, entertainment, and leisure	1%	3%	39%	40%	7%	5%	5%	80%	89%
Transportation, utilities, and communications	<0.5	7	46	24	7	6	10	77	86
Wholesale and retail trade	<0.5	1	39	41	3	6	10	74	86
Agriculture, mining, and construction	1	13	33	29	4	6	14	74	85
Finance, insurance, and real estate	1	2	42	32	4	8	11	74	85
Manufacturing	<0.5	4	40	36	5	6	9	75	84
Business, professional, and nonprofit	1	3	46	29	7	7	7	72	82
Education and health	2	<0.5	42	34	7	8	7	74	80

Source: Vanguard, 2018.

Plan investment options

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

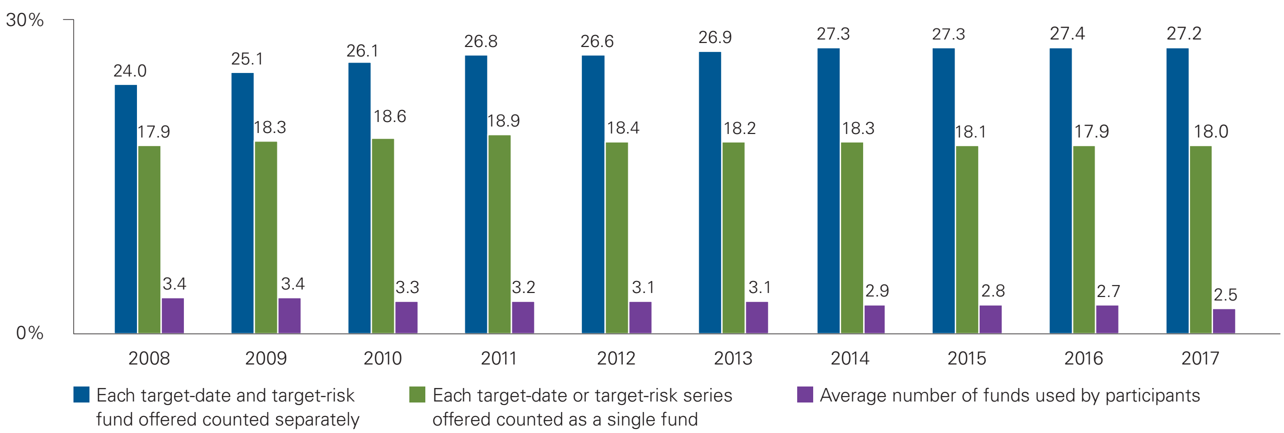
Number of options offered

The average Vanguard plan offered 27.2 investment options in 2017, essentially unchanged from 27.4 investment options in 2016 but up from 24.0 options in 2008—an increase of 13% **(Figure 60)**. The growth in the number of funds offered has been influenced by the increased use of "all-in-one" funds such as target-date funds, which are offered as a series of options. When each distinct target-date (or target-risk) fund is counted as a single offering, the average number of investment options for 2017 is 27.2. But when an entire series of such funds is counted as a single offering, the average number of investment options offered falls to 18.0. By this measure, sponsors have added no new investment options on a net basis since 2008—not the three additional options implied by the aggregate number.

Despite the modest expansion of funds offered—the number of funds used by participants has declined. This is directly attributable to the growth of target-date funds.

Figure 60. Average number of investment options offered and used

Vanguard defined contribution plans

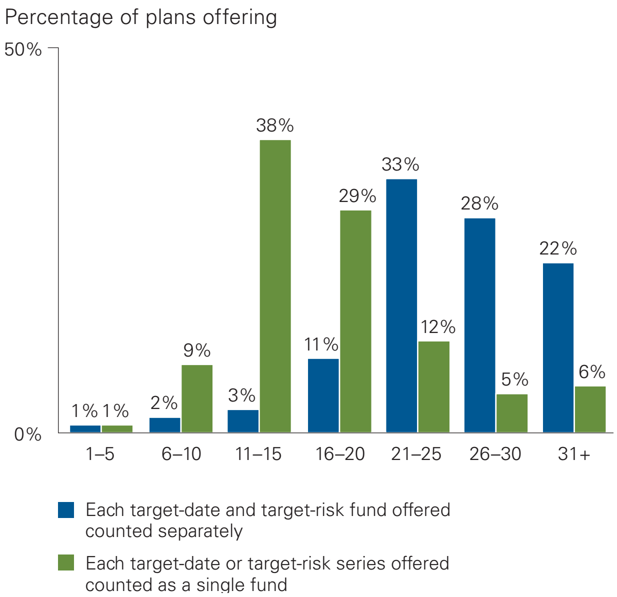


Source: Vanguard, 2018.

Counting a target-date or target-risk series as a single fund offering, the median plan sponsor offered 16 investment options in 2017. In 2017, 11% of plans offered more than 25 distinct investment options, while 10% of plans offered 10 or fewer (Figure 61).

Figure 61. Number of options offered, 2017

Vanguard defined contribution plans



Source: Vanguard, 2018.

Types of options offered

Virtually all Vanguard DC plans offer an array of investment options covering four major investment categories: equities, bonds, balanced (including target-date and target-risk strategies), and money market or stable value options (Figure 62). 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-capitalization and mid- or small-capitalization stocks, as well as one or more international funds.

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-six percent of plans offered sector funds, such as technology or health care funds. One in 5 plans offered a self-directed brokerage feature. Meanwhile, plan sponsor interest in target-date funds remains strong. At year-end 2017, 92% of plans offered target-date funds.

The types of investment options offered do not vary substantially by plan size. However, large plans are much more likely than small plans to offer company stock, self-directed brokerage accounts, and managed account programs. In addition, larger plans have been quicker than smaller plans to add target-date and inflation-protected securities funds.

Tiering

Tiering is a clear, understandable, and effective way to present plan investment choices to participants. Investment options are presented in categories or tiers. Typically the tiers are all-in-one options, such as target-date or risk-based balanced funds; an index core; and, supplemental investment options. Most Vanguard plan sponsors tier their investment lineup.[4]

4 For an in-depth analysis of how plan sponsor fund menu construction shapes participant portfolios, see Pagliaro, Cynthia A., and Stephen P. Utkus, *Choice architecture and participant investment decisions*, April 2018, Vanguard research, institutional.vanguard.com.

Figure 62. Type of investment options offered, 2017

Vanguard defined contribution plans

	Number of participants				
	All	<500	500–999	1,000–4,999	5,000+
Cash	99%	98%	99%	>99.5%	99%
Money market	64	68	61	59	63
Stable value/Investment contract	63	58	67	69	75
Bond funds	98%	98%	98%	>99.5%	99%
Active	73	68	77	81	74
Index	89	89	89	89	94
Inflation-protected securities	33	31	31	37	40
High-yield	19	20	17	19	19
International	21	19	24	25	16
Balanced funds	99%	99%	99%	>99.5%	100%
Traditional balanced	69	74	66	62	63
Target-risk	16	21	9	10	11
Target-date	92	87	97	99	99
Equity funds	99%	98%	98%	>99.5%	100%
Domestic equity funds	99%	98%	98%	>99.5%	100%
Active domestic	93	93	92	94	91
Index domestic	98	98	98	>99.5	99
Large-cap value	90	92	86	91	81
Large-cap growth	90	91	88	92	85
Large-cap blend	98	97	98	99	97
Mid-cap	89	88	91	93	85
Small-cap	88	87	89	90	82
Socially responsible	8	7	8	8	19
International equity funds	98%	97%	98%	99%	98%
Active international	85	84	86	86	87
Index international	68	64	70	76	70
Emerging markets	33	32	35	39	32
Sector funds	36%	38%	35%	36%	25%
REIT	32	32	32	33	25
Health care	11	13	10	8	6
Energy	7	8	5	6	5
Precious metals	4	4	3	3	4
Technology	2	3	3	2	1
Utilities	1	1	2	1	0
Natural resources	1	1	2	1	1
Financials	<0.5	<0.5	2	<0.5	0
Communications	<0.5	<0.5	1	0	0
Commodities	<0.5	<0.5	1	<0.5	1
Consumer	<0.5	<0.5	<0.5	<0.5	0
Company stock	9%	2%	7%	14%	33%
Self-directed brokerage	18%	14%	18%	20%	32%
Managed account program	30%	13%	34%	53%	61%

Source: Vanguard, 2018.

All index

Money market, stable value, and company stock funds, by definition, are not indexed funds. Excluding these nonindexable options, only 2% of all Vanguard plans offer an all-index menu.[5]

Index core

A newer development in investment menu design is offering a passive (or index) "core." A passive core is a comprehensive set of low-cost index options that span the global capital markets. At a minimum, a passive core in our definition 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 2017, 6 in 10 Vanguard plans offered at least four options within a passive core (Figure 63). Because larger plans have been quicker to offer this approach, 7 in 10 Vanguard participants were offered a passive core in 2017. In addition, many of these plans also offered a passive target-date fund to further simplify participant portfolio construction. Six in 10 plans offered both a passive core and passive target-date funds, and 70% of participants had access to these fund lineups. In 2008, one-third of all plans offered a passive core, and one-quarter offered both a passive core and passive target-date funds (Figure 64). In 2008, 4 in 10 participants were offered a passive core, and one-third were offered both a passive core and passive target-date funds (Figure 65).

Figure 63. Index core offered, 2017

Vanguard defined contribution plans

	Number of participants				
	All	<500	500–999	1,000–4,999	5,000+
Percentage of plans offering an index core	61%	55%	64%	66%	74%
Percentage of plans offering an index core and target-date funds	57	49	62	65	73
Percentage of participants offered an index core	72	58	64	66	76
Percentage of participants offered an index core and target-date funds	70	54	62	65	73

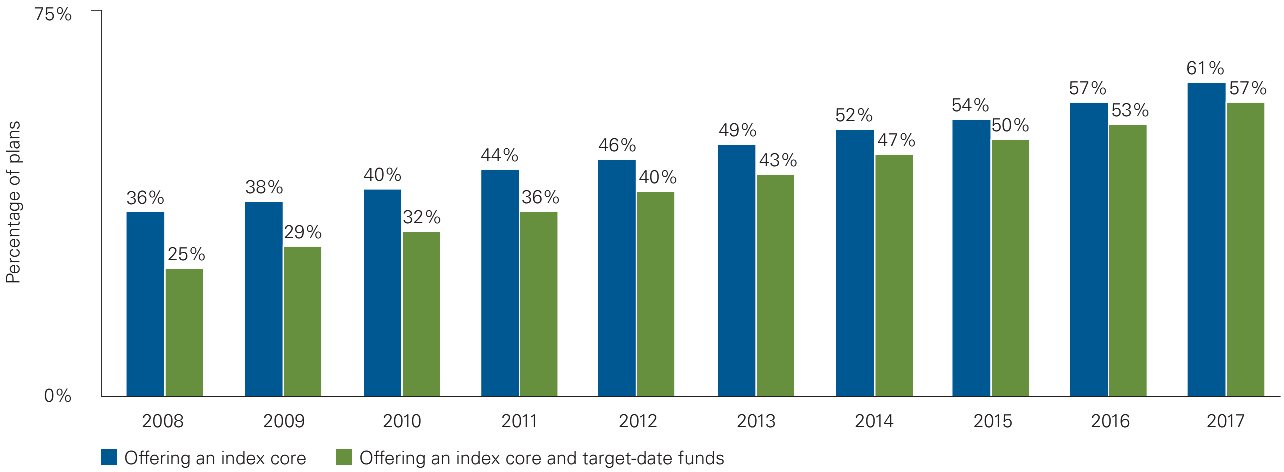
An index core includes broadly diversified index funds for U.S. stocks, U.S. bonds, and international stocks. At a minimum, the definition includes index funds for large-cap U.S. stocks, intermediate or long-term bonds, and developed markets.

Source: Vanguard, 2018.

5 For an in-depth analysis of how indexing in DC plans has evolved, see Pagliaro, Cynthia A., and Stephen P. Utkus, *Indexing in defined contribution plans 2006 to 2016*, May 2017, Vanguard research, institutional.vanguard.com.

Figure 64. Index core offered trend, plans

Vanguard defined contribution plans

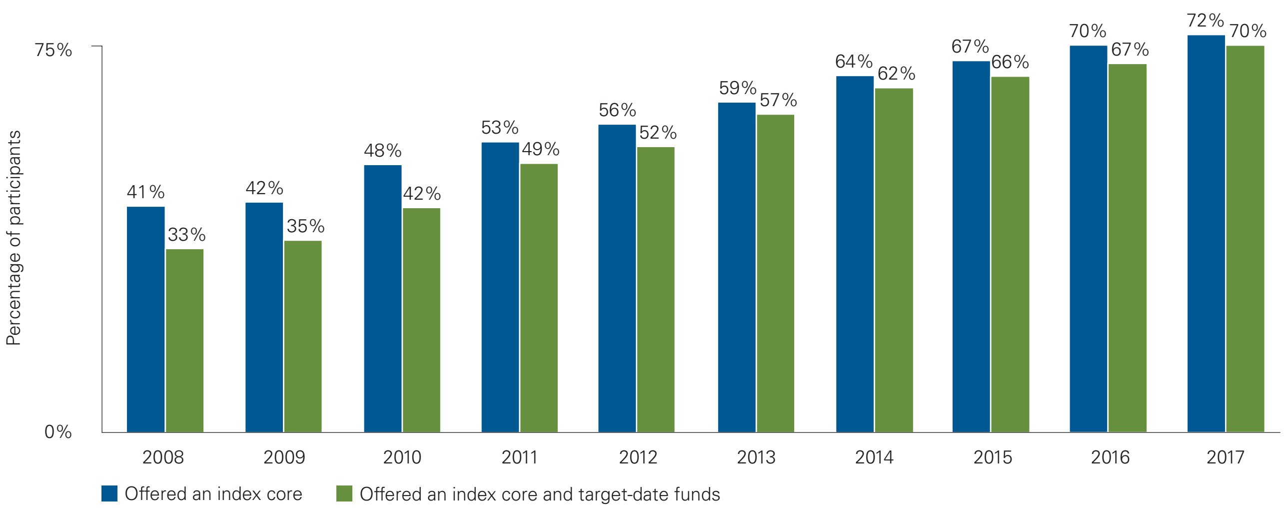


An index core includes broadly diversified index funds for U.S. stocks, U.S. bonds, and international stocks. At a minimum, the definition includes index funds for large-cap U.S. stocks, intermediate or long-term bonds, and developed markets.

Source: Vanguard, 2018.

Figure 65. 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, 2018.

Default funds

Increasingly, participants are being directed into default investments selected by the plan sponsor, rather than making active investment choices on their own. Default investing is rising in importance in response to concerns about the lack of investment knowledge among participants, as well as the growing use of automatic enrollment. In response to these developments, the U.S. Department of Labor (DOL), acting under the PPA, authorized three types of default investments as eligible for special fiduciary protection. These options, known as QDIAs, include target-date funds, other balanced funds, and managed account advisory services.

Nearly all Vanguard plans have designated a default fund, and 9 in 10 had selected a target-date or balanced fund option as the default option in 2017 (Figure 66). In 2008, about 3 in 10 plan sponsors had designated a money market or stable value fund as the default option (Figure 67).

Nearly 80% of plans in 2017 had specifically designated a QDIA under the DOL's regulations. Typically, these were plans with automatic enrollment or employer contributions other than a match. Among plans choosing a QDIA, 96% of designated QDIAs were target-date funds, and 4% were balanced funds.

Figure 66. Default fund designations, 2017

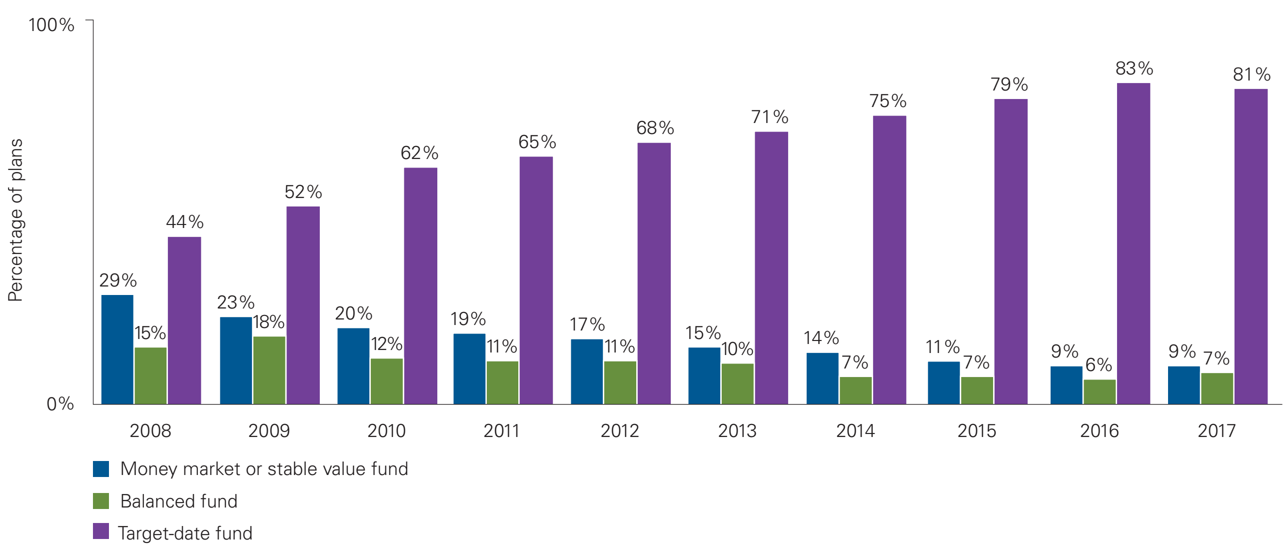
Vanguard defined contribution plans

	QDIA plans	Non-QDIA plans	All plans
Among all plans			
Target-date fund	76%	5%	81%
Balanced fund	3	4	7
Money market or stable value	0	9	9
Total plans designating a default	**79%**	**18%**	**97%**
Among plans designating a QDIA			
Target-date fund	96%		
Balanced fund	4		
Total plans designating a QDIA	**100%**		

Source: Vanguard, 2018.

Figure 67. Default fund designation trend

Vanguard defined contribution plans



Source: Vanguard, 2018.

Number of options used

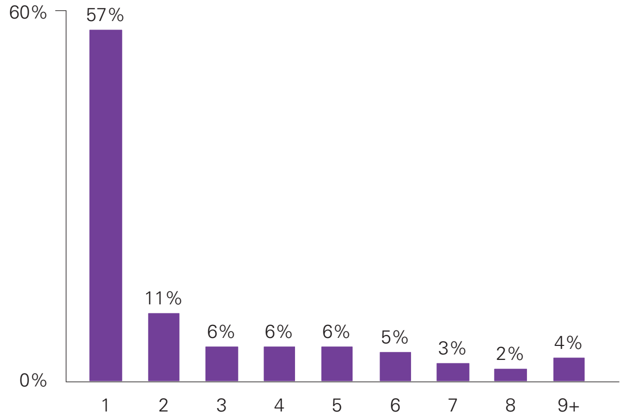
Although sponsors tend to offer a large menu of investment choices, more than half of participants used only one fund (Figure 68). On average, Vanguard participants used 2.5 options in 2017, and the median participant used just 1.0 option—fewer than the 3.4 options used, on average, in 2008, and the median participant used just three funds in 2008.

One reason for this change is the growing number of single target-date fund investors. In 2017, 6 in 10 participants held a single-fund option in their account (Figure 69). Eighty-seven percent of these participants were invested in a single target-date fund, and 5% were invested in either traditional balanced funds or target-risk funds. Since 2008, the percentage of single-fund investors holding cash investments has declined from 27% to 5% due to the growth of automatic enrollment, the availability of target-date funds, and a shift in default fund designations by employers.

Figure 68. Number of options used, 2017

Vanguard defined contribution plans

Percentage of participants using

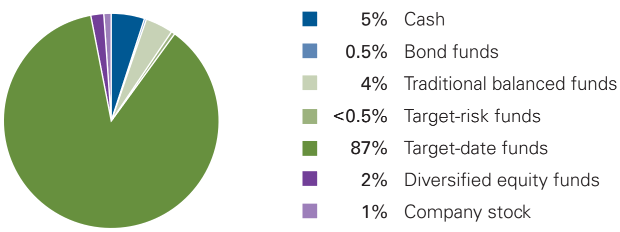


Source: Vanguard, 2018.

Figure 69. Single-fund holders, 2017

Vanguard defined contribution plans

Percentage of single-fund participants using



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Percentage of participants holding a single fund	34%	35%	37%	41%	43%	44%	48%	51%	55%	59%
Percentage of single-fund participants using										
Cash	27%	23%	18%	16%	14%	11%	8%	7%	6%	5%
Bond funds	2	2	1	1	1	1	1	1	1	<0.5
Traditional balanced funds	6	6	5	5	4	3	3	3	5	4
Target-risk funds	14	13	11	10	9	10	2	1	1	<0.5
Target-date funds	39	45	53	59	64	69	81	84	83	87
Diversified equity funds	9	8	7	5	4	4	4	3	3	2
Company stock	3	3	5	4	4	2	1	1	1	1

Source: Vanguard, 2018.

Types of options used

Among the options offered by DC plans, which do participants actually use? In 2017, a balanced fund (including target-date and other balanced funds) was the most common participant holding (84% of participants), followed by a diversified domestic equity fund (33% of participants) (Figure 70). Among the balanced options held, target-date funds were overwhelmingly more likely to be held (77% of participants offered) than traditional balanced funds (19% of participants offered) or target-risk funds (5% of participants offered). Before 2008, participants were most likely to hold a diversified domestic equity fund. This trend shift was first observed in 2009.

Nearly all participants were offered a U.S. equity index fund, yet only one-quarter used that option. However, participants holding balanced strategies (whether traditional, target-date, or target-risk) are often holding substantial equity index exposure. When participants holding index investments through all balanced options are factored in, 8 in 10 Vanguard participants hold some U.S. equity index exposure.

Only 1 in 5 participants chose to hold a bond fund, and about 1 in 6 also chose a money market or stable value cash investment.

Most Vanguard DC participants were offered a stand-alone international equity fund, but only one-fifth of participants chose to use one. Emerging markets funds were offered and used even less frequently; 3 in 10 participants had access to them, and only 7% of those chose to use one. Increasingly, international equity exposure is occurring through packaged investment programs, such as target-date funds.

Sector funds were offered to one-quarter of participants in 2017 and were also used infrequently; only 8% of participants who were offered these funds used them.

Three 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 a self-directed brokerage feature, only 1% of these participants used the feature in 2017. In these plans, about 2% of plan assets were invested in the self-directed brokerage feature in 2017.[6]

6 For an in-depth analysis of brokerage investors, see Young, Jean A., and Galina Young, *The brokerage option in DC plans,* May 2018, Vanguard research, institutional.vanguard.com.

Figure 70. Type of investment options offered and used, 2017

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%**	**16%**	**16%**
Money market	64	64	9	6
Stable value/Investment contract	63	73	15	11
Bond funds	**98%**	**99%**	**18%**	**18%**
Active	73	77	9	7
Index	89	93	14	13
Inflation-protected securities	33	39	3	1
High-yield	19	16	5	1
International	21	16	2	<0.5
Balanced funds	**99%**	**>99.5%**	**84%**	**84%**
Traditional balanced	69	64	19	12
Target-risk	16	15	5	1
Target-date	92	97	77	75
Equity funds	**99%**	**>99.5%**	**34%**	**34%**
Domestic equity funds	**99%**	**>99.5%**	**33%**	**33%**
Active domestic	93	93	21	20
Index domestic	98	99	26	26
Large-cap value	90	88	12	10
Large-cap growth	90	89	15	14
Large-cap blend	98	96	23	22
Mid-cap	89	80	16	13
Small-cap	88	82	12	10
Socially responsible	8	20	3	1
International equity funds	**98%**	**98%**	**20%**	**19%**
Active international	85	87	16	14
Index international	68	63	11	7
Emerging markets	33	28	7	2
Sector funds	**36%**	**24%**	**8%**	**2%**
REIT	32	23	6	1
Health care	11	5	7	<0.5
Energy	7	4	4	<0.5
Precious metals	4	3	2	<0.5
Technology	2	1	9	<0.5
Utilities	1	<0.5	4	<0.5
Natural resources	1	1	3	<0.5
Financials	<0.5	<0.5	2	<0.5
Communications	<0.5	<0.5	5	<0.5
Commodities	<0.5	<0.5	4	<0.5
Consumer	<0.5	<0.5	2	<0.5
Company stock	**9%**	**23%**	**42%**	**10%**
Self-directed brokerage	**18%**	**30%**	**1%**	**<0.5%**
Managed account program	**30%**	**55%**	**7%**	**4%**

Source: Vanguard, 2018.

Professionally managed allocations

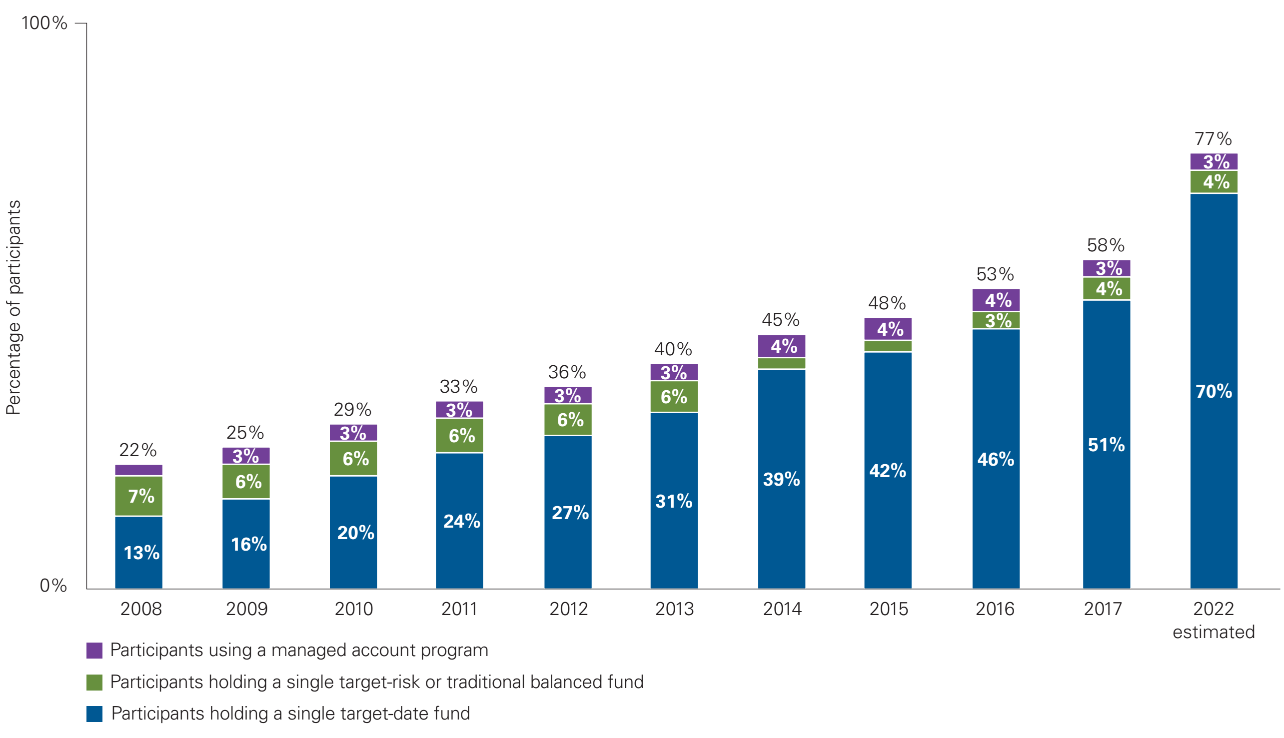
The most notable effect of plan investment menus on participant choices is the expanded offering and use of professionally managed allocations. Participants with professionally managed allocations have their entire account balance invested solely in a single target-date, target-risk, or traditional balanced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

In 2017, 6 in 10 Vanguard participants were invested in a professionally managed allocation (Figure 71). Driving this development is the growing use of target-date funds. A total of 51% of participants were invested in a single target-date fund in 2017. Among new plan entrants (those entering the plan for the first time), 84% of participants were invested in a single target-date fund (Figure 72). Due to the growing use of the target-date option, we anticipate that three-quarters of all participants will be solely invested in a professionally managed option by 2022. 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.

The users of the three types of professionally managed allocation strategies are quite distinct from nonusers. The three types of managed allocation investors are also quite different from one another (Figure 73). Participants who construct their own portfolios tend to be older and longer-tenured with higher average and median balances. Both single target-date fund and balanced fund investors are younger and shorter-tenured, with lower account balances. Single target-date fund investors are more likely to be in an automatic enrollment plan and to have been defaulted into the fund. In contrast, managed account investors are older, longer-tenured, and have higher balances. Finally, some plan sponsors have opted to reenroll participants to the plan's QDIA. This most often occurs when changing providers. Two percent of single target-date fund investors were reenrolled.

Figure 71. Participants with professionally managed allocations

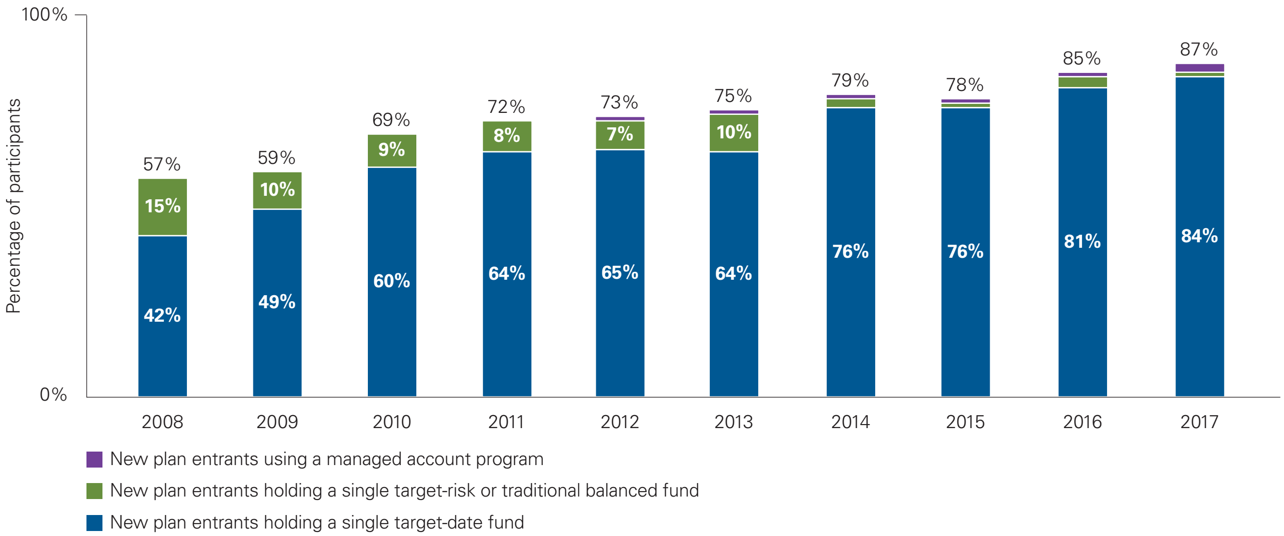
Vanguard defined contribution plans



Source: Vanguard, 2018.

Figure 72.	New plan entrants with professionally managed allocations

Vanguard defined contribution plans



Source: Vanguard, 2018.

Figure 73.	Demographic characteristics of participants with professionally managed allocations, 2017

Vanguard defined contribution plans

	All	All other participants	Single target-date fund	Single balanced fund	Managed account
Percentage of participants		42%	51%	4%	3%
Percentage male	58%	61%	54%	72%	59%
Median age	45	50	39	49	51
Median tenure	5	10	3	4	12
Average account balance	$103,866	$181,873	$37,032	$40,219	$166,478
Median account balance	$26,331	$78,252	$9,478	$9,932	$86,966
Percentage web-registered	73%	85%	64%	34%	93%
Percentage defaulted under automatic enrollment	21%		50%	2%	1%
Percentage defaulted under reenrollment	1%		2%	<0.5%	

Source: Vanguard, 2018.

Target-date funds

Target-date funds base portfolio allocations on an expected retirement date; allocations grow more conservative as the participant approaches the fund's target year. Target-date fund use has grown from 7 in 10 plans in 2008 to 9 in 10 plans in 2017 (Figure 74). At year-end 2017, nearly all participants were in plans offering target-date funds. Three-quarters of all participants had all or part of their account invested in target-date funds in 2017. More than half of all contribution dollars were directed to target-date funds in 2017.

Among plans offering the strategy, target-date options accounted for one-third of plan assets in 2017 (Figure 75). In these plans, more than half of all contributions in 2017 were directed to target-date funds.

Target-date funds are replacing target-risk funds, which maintain a static risk allocation (Figure 76). Since 2008, the fraction of plans offering target-risk funds as an investment option declined from 33% of plans to 16% of plans. However, 12% of plans maintain both target-risk and target-date funds, although for some of these plans, new contributions into the target-risk funds may be restricted.

Figure 74. Use of target-date funds

Vanguard defined contribution plans

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Percentage of all plans offering target-date funds	68%	75%	79%	82%	84%	86%	88%	90%	92%	92%
Percentage of recordkeeping assets in target-date funds	7	9	12	14	17	19	23	26	28	33
Percentage of all contributions directed to target-date funds	13	16	22	27	31	34	41	46	49	54
Percentage of all participants offered target-date funds	76	81	86	87	88	90	97	98	97	97
Percentage of all participants using target-date funds	28	34	42	47	51	55	64	69	72	75

Source: Vanguard, 2018.

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 75. Plan use of target-date funds

Vanguard defined contribution plans offering target-date funds

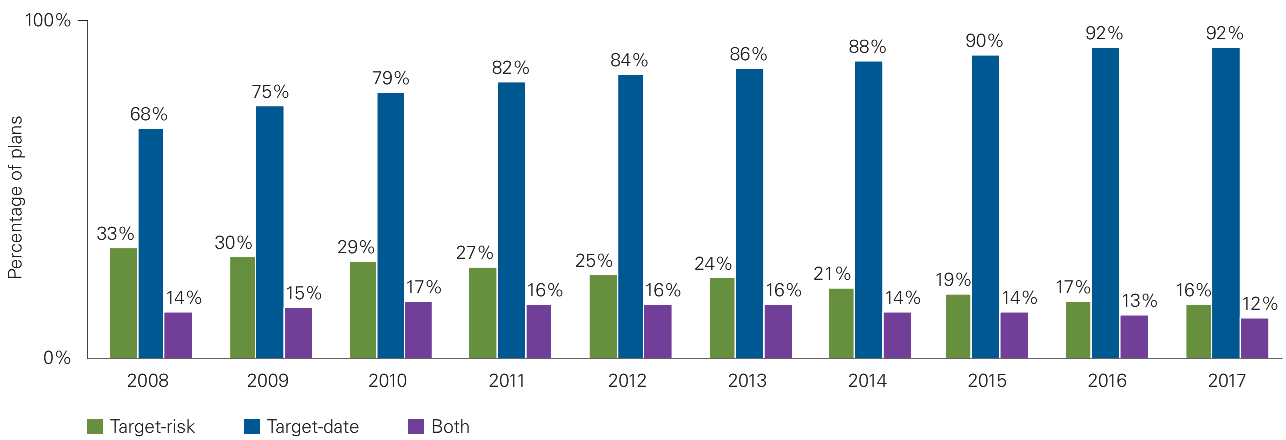
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Percentage of plan assets invested in target-date funds	9%	12%	15%	17%	19%	20%	24%	26%	29%	33%
Percentage of plan contributions invested in target-date funds	17%	21%	26%	31%	35%	38%	42%	47%	50%	54%
Distribution of percentage of plan assets in target-date funds										
<10%	55%	48%	38%	31%	25%	21%	16%	13%	11%	9%
10%–19%	25	27	32	34	34	31	28	26	22	19
20%–29%	10	11	14	17	20	23	25	25	25	23
30%–39%	3	5	6	7	8	10	11	13	15	18
40%–49%	2	3	3	4	4	5	7	8	9	10
50%+	5	6	7	7	9	10	13	15	18	21
Distribution of percentage of plan contributions to target-date funds										
<10%	27%	23%	17%	13%	9%	7%	6%	4%	4%	3%
10%–19%	32	29	25	20	17	14	10	8	7	6
20%–29%	19	23	25	25	23	21	17	14	10	8
30%–39%	10	11	16	19	21	22	22	18	17	14
40%–49%	5	5	7	10	13	16	17	21	20	19
50%+	7	9	10	13	17	20	28	35	42	50

Source: Vanguard, 2018.

Figure 76. Trend in plan adoption of target-date and target-risk funds

Vanguard defined contribution plans

Percentage of plans offering



Source: Vanguard, 2018.

Participant use of target-date funds

Among participants using target-date funds, 57% of account balances were invested in these funds (Figure 77). These target-date participants directed 80% of their 2017 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 67% of all target-date investors in 2017. 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).

Pure target-date investors are more likely to be younger, lower-wage, shorter-tenured participants with lower 401(k) account balances than other investors. Meanwhile, mixed investors appear very much like non-target-date investors in terms of their demographic and portfolio characteristics. Sixty-three percent of single target-date fund investors were younger than 45, compared with only 44% of mixed investors (Figure 78). More than two-thirds of plan participants younger than 35 hold a single target-date fund.

Figure 77. Participant use of target-date funds

Vanguard defined contribution plan participants using target-date funds

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Percentage of all participants offered target-date funds	76%	81%	86%	87%	88%	90%	97%	98%	97%	97%
Percentage of participants using target date funds when offered	37%	42%	48%	54%	58%	61%	66%	70%	74%	77%
Percentage of participant account balances in target-date funds	37%	38%	41%	43%	46%	48%	50%	51%	53%	57%
Percentage of total participant and employer contributions in target-date funds	57%	63%	67%	71%	72%	74%	75%	76%	78%	80%
Distribution of percentage of participant assets in target-date funds										
1%–24%	26%	26%	24%	21%	19%	17%	15%	14%	13%	11%
25%–49%	12	12	11	10	10	10	9	9	8	8
50%–74%	7	8	8	8	8	8	7	7	6	5
75%–99%	6	7	8	8	7	7	7	7	7	7
100%	49	47	49	53	56	58	62	63	66	69
Distribution of percentage of total participant and employer contributions in target-date funds										
1%–24%	19%	16%	14%	11%	11%	9%	9%	8%	8%	6%
25%–49%	13	11	11	9	9	8	8	8	7	7
50%–74%	7	7	6	7	7	7	6	6	4	4
75%–99%	5	4	5	4	4	5	8	5	5	4
100%	56	62	64	69	69	71	69	73	76	79
Percentage of participants owning										
One target-date fund only	46%	46%	48%	52%	54%	56%	60%	62%	65%	67%
One target-date fund plus other funds	46	46	44	41	38	36	33	31	28	26
Two or more target-date funds only	2	2	2	1	2	2	2	2	2	2
Two or more target-date funds plus other funds	6	6	6	6	6	6	5	5	5	5

Source: Vanguard, 2018.

Figure 78.	Participant use of target-date funds by age

Vanguard defined contribution plan participants using target-date funds

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Distribution of pure target-date fund holders by age										
<25	11%	9%	8%	8%	7%	7%	6%	6%	7%	7%
25–34	31	31	31	32	32	32	31	31	31	31
35–44	25	26	26	26	26	26	26	26	25	25
45–54	21	21	22	21	21	21	21	21	20	20
55–64	10	11	11	11	12	12	13	13	14	14
65+	2	2	2	2	2	2	3	3	3	3
Distribution of mixed target-date fund holders by age										
<25	3%	2%	2%	1%	2%	2%	2%	2%	2%	2%
25–34	22	21	20	19	18	18	17	17	17	17
35–44	28	27	27	27	26	26	26	25	25	25
45–54	29	30	30	30	30	29	29	28	28	27
55–64	16	17	18	20	20	21	22	23	23	23
65+	2	3	3	3	4	4	4	5	5	6
Percentage of all participants holding a single target-date fund by age										
<25	42%	50%	62%	69%	69%	71%	76%	77%	82%	85%
25–34	21	25	33	40	46	51	60	63	67	71
35–44	12	15	20	24	28	31	41	45	49	54
45–54	9	11	15	18	21	23	31	34	38	42
55–64	7	9	12	14	16	19	25	28	31	35
65+	6	7	9	11	13	15	20	23	25	28
Percentage of all participants holding target-date funds with other options by age										
<25	14%	14%	14%	12%	14%	14%	14%	15%	11%	9%
25–34	18	20	23	22	22	22	22	22	20	19
35–44	16	19	23	24	24	25	27	27	27	26
45–54	15	19	22	24	25	26	28	29	28	28
55–64	14	17	21	22	24	25	28	29	28	29
65+	10	12	15	17	18	20	22	24	24	24

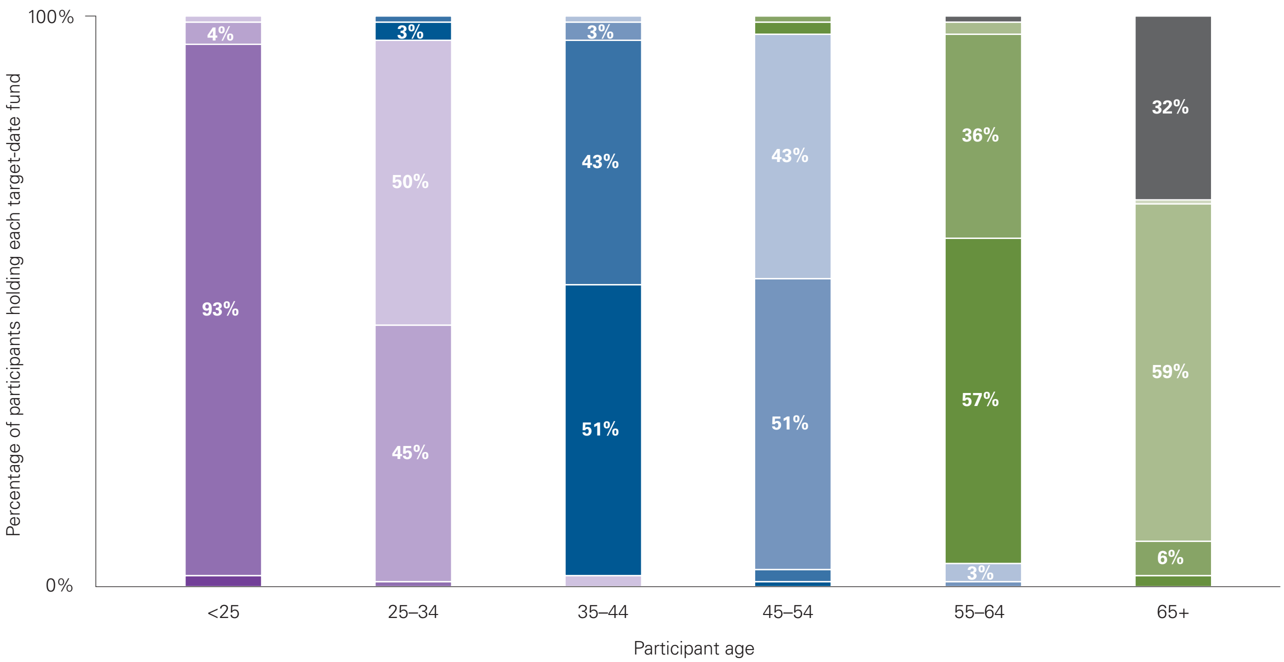
Source: Vanguard, 2018.

Half of all mixed-target-date investors arise through sponsor action and the other half through participant choice.[7] Sponsor actions leading to mixed investors 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 appear to select, or are defaulted into, a target-date fund with an appropriate target date (Figure 79). Half of participants ages 25 to 34 are invested in a 2050 target-date fund, and most of the remaining participants use either a 2045 or 2055 target-date fund.

Figure 79. Target-date fund utilization by age, 2017

Vanguard defined contribution plan participants holding a single target-date fund (51% of all participants)



Percentage of single target-date fund holders

<25	25–34	35–44	45–54	55–64	65+
7%	31%	25%	20%	14%	3%

2065 2060 2055 2050 2045 2040 2035 2030 2025 2020 2015 2010 2005 Income

Source: Vanguard, 2018.

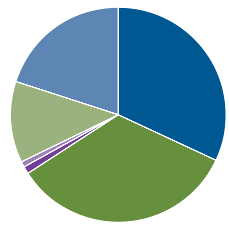
7 For an in-depth analysis of target-date fund investors, see Pagliaro, Cynthia A., and Stephen P. Utkus, *A different kind of target-date investor*, January 2017, Vanguard research, institutional.vanguard.com.

Similarly, more than half of participants ages 55 to 64 are invested in a 2025 target-date fund, and most of the remaining participants use a 2020 target-date fund.

Automatic enrollment into a target-date fund default is one important factor explaining the increase in the fraction of pure target-date investors. However, a large fraction of pure investors select target-date options voluntarily. Of the 67% of participants who were pure investors in 2017, a large portion of participants were in plans not offering automatic enrollment. Nearly half of pure investors were in plans where participants made the choice to select the fund (Figure 80).

Figure 80. Plan design and target-date funds, 2017

Vanguard defined contribution plan participants holding target-date funds



- 32% Voluntary-enrollment pure investors holding a single target-date fund
- 34% Automatic-enrollment pure investors holding a single target-date fund
- 1% Reenrollment pure investors holding a single target-date fund
- 1% Reenrollment mixed investors holding target-date and other funds
- 12% Automatic-enrollment mixed investors holding target-date and other funds
- 20% Voluntary-enrollment mixed investors holding target-date and other funds

Source: Vanguard, 2018.

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 may appear appropriate in light of the long-term retirement objectives of most DC plan participants.

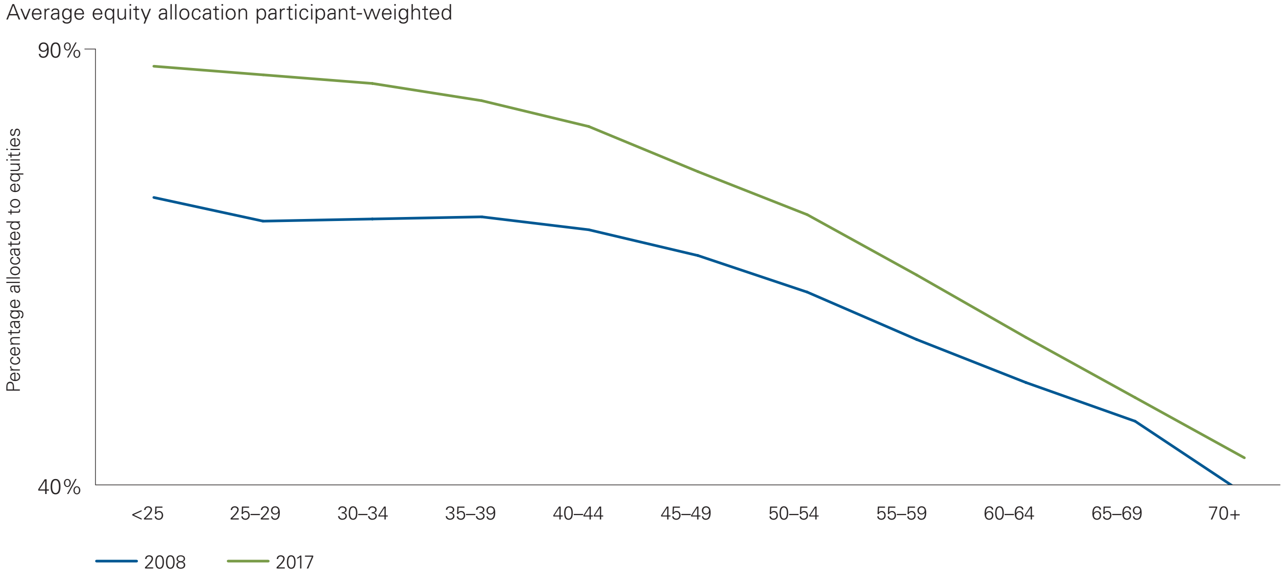
The growing use of professionally managed allocations within DC plans, including target-date funds, is reshaping equity allocations by age and reducing extreme allocations.

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 81**). In 2017, the equity allocation among Vanguard DC participants is downward sloping by age. This phenomenon is tied directly to the growing use of target-date funds, along with managed account advice, both of which provide for a declining equity exposure with age.

Figure 81. Trend in asset allocation by participant age

Vanguard defined contribution plans



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

Source: Vanguard, 2018.

One development influencing this change is the growth in default funds under automatic enrollment and the designation of target-date funds as the most common type of default investment. However, participants choosing target-date funds on a voluntary basis are also contributing in a meaningful way to this change.

A transition is under way in the factors influencing age-related equity exposure in DC plans. On the one hand, existing participants make few changes in their allocations as they age because of inertia in financial decision-making. On the other hand, the growing use of professionally managed allocations, particularly among new entrants to plans, is contributing to a sharper delineation of equity risk-taking by age.

Extreme equity allocations

The rising use of professionally managed allocations is also influencing extreme portfolio allocations (Figure 82). The fraction of participants with no allocation to equities has fallen by two-thirds, from 11% in 2008 to 3% in 2017. At the other extreme, the fraction of participants investing exclusively in equities has fallen from 16% to 5% over the same period.

One of the benefits of target-date funds is that they eliminate extreme equity allocations. Participants who construct their portfolios on their own tend to hold greater extremes in equity exposure (Figure 83, Panel D, page 78). Twenty percent of "do-it-yourself" investors hold extreme portfolios (8% with no equities, 12% with only equities). Professionally managed investors cannot hold extreme positions because professionally managed options generally include both equity and fixed income assets.

Figure 82. Distribution of equity exposure

Vanguard defined contribution plans

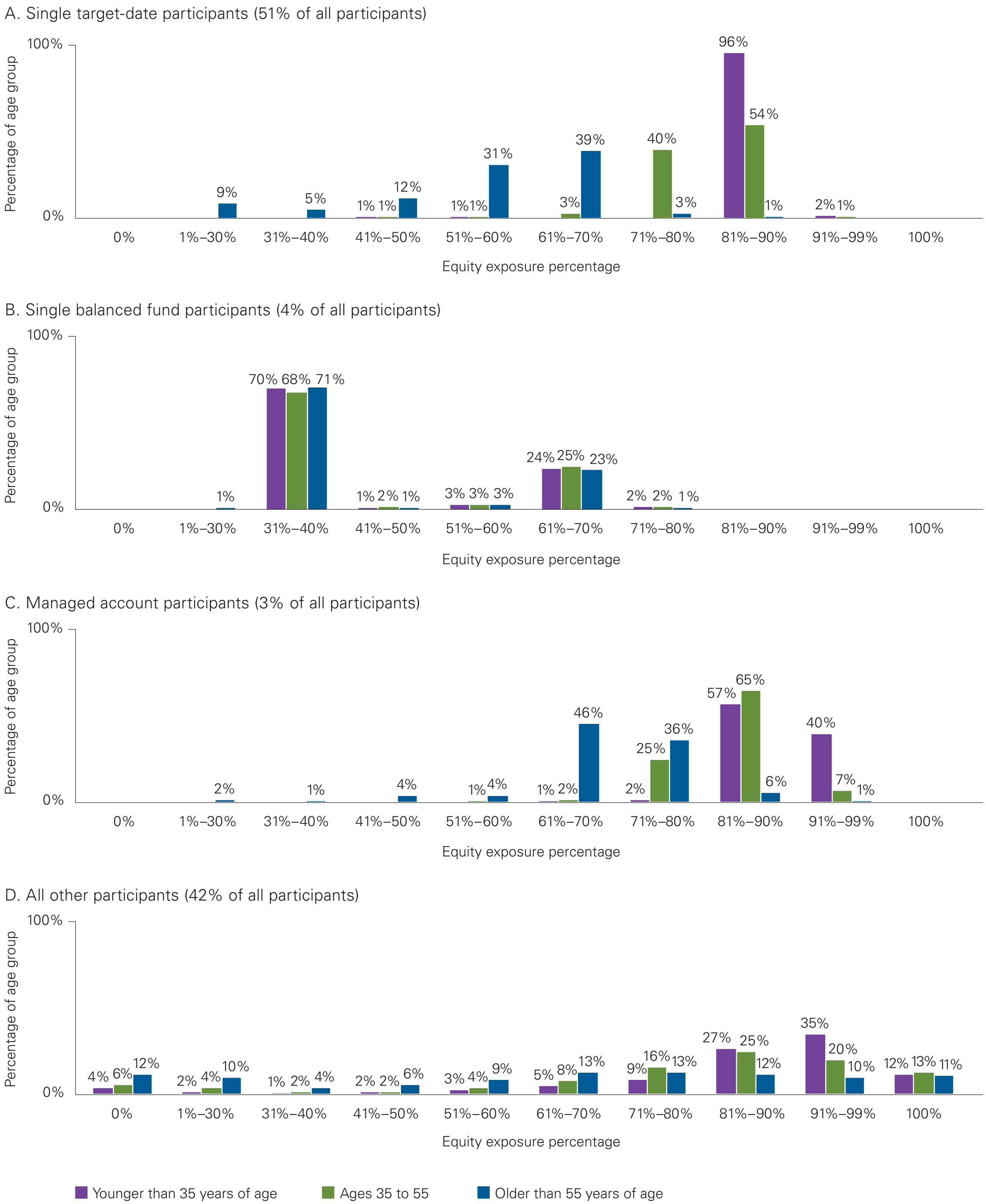
Percentage of participants

Percentage of account balances in equities	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Percentage of contributions to equities, 2017
0%	11%	11%	9%	8%	7%	6%	5%	5%	4%	3%	4%
1%–10%	2	2	2	2	2	2	1	1	1	1	<0.5
11%–20%	2	2	2	3	2	1	1	1	1	1	1
21%–30%	3	2	2	2	2	2	2	2	2	2	1
31%–40%	4	3	3	5	5	6	3	2	4	3	3
41%–50%	4	6	6	4	4	2	2	3	3	3	3
51%–60%	9	7	6	7	7	6	8	7	6	6	6
61%–70%	12	11	10	10	10	12	10	10	10	9	9
71%–80%	11	11	12	14	15	12	13	12	16	18	18
81%–90%	18	22	26	26	28	33	37	40	38	40	43
91%–99%	8	9	9	9	9	10	10	10	9	9	6
100%	16	14	13	10	9	8	8	7	6	5	6
Average equity participant-weighted	**65%**	**66%**	**68%**	**68%**	**69%**	**72%**	**74%**	**74%**	**74%**	**75%**	**76%**
Median equity participant-weighted	**74%**	**76%**	**79%**	**79%**	**79%**	**82%**	**83%**	**83%**	**83%**	**84%**	**86%**

Source: Vanguard, 2018.

Figure 83. Distribution of equity exposure by investor type, 2017

Vanguard defined contribution plan participants



Source: Vanguard, 2018.

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

This phenomenon 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.

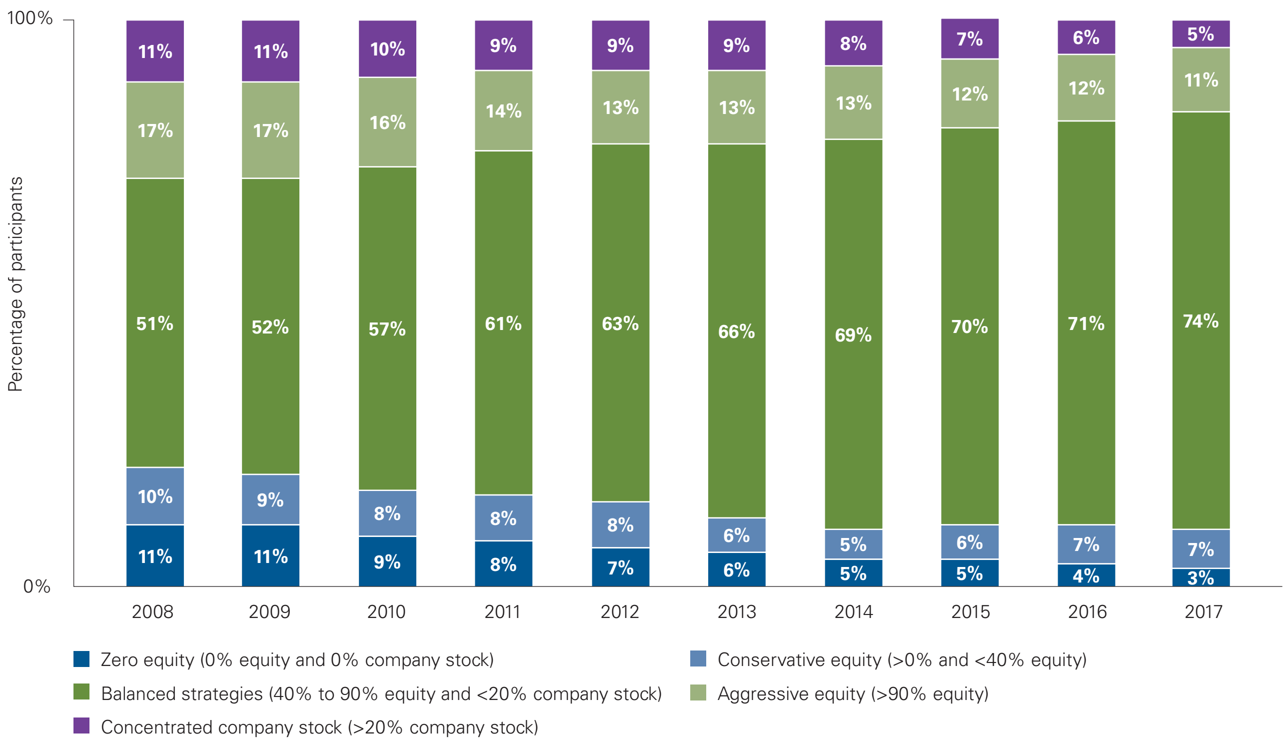
This rising use of professionally managed allocations is also contributing to a reduction in portfolio construction errors (Figure 84). The fraction of participants holding broadly diversified portfolios rose from half in 2008 to three-quarters in 2017. Participants holding concentrated stock positions fell by half, along with reductions in extreme portfolio positions. More than 8 in 10 participants younger than age 35 held balanced portfolios, compared with two-thirds of participants age 55 to 64 and only 47% of participants 65 or older (Figure 85, page 80).

Initial equity allocations

We analyzed how participants are currently allocating their contributions, based on the year they entered their employer's retirement plan.[8] Participants who enrolled during 2008–2009 were allocating slightly more than 70% of contributions to equities (Figure 86, page 80). Participants who enrolled during 2017 were allocating 81% of their contributions to equities. New plan entrants in 2017 allocated 83% of their total contributions to target-date funds.

Figure 84. Participant portfolio construction

Vanguard defined contribution plan participants

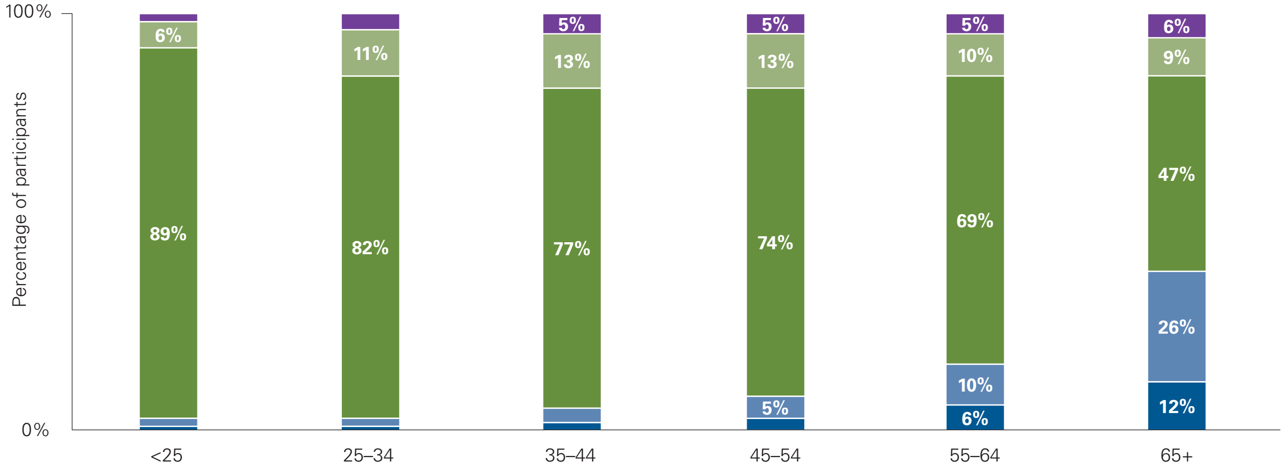


Source: Vanguard, 2018.

8 We do not have ready access to contribution allocations over time and so instead focus on current contribution allocations by date of plan entry.

Figure 85. Participant portfolio construction by age, 2017

Vanguard defined contribution plan participants

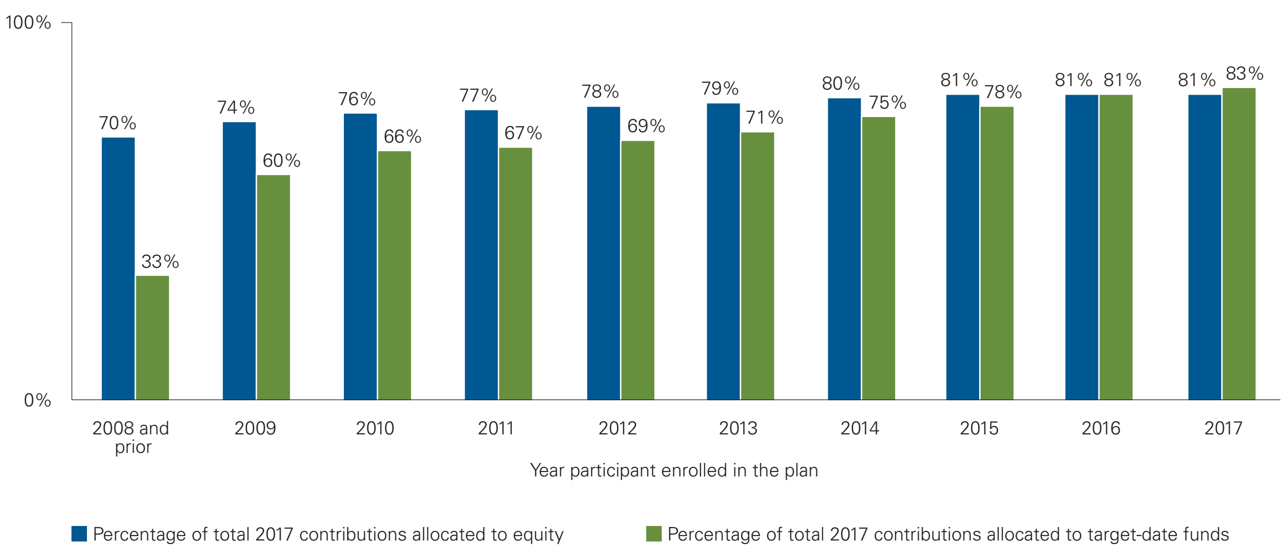


Source: Vanguard, 2018.

Figure 86. Current contribution allocation by plan entry date, 2017

Vanguard defined contribution participants

Contributions from January 1, 2017, through December 31, 2017



Distribution of all participants with contributions in 2017 by year of plan entry

2008 and prior	2009	2010	2011	2012	2013	2014	2015	2016	2017
33%	2%	3%	4%	4%	6%	8%	10%	14%	16%

Source: Vanguard, 2018.

Advice

Many participants in DC plans may lack the financial planning skills, time, or interest to make appropriate investment decisions. To address participants' need for assistance with investment decisions, plan sponsors using Vanguard as their recordkeeper offer a range of advice programs, including an online advice service, Personal Online Advisor; a managed account advisory service, Vanguard Managed Account Program; and Vanguard Financial Planning Services.

The online advice service and managed account program are provided by Financial Engines, a third-party advisor; the financial planning services are provided by Vanguard Advisers, Inc. Each of these programs allows participants to include information about assets they have outside the plan, which may affect the selection of in-plan investments.

Online advice is targeted toward participants who want to manage their investments themselves. Four in 10 plans offer online advice, which assists participants in developing and managing optimal portfolios and continues to recommend portfolio changes over time (Figure 87). Participants need to take action to implement online advice.

Because large plans are more likely to offer advice, two-thirds of participants have access to the online advice service.

Managed account advice is targeted toward participants who prefer professional investment management. The managed account program includes development of customized portfolios using the funds offered in the plan and ongoing monitoring and rebalancing. It also offers customized retirement savings projections. Participants may also further personalize the advice according to risk tolerance or other holdings. Thirty percent of plans offer managed account advice—and again, because larger plans are more likely to offer advice, half of participants have access to the service.[9]

Financial planning services are offered to all participants with plan sponsor authorization, but a fee may apply. However, the service is available at no charge to participants 55 and older who are in or nearing retirement if their plan sponsor authorizes the offer. Two-thirds of plans offer this service to their participants, and 7 in 10 participants in this age group have access to the program.

Figure 87. Advice offered, 2017

Vanguard defined contribution plans

	Number of participants				
	All	<500	500–999	1,000–4,999	5,000+
Online advice					
Percentage of plans offering online advice	41%	23%	49%	64%	73%
Percentage of participants offered online advice	65	30	49	66	68
Percentage of participants offered online advice accessing	6	9	7	5	7
Managed account advice					
Percentage of plans offering managed account advice	30%	13%	34%	53%	61%
Percentage of participants offered managed account advice	55	16	34	56	58
Percentage of participants offered managed account advice accessing	7	6	7	7	7
Financial planning services					
Percentage of plans offering financial plans	65%	61%	69%	71%	74%
Percentage of participants offered financial plans	71	66	72	74	70
Percentage of participants offered financial plans accessing	2	3	2	2	2

Source: Vanguard, 2018.

9 For an in-depth analysis of managed account advice, see Pagliaro, Cynthia A., and Stephen P. Utkus, *The value of managed account advice*, October 2015, Vanguard research, institutional.vanguard.com.

Company stock

Company stock is more likely to be offered as an investment option by a large plan—one-third of Vanguard plans with 5,000 or more participants offered company stock, compared with only 2% of plans with fewer than 500 participants. In some plans that offer company stock, participants can choose whether or not to invest their own contributions in this option.[10]

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 2017, only 9% of Vanguard recordkeeping plans offered company stock as an investment option. However, because large plans are more likely to offer company stock, 23% of Vanguard recordkeeping participants had access to company stock in their employer's plan. Among all Vanguard participants:

- 90% had no company stock investments in 2017—either because their employer did not offer company stock (76%) or because they chose not to invest in it (14%).
- 5% had company stock holdings of 1% to 20% of their account balance in 2017.
- 5% had concentrated positions exceeding 20% of their account balance as of 2017.

Among Vanguard plans actively offering company stock, 81% had 20% or less of plan assets invested in company stock (Figure 88). The remaining 19% had concentration levels of more than 20%.

In 2017, 6 in 10 Vanguard participants who were offered company stock in their plan chose not to invest their contributions—or their employer's contributions—in company stock. If they received employer stock contributions, they diversified these assets. At the other extreme, 1 in 5 participants in plans actively offering company stock had more than 20% of their account balance invested in company stock, and 3% had more than 80% of their account balance in company stock.

During 2017, the shift away from participant company stock holdings persisted. The number of participants in plans with company stock and holding a concentrated position of more than 80% of their account balance in company stock fell from 9% in 2008 to 3% in 2017, and fewer plans are offering company stock.

Despite this shift, why do 1 in 5 participants in plans offering company stock continue to hold a concentrated position in their employer's stock? One reason is that most participants view company stock as a safer investment than a diversified equity fund. Another factor encouraging concentrated stock holdings is the plan sponsor's decision to make an employer contribution in company stock. This implied endorsement often leads participants to invest more of their own savings in the stock 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 stock. In 2017, plans offering company stock as an investment option but making employer contributions in cash had an average of 12% of plan assets invested in company stock (Figure 89). Meanwhile, plans offering company stock as an investment option and making employer contributions in stock had an average of 22% of plan assets in company stock.

10 For an in-depth analysis of company stock in DC plans, see Lamancusa, John A., and Jean A. Young, *Company stock in DC plans: A decade later*, December 2017, Vanguard research, institutional.vanguard.com.

Figure 88. Company stock exposure for plans and participants

Vanguard defined contribution plans actively offering company stock

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Balance of account in company stock—percentage of plans										
1%–20%	82%	79%	80%	75%	77%	78%	79%	82%	81%	81%
21%–40%	10	15	13	17	16	16	15	14	16	18
41%–60%	6	5	6	7	6	6	6	4	3	1
61%–80%	1	0	0	0	0	0	0	0	0	0
>80%	1	1	1	1	1	0	0	0	0	0
Balance of account in company stock—percentage of participants										
0%	44%	45%	43%	45%	45%	47%	50%	50%	55%	61%
1%–20%	26	25	26	25	24	22	22	22	21	20
21%–40%	12	12	12	12	13	14	14	13	12	10
41%–60%	6	6	6	5	5	7	6	8	6	5
61%–80%	3	3	3	3	3	4	3	2	2	1
>80%	9	9	10	10	10	6	5	5	4	3

Source: Vanguard, 2018.

Figure 89. Impact of company stock employer contributions on asset allocation, 2017

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 employer contributions in company stock
Percentage of plans		93%	6%	1%
Brokerage	1%	1%	1%	<0.5%
Company stock	4	<0.5	12	22
Diversified equity funds	41	43	39	37
Balanced funds	39	41	34	29
Bond funds	6	6	6	6
Cash	9	9	9	6

Source: Vanguard, 2018.

Investment returns

There are two categories of investment returns: total returns and personalized returns. Total rates of return reflect time-weighted investment performance and allow comparison of results to benchmark indexes. Personal rates of return 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 rates of return can be compared with published benchmark indexes.

Participant returns

Due to generally rising markets in 2017, average total and personal returns for DC participants were 18.0% and 17.4% for the 1-year period ended December 31, 2017 (Figure 90). Reflecting strong U.S. equity markets, average total and personal returns for DC participants were around 8.5% across the 3-year period and around 10% for the 5-year period ended December 31, 2017.

Five-year participant total returns averaged 10.2% per year or 63% cumulatively (personalized total returns rose 9.9% per year or 60% cumulatively).

Distribution of returns

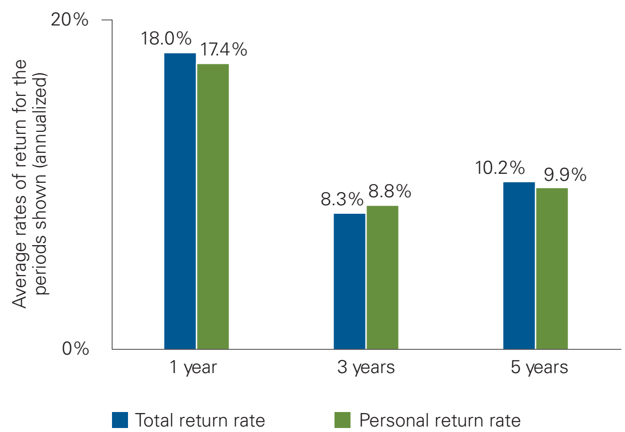
As of December 2017, 5-year personalized annual returns were positive for nearly all Vanguard DC plan participants. There was wide variation in returns among participants (Figure 91). Participants in the fifth percentile had five-year personalized returns of 1.9% per year in 2017. At the other extreme, participants above the 95th percentile had five-year personalized returns greater than 15.6% 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 7.3% for the 5th percentile to 11.7% for the 95th percentile, a difference of approximately 4 percentage points (Figure 92). For the single balanced fund and managed account participants, the 5th-to-95th percentile differences were approximately 4 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 1.9% per year for the 5th percentile to 16.3% for the 95th percentile, a difference of 14 percentage points.

Figure 90. Participant rates of return, December 2017

Vanguard defined contribution plans



Market returns ended December 31, 2017	1 year	3 years	5 years
60/40 Balanced*	14.6%	7.4%	9.3%
70/30 Balanced*	16.5	8.2	10.4
S&P 500	21.8	11.4	15.8
Barclays US Aggregate	3.5	2.2	2.1
FTSE Global All Cap ex US	26.8	8.7	8.3

Past performance is no guarantee of future returns.

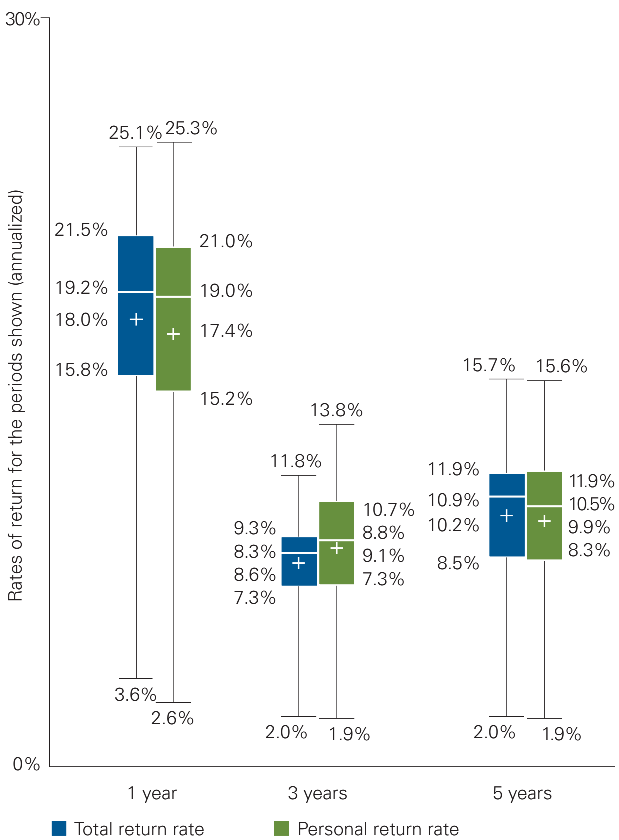
The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.

* Balanced composites based on S&P 500 and Barclays US Aggregate Indexes for periods and percentages shown; rebalanced monthly.

Source: Vanguard, 2018.

Figure 91.	Variation in participant total and personal return rates, 2017

Vanguard defined contribution plans

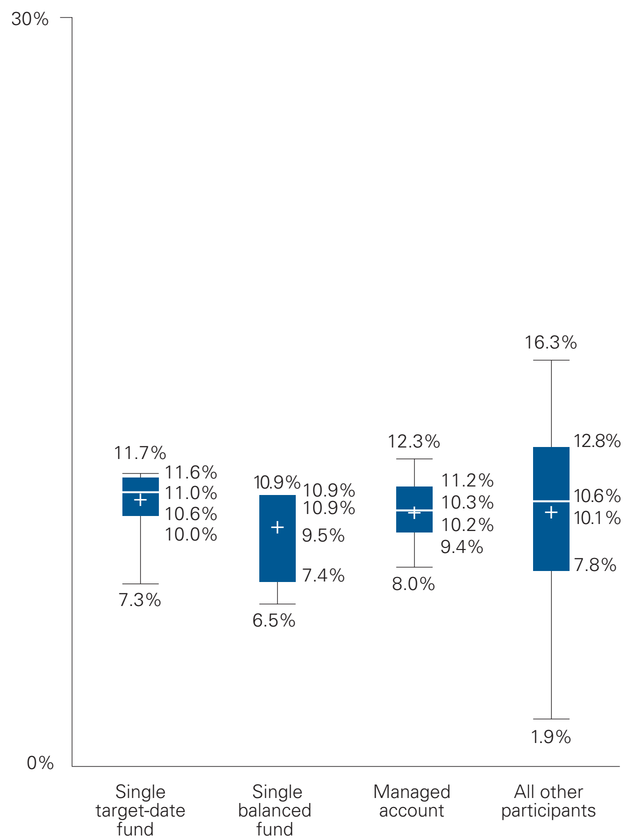


Note: Based on 3.7 million observations for 1 year; 2.6 million for 3 year; and 1.9 million for 5 year.

Source: Vanguard, 2018.

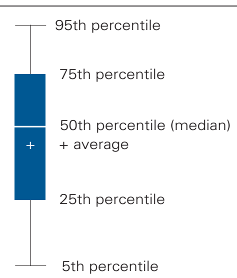
Figure 92.	Distribution of 5-year total returns by strategy, 2017

Vanguard defined contribution plans



Note: Based on 440,000 observations for single target-date fund investors; 26,000 for balanced fund investors; 53,000 for managed account investors; and 1.4 million for all other participants.

Source: Vanguard, 2018.



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 91** is: For the 1-year period, 5% of participants had total return rates (TRR) greater than 25.1%; 25% had TRRs greater than 21.5%; half had TRRs greater than 19.2%; 75% had TRRs greater than 15.8%; 95% had TRRs greater than 3.6%; and 5% had TRRs less than 3.6%. The average 1-year TRR was 18.0%.

Dispersion of outcomes

These differences are also apparent when examining both return and risk outcomes in scatter plots. For ease of presentation, we created a random sample of 1,000 participants for each group of investors.

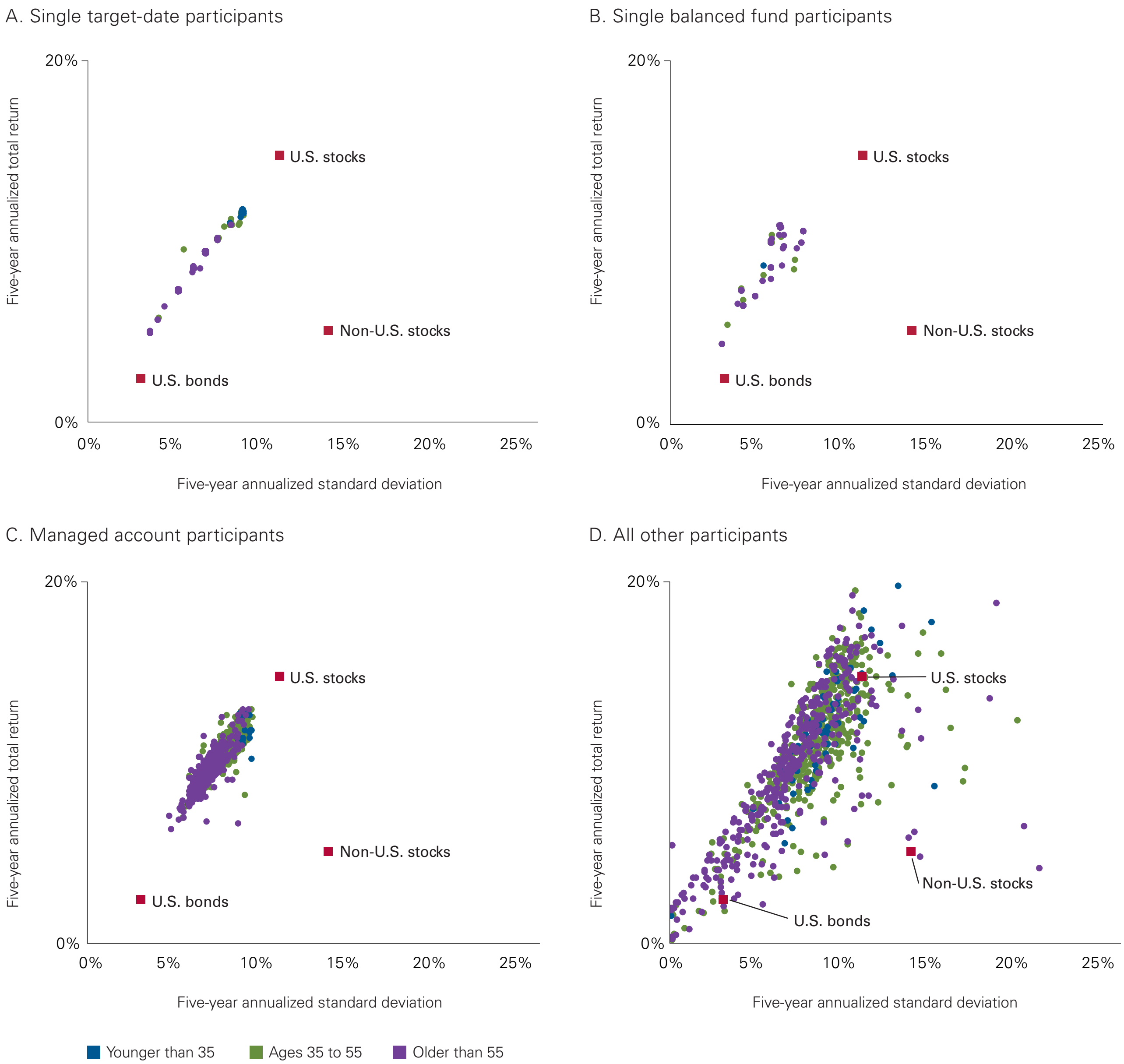
During the five-year period ended 2017, outcomes for single target-date investors were distributed among major market indexes (Figure 93, Panel A), and upward sloping reflecting a positive equity risk premium. These results are consistent with the fact that most of the target-date portfolios in our sample are a specific combination of indexed U.S. equities, international equities, U.S. bonds, and international bonds. In the target-date scatter plot, younger participants (represented by blue dots and in long-dated portfolios) are to the right of the chart; older participants (represented by purple dots and in near-dated portfolios) are to the left.

The figure includes about 1,000 observations, although there appear to be far fewer. The reason is that while there are many observations in our sample, they are all invested in a limited set of target-date portfolios, which means that the range of portfolio outcomes are also limited. For example, if a plan offered 12 target-date options, then 1,000 participants invested solely in a single target-date fund would have 12 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 93, Panel B). Managed account investors are more dispersed, reflecting the customized nature of managed account advice (Figure 93, Panel C). The greatest dispersion of risk/return outcomes is among participants making their own investment choices (Figure 93, Panel D). Over time, due to the growing use of professionally managed allocations in DC plans, this population is expected to decline.

Figure 93. Risk and return characteristics, 2013–2017

Defined contribution plan participants for the five-year period ended December 31, 2017



Note: Includes 1,000 random sample of participant accounts drawn from respective samples. Excludes ½% top and ½% bottom outliers for both risk and return, for a net sample of 980 observations.

Source: Vanguard, 2018.

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 contributions to the plan 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

Markets rose steadily in 2017, interspersed with some volatile days (Figure 94). Only 12% of participants made one or more portfolio trades or exchanges during the year, down from 16% in 2008.[11]

When participants using the managed account program are excluded, only 8% of participants initiated an exchange. As in prior years, most participants did not trade. Not only did participant trading activity remain low during 2017, trading activity between 2009 and 2017 was lower than the trading activity during 2008.

Another measure of trading is the volume of dollars traded. We measure dollar volume movements as a fraction of total recordkeeping assets in order 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 2017, traders exchanged the dollar equivalent of 10.6% of average DC recordkeeping assets at Vanguard. On a net basis, 0.3% of assets were shifted from equities to fixed income in 2017, compared with a 1.5% shift from equities to fixed income in 2016.

Since 2008, dollar-trading levels have generally remained stable, with the exception of periods of high market volatility (Figure 95). The most notable spikes in dollars traded occurred in months of high market volatility: January, September, and October 2008; March 2009; and August 2011.

11 Our trading statistics are generally adjusted for sponsor-initiated trading—e.g., replacement of one plan option with another. On the date the option is eliminated and the balances are moved to a different fund, we are able to capture and adjust for the fund replacement effect. However, some participants initiate exchanges either before or after the fund is eliminated. We are not able to isolate this participant activity but estimate that it could account for up to one-third of the trading activity.

Figure 94. Participant trading summary

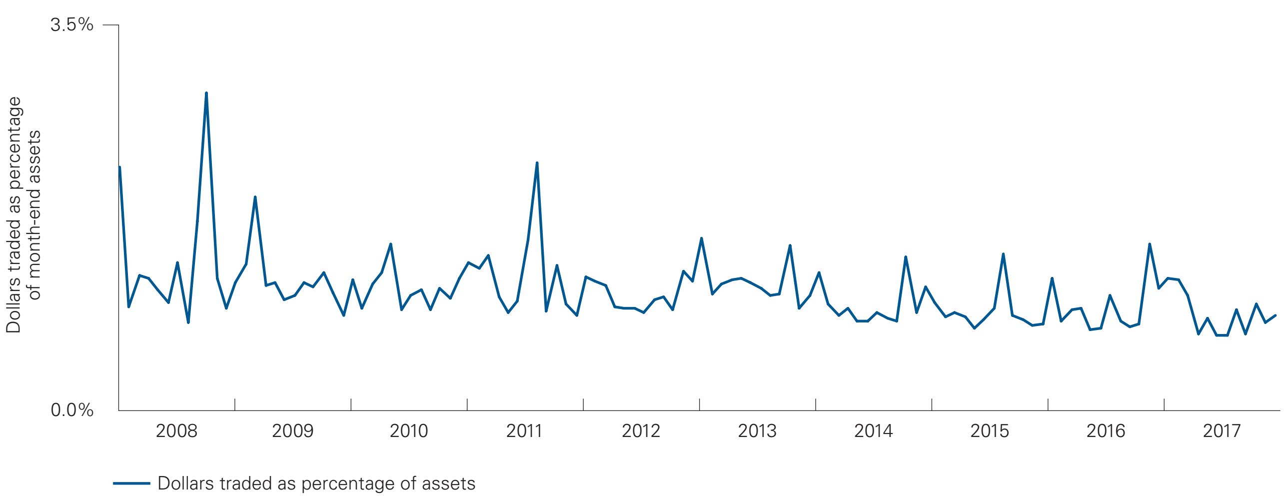
Vanguard defined contribution plans

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Percentage of participants										
Percentage trading including managed account investors	16%	13%	12%	11%	12%	13%	14%	13%	12%	12%
Percentage with participant-directed exchanges	14	11	10	10	9	10	10	9	8	8
Percentage of average recordkeeping assets										
Percentage traded	16.6%	14.1%	13.4%	14.8%	12.6%	14.0%	11.6%	10.7%	11.4%	10.6%
Percentage moved to equities (fixed income)	(3.9)	(0.6)	(1.1)	(2.5)	(1.7)	0.2	(0.6)	(0.8)	(1.5)	(0.3)
Dollar flows (in billions)										
Dollars traded	$39.7	$29.0	$32.5	$40.6	$36.2	$44.8	$41.8	$40.9	$44.7	$48.6
Dollars moved to equities (fixed income)	(9.3)	(1.2)	(2.8)	(6.9)	(4.9)	0.5	(2.3)	(3.0)	(6.0)	(1.5)
S&P 500 Index volatility										
Percentage of days up or down 3% or more	16.8%	8.7%	3.2%	4.8%	0.0%	0.0%	0.0%	1.2%	0.8%	0.8%
Percentage of days up or down 1% or more	54	46	30	37	20	15	31	29	19	19

Source: Vanguard, 2018.

Figure 95. Trading activity, January 2008–December 2017

Vanguard defined contribution plan participants



Source: Vanguard, 2018.

Direction of money movement

Summary statistics may sometimes give the impression that all participant trading is in one particular direction. However, in any given month, participants who trade are trading meaningful dollar amounts both into and out of equities (Figure 96). Even in volatile markets, as some traders shift their portfolios toward fixed income assets, there are others who shift toward equities.

During the past decade, which includes the 2008–2009 bear market, the net movement of money among participants trading in their accounts has been generally toward fixed income investments. Nonetheless, even at the height of the market volatility, there were significant gross flows toward equities among some participants.

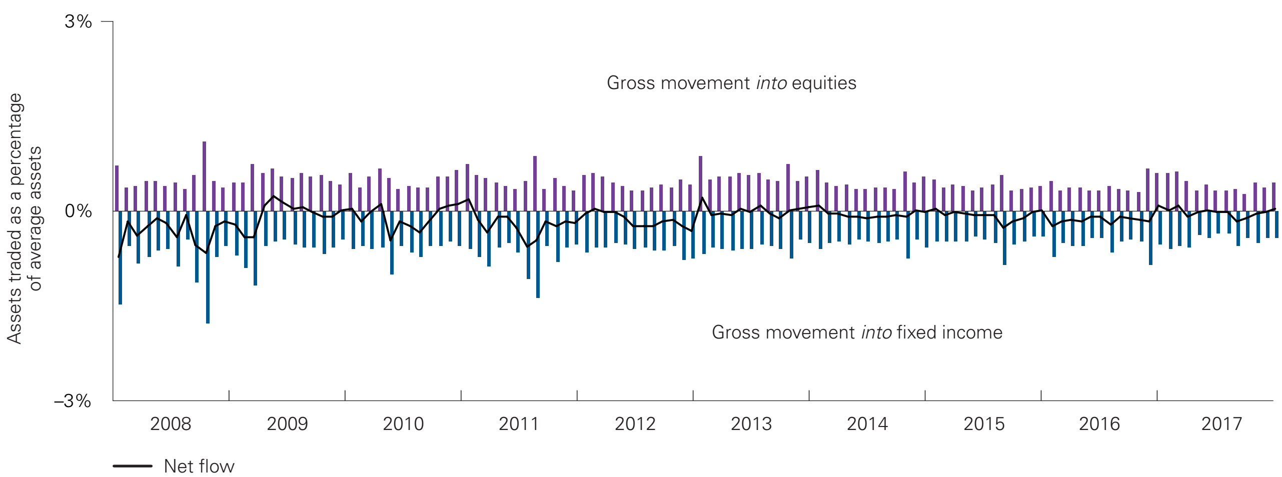
The growing reliance on single-fund investment programs, such as target-date funds, has likely contributed to lower trading levels by participants. Pure target-date and single balanced fund investors trade much less frequently than all other participants, although their portfolios are rebalanced daily by the fund managers (Figure 97).

Men are more likely to trade than women (Figure 98). However, participants enrolled in the managed account program trade much more frequently than all other participants, as their investments are rebalanced periodically to the target asset allocation.

Figure 96. Direction of money movement, January 2008–December 2017

Vanguard defined contribution plan participants

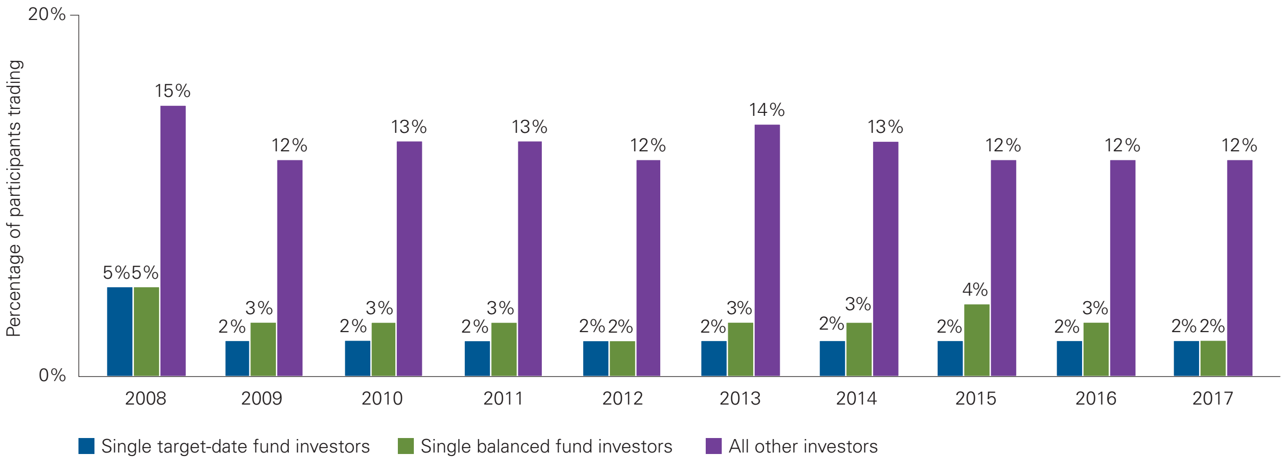
Money movement as a percentage of average assets



Source: Vanguard, 2018.

Figure 97. Participant trading by investor type

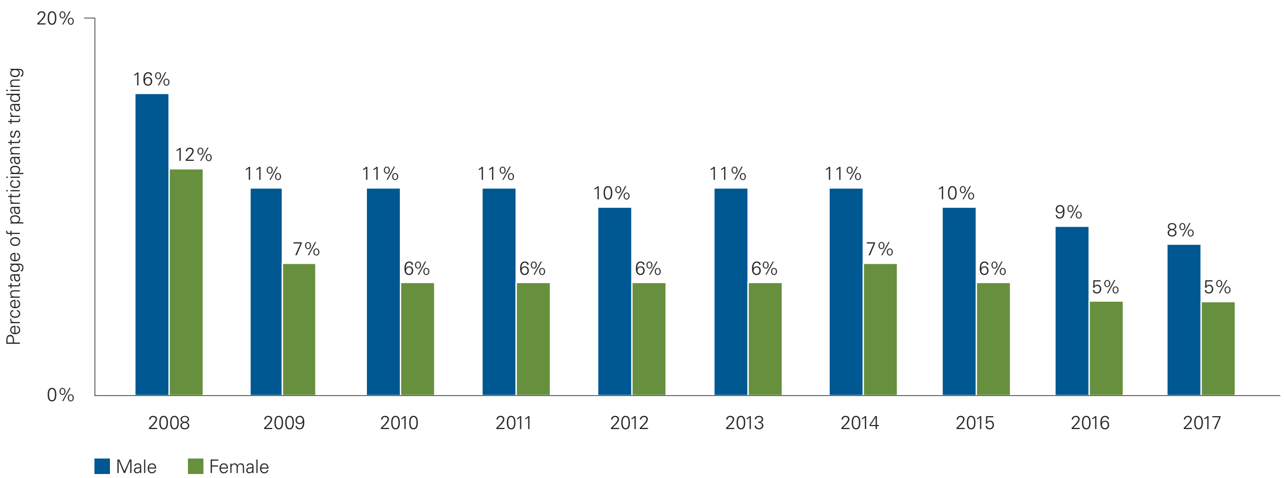
Vanguard defined contribution plan participants



Source: Vanguard, 2018.

Figure 98. Participant trading by gender

Vanguard defined contribution plan participants



Source: Vanguard, 2018.

Types of trading activity

Among participants who trade in their accounts, the types of exchanges made by participants are varied. In 2017, 98% of single target-date investors and single balanced fund investors did not trade to other fund options and instead retained their single holding (Figure 99). However, the fund managers for these strategies rebalanced the underlying assets of the funds daily.

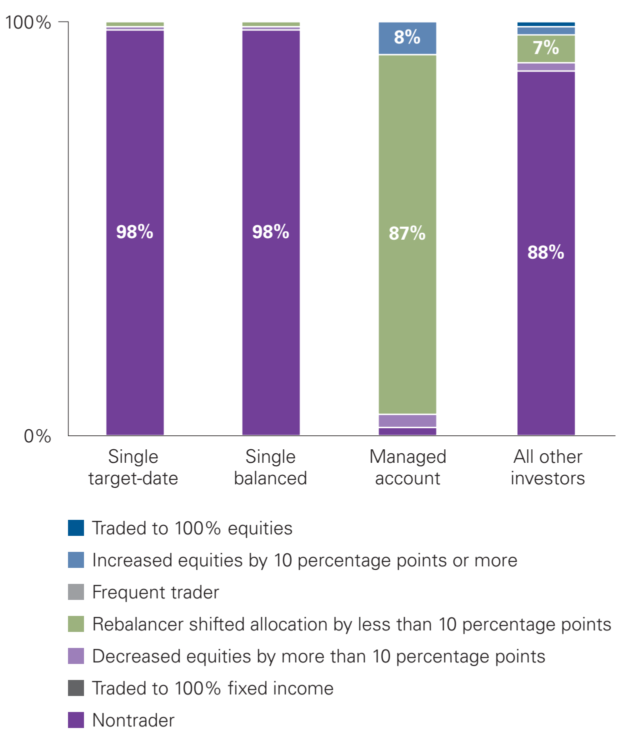
On the other hand, nearly all participants using a managed account had exchanges. In a managed account, the advisor oversees multiple fund holdings in a typical participant's account. The trading activity reflects the advisor rebalancing the participant's portfolio (or, with those initially signing up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

Among "do-it-yourself" investors, most participants do not trade—not even to rebalance their account. In 2017, less than 0.5% of all other participants abandoned equities.[12] Even among all other investors, most participants trading were rebalancing their portfolios.

Over a longer time frame, 2013–2017, 26% of participants initiated trades. Three-quarters of participants (excluding managed account investors) made no trades in their workplace retirement plan account, not even to rebalance to a target asset allocation. Again, single target-date and balanced fund investor portfolios are rebalanced by the fund managers. However, 42% of participants were making their own investment decisions in 2017.

Figure 99. Participant trading decisions, 2017

Vanguard defined contribution plan participants



Source: Vanguard, 2018.

12 A participant who abandoned equities is one who shifted his or her entire portfolio into fixed income investments during the year. Only participants with some equity exposure in their portfolio who shifted to all fixed income assets during 2017 are included in this category.

THREE

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.

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Plan loans

Plan loans allow DC 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 for employer-funded DC plans, such as money purchase or profit-sharing plans.

Offering loans appears to have a beneficial effect on retirement savings, raising contribution rates above what they would otherwise be. Yet they also come with risks. Cash that has been borrowed earns fixed income rather than equity market returns. Also, participants who leave their employer must typically 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.[13]

Loan availability

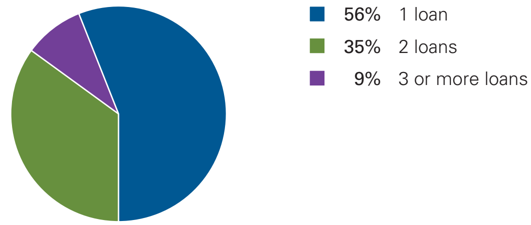
Loans are widely offered by employee-contributory DC plans. In 2017, 80% of Vanguard 401(k) plans permitted participants to borrow from their plan and 89% of active participants had access to a loan feature. The availability of loans depends on plan size. Large plans tend to offer loans; small plans 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 2017, 56% of Vanguard 401(k) plans offering loans permitted only one loan at a time (Figure 100). Thirty-five percent of plans allowed two, and 9% of plans allowed three or more.

Loan use by participant demographics

Only 15% of participants had a loan outstanding at year-end 2017 (Figure 101).[14]

Figure 100. Number of loans allowed, 2017

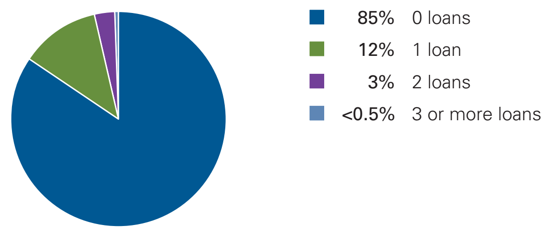
Vanguard defined contribution plans offering loans



Source: Vanguard, 2018.

Figure 101. Participant loan use, 2017

Vanguard defined contribution plans offering loans



Source: Vanguard, 2018.

13 For a comprehensive analysis of loans, see Timothy (Jun) Lu, Olivia S. Mitchell, Stephen P. Utkus, and Jean A. Young, *Borrowing from the Future: 401(k) Plan Loans and Loan Defaults*. pensionresearchcouncil.org/publications

14 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 102. Participant loan demographics, 2017

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	15%	9%	$9,714	$96,102	$105,816	$109,702
Household income						
<$30,000	22%	13%	$7,812	$60,236	$68,048	$69,055
$30,000–$49,999	21	12	8,571	71,401	79,972	77,641
$50,000–$74,999	18	11	10,094	94,118	104,212	102,558
$75,000–$99,999	14	9	11,843	131,137	142,980	144,781
>$100,000	10	7	13,718	192,027	205,745	210,989
Age						
<25	3%	26%	$2,388	$9,305	$11,693	$4,681
25–34	11	21	5,961	28,829	34,790	25,443
35–44	19	15	9,651	66,344	75,995	74,029
45–54	21	10	11,108	116,558	127,666	140,226
55–64	15	7	10,884	159,221	170,105	205,937
>65	4	6	9,027	147,575	156,602	216,541
Gender						
Male	16%	9%	$10,394	$112,758	$123,152	$134,978
Female	15	11	8,849	78,287	87,136	86,776
Job tenure (years)						
0–1	3%	20%	$5,562	$28,152	$33,714	$14,274
2–3	10	21	4,954	23,721	28,675	34,437
4–6	16	18	7,124	38,660	45,784	66,483
7–9	19	15	9,418	61,512	70,930	109,439
>10	25	8	11,781	139,183	150,964	253,344
Account balance						
<$10,000	8%	44%	$2,359	$5,331	$7,690	$3,059
$10,000–$24,999	19	32	5,340	16,861	22,201	16,599
$25,000–$49,999	21	25	9,164	36,264	45,428	36,080
$50,000–$99,999	21	17	12,496	71,633	84,129	71,950
$100,000–$249,999	19	10	15,314	157,748	173,062	160,270
>$250,000	12	4	17,468	461,831	479,299	566,035

Source: Vanguard, 2018.

On average, the outstanding loan account balance equaled 9% of the participant's account balance, excluding the loan, and the average participant had borrowed about $9,700 (Figure 102). 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. However, more than 90% of loans are repaid and outstanding loans do represent participant and plan assets. Only about 1% of aggregate plan assets were borrowed by participants at the end of 2017.

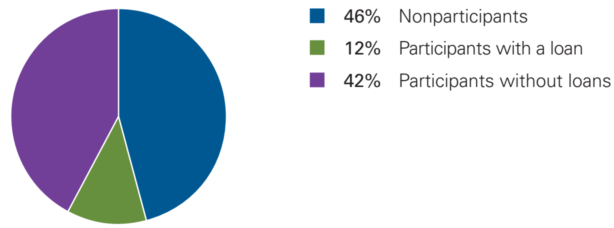
Loans are sometimes criticized as a form of revolving credit for younger, lower-income workers. While that may be partly true, loan use by age follows a hump-shaped profile, with loan use highest among participants in their prime working years. Among workers ages 35 to 54, loan use averaged about 20% in 2017. Men and women used loans at about the same rate.

Income appears to have a greater influence on loan use than age does. In 2017, 22% of participants with household incomes of less than $30,000 had a loan, while only 10% of participants with household incomes of more than $100,000 did. This difference reflects liquidity constraints among those with low wealth and income—i.e., higher-income households have less need for borrowing because of their higher income or other savings.

In 2017, loans were most common among participants with a balance between $10,000 and $250,000. Participants with account balances of less than $10,000 were actually somewhat less likely to have a loan, yet they borrowed the largest percentage of their account balances. Only 8% of participants in this group had a loan, but the loan accounted for 44% of their account balance on average.

Figure 103. Participation and loans, 2017

All employees earning less than $30,000



Source: Vanguard, 2018.

Across many demographic groups, participants with no loans outstanding in 2017 appear to have accumulated more in retirement savings than those with loans. However, among participants younger than 35, participants with outstanding loans appear to have greater retirement savings accumulations. These differences in part reflect the interplay of demographic differences in terms of age, income, and tenure between borrowers and nonborrowers.

Loan use is highest among participants who earn less than $30,000—about 1 in 5 of these participants has a loan outstanding. However, earlier in this report, we noted that participation rates are lowest among this group, with only 54% of these workers joining their plan. Arguably, participants who earn less than $30,000 but have borrowed from their retirement savings (12% of these workers) are better off than those employees who earn less than $30,000 and do not participate in their employer plan (Figure 103).

Loan use by industry group

Loan use varies significantly by industry group (Figure 104). Participants in the media, entertainment, and leisure fields, as well as those in the business, professional, and nonprofit industries, use loans at a lower rate than other participants, suggesting that more highly educated participants might use loans less frequently.

Trends in new loan issuance

Among Vanguard plans, the fraction of participants taking loans from their DC plans fell during 2008 (Figure 105). However, in 2009, the rate of new borrowing rose by 19%. New borrowing rose again in 2010. In 2011, loan-taking was on par with the level in 2010, and it declined modestly in 2012. Loan-taking grew again in 2013, and then declined modestly in 2014 and declined further in 2015. Loan-taking was flat in 2016 and then rose in 2017. There is a pronounced seasonality to loan-taking, with borrowing typically peaking in the summer months. The reasons for this pattern, as well as the reasons for the decline and then rise in loan use in recent years, are not well understood. We speculate that loan use first fell with the overall decline in consumer spending in the economic downturn, along with the decline in housing transactions (loans are often used for housing-related expenses). Loan use may have jumped sharply in 2009 and 2010 as the effects of the recession lingered.

Figure 104. Participant loans by industry sector, 2017

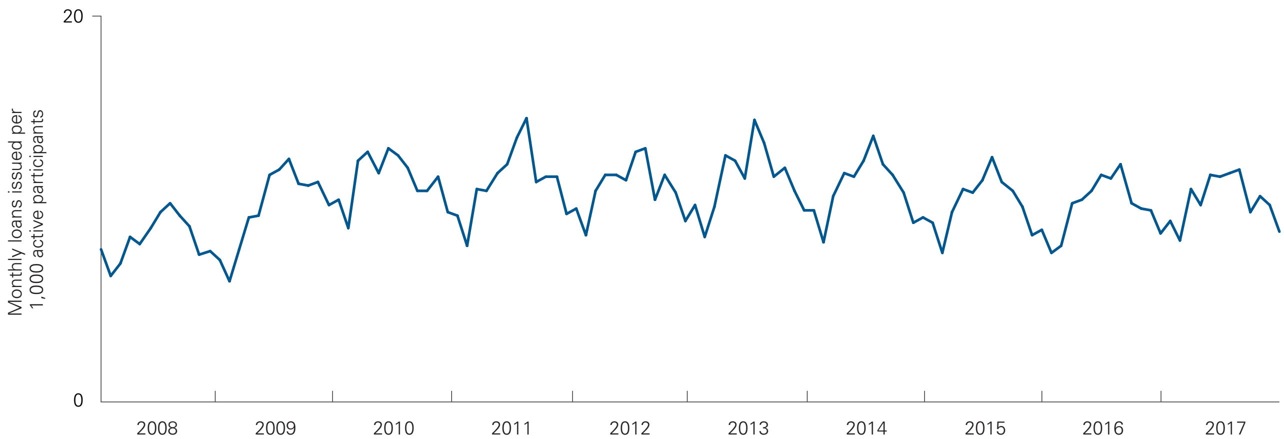
Vanguard defined contribution plans offering loans

	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	15%	9%	$9,714	$96,102	$105,816	$109,702
Industry group						
Transportation, utilities, and communications	22%	11%	$9,116	$85,661	$94,777	$107,579
Finance, insurance, and real estate	19	12	10,886	94,174	105,060	118,800
Manufacturing	18	9	9,405	101,990	111,395	122,850
Agriculture, mining, and construction	18	9	13,733	159,977	173,710	198,671
Wholesale and retail trade	17	10	7,185	69,288	76,473	63,321
Education and health	13	14	9,335	68,565	77,900	71,138
Media, entertainment, and leisure	9	11	9,717	88,005	97,722	88,543
Business, professional, and nonprofit	9	8	11,059	133,503	144,562	137,336

Source: Vanguard, 2018.

Figure 105. Loan origination trend

Vanguard defined contribution active participants in plans offering loans



Source: Vanguard, 2018.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Monthly average (per 1,000 participants)	8.5	10.1	11.5	11.4	11.1	11.5	11.0	10.2	10.2	10.5
Annual increase (decrease) in loans issued per 1,000 participants	(7%)	19%	14%	(1%)	(3%)	4%	(4%)	(7%)	0%	3%

Source: Vanguard, 2018.

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 college education and purchase of a first 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, after-tax contributions, or rollover assets while they are working.

Among all Vanguard DC plans in 2017, 85% allowed hardship withdrawals and 88% allowed plan withdrawals for those who have reached age 59½ (Figure 106). In 2017, less than 4% of Vanguard participants in plans offering any type of withdrawal used the feature, and the average portion of account balance withdrawn was 30% (Figure 107).

About one-fifth of withdrawals were for hardship and four-fifths for nonhardship reasons. Assets withdrawn totaled 1% of Vanguard recordkeeping assets. Of the participants who took withdrawals, 91% took the money in cash, withdrawing on average 18% of account savings. They had a median age of 52. Meanwhile, 9% of participants taking withdrawals rolled over their assets from the plan to an IRA.

A major contributor to this is likely participants older than 59½ rolling over their plan savings even as they continue to work and participate in the plan. Participants choosing a rollover had a median age of 61 and on average they rolled over about 70% of their account balance. These participants rolling over assets account for more than half of the assets being withdrawn.

In the aftermath of the Great Recession, the rate of new nonhardship withdrawals, such as post-age-59½ in-service or other withdrawals, has about doubled from 2008 to 2017 (Figure 108). Nonhardship withdrawals also have a seasonal pattern and often spike in the first quarter of the year. This spike in activity is likely due to the withdrawal of employer profit-sharing contributions, which are frequently made early in the calendar year.

Over the same 2008-to-2017 period, the rate of new hardship withdrawals rose modestly and then fell modestly, while remaining at a low absolute level of 2% of participants. One of the reasons a participant can take a hardship withdrawal is to avoid foreclosure or eviction from a home. We believe that the surge in foreclosures resulting from the housing bubble did, in part, drive this increase. Hardship withdrawals have fluctuated within a relatively narrow range from 2008 to 2017.

Plan withdrawals are used infrequently in the aggregate. However, 4 in 10 participants taking a withdrawal in 2017 had also taken plan withdrawals in 2016, and about 1 in 10 in this group had taken a plan withdrawal in each of the past five years. Certain participants could, over time, jeopardize their retirement program if they continue to rely on this feature throughout their working careers.

Figure 106.	Plan withdrawals, 2017

Vanguard defined contribution plans

Percentage of plans offering	
Hardship withdrawals	85%
Withdrawals after age 59½	88

Source: Vanguard, 2018.

Figure 107.	Use of all plan withdrawals, 2017

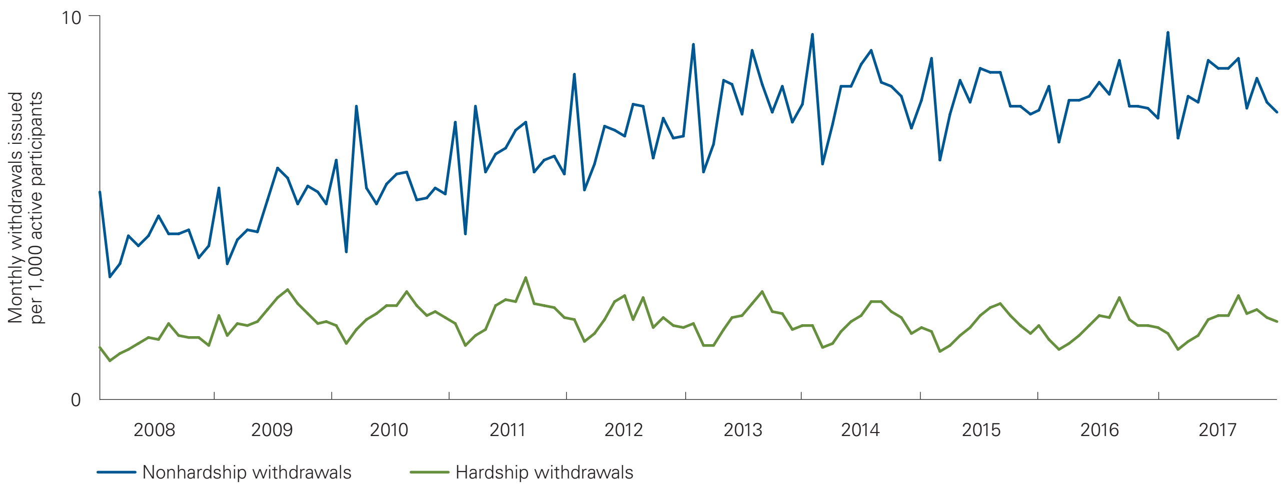
Vanguard defined contribution plans

	All	Cash	Rollover
Percentage of participants using	3.5%	3.2%	0.3%
Percentage of assets withdrawn	0.9	0.4	0.5
Percentage of participant account assets withdrawn	30.5	18.0	68.8
Median age	52	52	61

Source: Vanguard, 2018.

Figure 108.	In-service withdrawal trend

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



Source: Vanguard, 2018.

Monthly average per 1,000 active participants	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Nonhardship withdrawals	4.2	5.0	5.6	6.4	7.0	7.8	8.0	7.9	7.8	8.2
Hardship withdrawals	2.0	2.2	2.2	2.2	2.1	2.0	2.0	1.9	1.9	2.0
Annual increase (decrease) per 1,000 active participants										
Nonhardship withdrawals	2%	19%	12%	14%	9%	11%	3%	(1%)	(1%)	5%
Hardship withdrawals	11	10	0	0	(5)	(5)	0	(5)	0	5

Source: Vanguard, 2018.

Plan distributions and rollovers

When changing jobs or retiring, DC plan participants have the choice of preserving their savings for retirement (by retaining them in the plan or rolling them 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).

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

Policymakers have attempted to discourage leakage in several ways. Generally, participants may keep their 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 less than $1,000 may be distributed to the terminated participant. Most plans have adopted these provisions—only 3% of plans permit deferral within the plan when balances are less than $1,000 (Figure 109). In some cases, the sponsor may allow participants to retain a balance of $1,000 or more in the plan—17% of plans permit these balances to remain in the plan.

Figure 109. Frequency of automatic distributions, 2017

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)	3%	4%	3%	3%	4%
Automatic cash-out if balance is <$1,000; remain in plan if balance is higher	17	14	17	17	29
Automatic cash-out if balance is <$1,000; rollover if balance is $1,000+ or <$5,000	80	82	80	80	67
Percentage of participants offered					
Remain in plan (no automatic distribution)	3%	4%	3%	3%	3%
Automatic cash-out if balance is <$1,000; remain in plan if balance is higher	28	14	17	16	33
Automatic cash-out if balance is <$1,000; rollover if balance is $1,000+ or <$5,000	69	82	80	81	64

Note: This analysis excludes approximately 100 403(b) plans and approximately 360,000 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, 2018.

Most sponsors permit indefinite deferral of savings, meaning that participant balances can remain in the employer plan as long as they are above the $5,000 (or $1,000) threshold. However, 3% of sponsors require terminated participants to leave the plan by age 65 or age 70 (Figure 110).

Six in 10 sponsors allow participants to establish installment payments and about 2 in 10 offer an annuity option for at least a portion of the plan assets. Twelve percent of plans offered an annuity for a grandfathered source only, and these annuity features are mostly associated with plan assets relating to a prior money purchase plan.

Nine percent of plans offered an annuity as a general distribution option and one-third of these plans offered the annuity for statutory reasons or as a general market practice such as with 403(b) plans.

Finally, about one-quarter of sponsors permit terminated participants to take partial ad hoc cash distributions. These plans cover 45% of participants. If a plan does not offer ad hoc distributions, it requires any terminated participant seeking to use any part of 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 110. Distribution options, 2017

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	2	3	2	3
Deferral only to age 70	1	<0.5	1	<0.5	1
Installments other than RMDs	61	59	61	60	75
Annuity	9	10	8	8	5
Annuity grandfathered source only	12	13	9	10	14
Ad hoc partial distributions	24	12	27	36	49
Percentage of participants offered					
Deferral	100%	100%	100%	100%	100%
Deferral only to age 65	2	3	3	2	1
Deferral only to age 70	5	<0.5	1	1	7
Installments other than RMDs	70	61	60	61	73
Annuity	14	14	10	10	16
Annuity grandfathered source only	1	2	2	1	1
Ad hoc partial distributions	45	16	28	39	49

Source: Vanguard, 2018.

Participant and asset flows

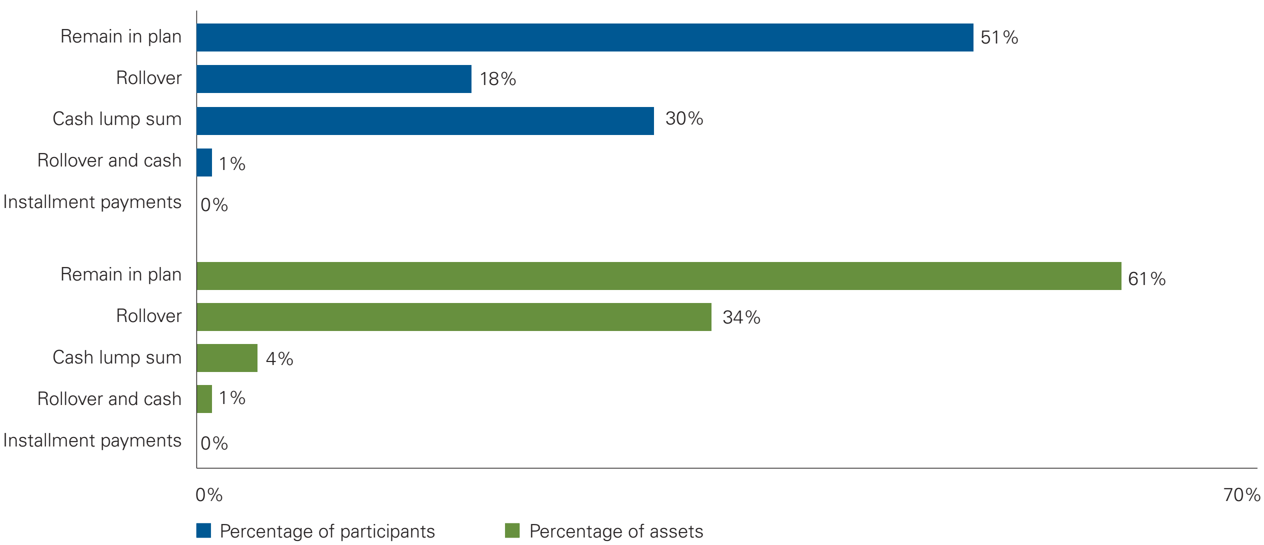
Plan distributions can occur somewhat frequently as participants change jobs or retire, and they represent a large portion of total plan and participant assets. In 2017, 10% of participants left their employer and were eligible for a distribution. Their assets totaled 6% of Vanguard recordkeeping assets. In 2017, 69% of participants terminating employment preserved their assets and 31% took a cash distribution (**Figure 111**). More than 90% of the assets available for distribution were preserved for retirement because they were either retained in the prior employer's plan, were rolled over to an IRA, or were rolled over to a new employer's plan. The percentage of participants choosing to take cash and presumably spending their savings has been fairly stable (**Figure 112**).

These figures differ from other reported statistics on plan distributions because they include participants who chose to retain their assets in their prior employer's plan when they changed jobs or retired. Among only those participants who took a distribution from their plan, more took cash distributions (31%) than rolled over their assets to another plan or IRA (18%). But in our view, a full assessment of plan distribution behavior must include participants who kept their assets within their prior employer's plan at the time of a job change or retirement.

Figure 111. Plan distributions, 2017

Vanguard defined contribution plans

Participants with termination dates in 2017



Source: Vanguard, 2018.

Figure 112.	Trends in distribution of plan assets

Vanguard defined contribution plans

Participants with termination dates in the given year

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Percentage of participants choosing										
Remain in plan	48%	48%	48%	49%	48%	49%	49%	51%	50%	51%
Rollover	21	21	22	21	21	22	22	20	19	18
Installment payments	0	0	0	0	0	0	0	0	0	0
Participants preserving assets	**69%**	**69%**	**70%**	**70%**	**69%**	**71%**	**71%**	**71%**	**69%**	**69%**
Cash lump sum	30%	30%	28%	28%	29%	28%	28%	28%	30%	30%
Rollover and cash	1	1	2	2	2	1	1	1	1	1
Percentage of assets available for distribution										
Remain in plan	50%	59%	55%	54%	53%	54%	53%	56%	59%	61%
Rollover	42	33	37	38	39	39	40	37	35	34
Installment payments	0	0	0	0	0	0	0	0	0	0
Assets preserved for retirement	**92%**	**92%**	**92%**	**92%**	**92%**	**93%**	**93%**	**93%**	**94%**	**95%**
Cash lump sum	6%	6%	6%	5%	5%	5%	5%	5%	5%	4%
Rollover and cash	2	2	2	3	3	2	2	2	1	1

Source: Vanguard, 2018.

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 2017, 36% of participants in their 20s chose to cash out their plan assets, compared with 18% of participants in their 60s (Figure 113). In terms of assets, 87% of assets owned by participants in their 20s and 97% of assets owned by participants in their 60s were preserved. Account balances also have a significant impact on distribution behavior. Participants with smaller account balances are less likely to preserve their assets for retirement. Forty-three percent of participants with balances of less than $1,000 kept their balance in a tax-deferred account (Figure 114). However, once balances reach $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 115). While participants in their 40s did overwhelmingly preserve their assets for retirement, at most 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 113. Plan distribution behavior by age, 2017

Vanguard defined contribution plans

Participants with termination dates in 2017

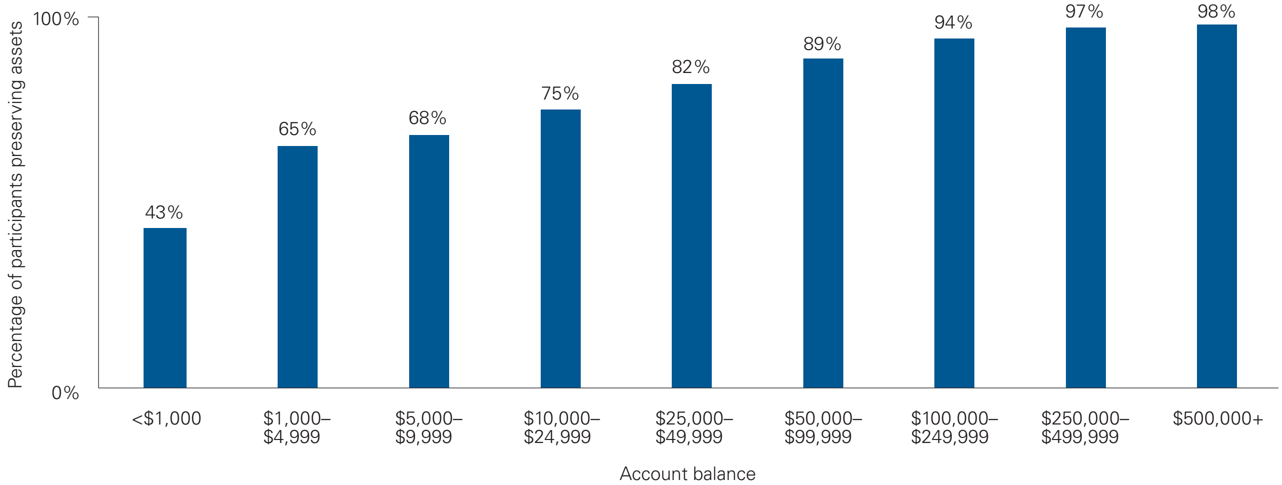
	20s	30s	40s	50s	60s	70s	All ages
Percentage of participants choosing							
Remain in plan	51%	52%	51%	53%	48%	25%	51%
Rollover	13	15	16	21	33	30	18
Installment payments	0	0	0	0	1	21	0
Participants preserving assets	**64%**	**67%**	**67%**	**74%**	**82%**	**76%**	**69%**
Cash lump sum	36%	32%	32%	24%	17%	23%	30%
Rollover and cash	0	1	1	2	1	1	1
Percentage of assets available for distribution							
Remain in plan	68%	69%	67%	65%	54%	37%	61%
Rollover	19	21	25	31	43	57	34
Installment payments	0	0	0	0	0	1	0
Assets preserved for retirement	**87%**	**90%**	**92%**	**96%**	**97%**	**95%**	**95%**
Cash lump sum	12%	9%	7%	3%	2%	4%	4%
Rollover and cash	1	1	1	1	1	1	1

Source: Vanguard, 2018.

Figure 114. Plan distribution behavior by account balance, 2017

Vanguard defined contribution plans

Participants with termination dates in 2017



Source: Vanguard, 2018.

Figure 115. Plan distribution behavior by age and account balance, 2017

Vanguard defined contribution plans

Participants with termination dates in 2017

Source: Vanguard, 2018.

A more optimistic picture of plan distribution behavior emerges if we analyze the total plan assets available for distribution at any given time. During 2017, one-third 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 16% of participants eligible for a cash distribution took one, while the vast majority (84%) continued to preserve their plan assets for retirement (Figure 116). In terms of assets, 98% 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 2% of assets were distributed in cash.

Access methods and the internet

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

Frequency of account access

In 2017, 36% of plan participants never contacted Vanguard regarding their plan account (Figure 117). However, 64% did contact Vanguard—a ratio that has improved from 2008, when 57% of participants contacted Vanguard (Figure 118). One reason for this may be the broad adoption of internet and mobile options; another may be the strong equity markets, which may have led to higher levels of investor attention to their accounts. 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.

Figure 116. Alternative view of distribution of plan assets

Vanguard defined contribution plans

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

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Percentage of participants choosing										
Remain in plan	66%	67%	65%	68%	67%	68%	68%	69%	67%	68%
Rollover	14	13	14	13	13	14	14	13	12	12
Installment payments	2	2	2	2	2	3	3	3	3	4
Participants preserving assets	**82%**	**82%**	**81%**	**83%**	**82%**	**85%**	**85%**	**85%**	**82%**	**84%**
Cash lump sum	17%	17%	18%	16%	16%	14%	14%	14%	17%	15%
Rollover and cash	1	1	1	1	2	1	1	1	1	1
Percentage of assets available for distribution										
Remain in plan	72%	78%	75%	75%	75%	76%	76%	77%	78%	80%
Rollover	23	17	20	20	20	20	20	19	18	17
Installment payments	1	1	1	1	1	1	1	1	1	1
Assets preserved for retirement	**96%**	**96%**	**96%**	**96%**	**96%**	**97%**	**97%**	**97%**	**97%**	**98%**
Cash lump sum	3%	3%	3%	3%	3%	2%	2%	2%	2%	1%
Rollover and cash	1	1	1	1	1	1	1	1	1	1

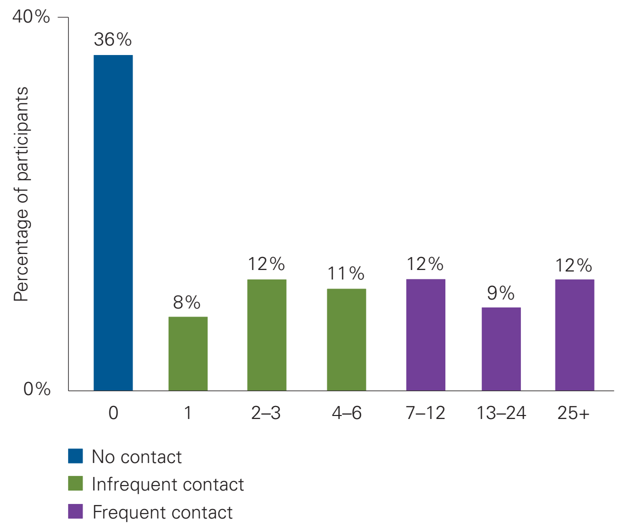
Source: Vanguard, 2018.

Three in 10 participants contacted Vanguard intermittently. This group interacted with Vanguard between one and six times per year through a phone associate, an automated voice-response system, a mobile application, or the internet. One-third of participants contacted Vanguard frequently. This group, using all channels, contacted Vanguard monthly, if not two or three times a month or more. This level of contact may seem high, but keep in mind, for those using a mobile application or the internet, a brief logon to examine account balances constitutes a unique contact event.

Account balances are a strong influence on contact behavior. The larger a participant's balance, the more likely they are to be proactive in obtaining information about their Vanguard plan account. Participants with account balances of more than $100,000—about one-quarter of all Vanguard participants—contacted Vanguard at least monthly, if not more, compared with a median level of two contacts per year for the entire participant population.

Figure 117. Participant contact frequency, 2017

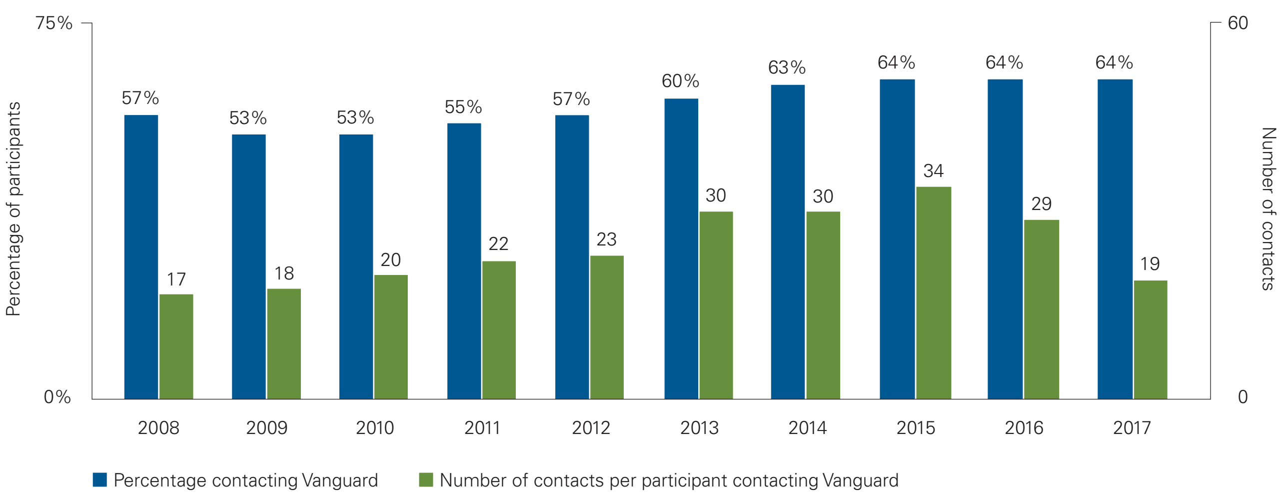
Vanguard defined contribution plans



Source: Vanguard, 2018.

Figure 118. Participant contact trend

Vanguard defined contribution plans



Source: Vanguard, 2018.

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 internet. When measured in terms of total participant use, the internet remained the most widely used channel in 2017—53% used the internet, compared with 12% who used telephone associates (Figure 119). Introduced between 2009 and 2011, mobile applications were used by 23% of participants. In terms of total contacts, the internet clearly dominates. Web interactions accounted for 68% of all participant contacts in 2017. Participants using this contact method averaged about 15 web interactions per year. Each distinct logon is counted as a unique contact event. Mobile access, though relatively new, was the second most common channel, accounting for 25% of all contacts—or eight times the number of phone contacts.

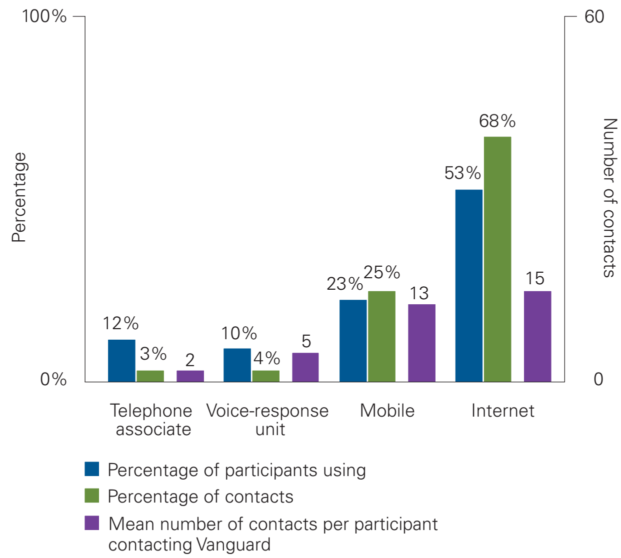
The portion of participants selecting the internet as an access channel has grown by 18% since 2008 (Figure 120). During this interval, the portion of participants selecting a phone associate as an access channel has declined by about two-thirds, and the portion choosing the voice-response system has increased, but on a small base. Given current trends, the dominance of the internet as a contact channel is likely to continue. We also expect the adoption of mobile applications to continue to grow dramatically over the next few years.

Participant registration for internet access to their DC plan account has fueled this growth. Seventy-three percent of participants were registered for the internet in 2017, about one-quarter higher than in 2008 (Figure 121).

Increasingly, participants are choosing the internet as the preferred access channel for transactions, as 77% of all transactions were processed via the internet during 2017, and another 11% were processed via mobile devices (Figure 122). Moreover, more than 90% of all exchanges, payroll deferral, and contribution allocation changes occurred on the internet or mobile devices.

Figure 119. Account access methods, 2017

Vanguard defined contribution plans



Source: Vanguard, 2018.

Figure 120. Account access trend

Vanguard defined contribution plans

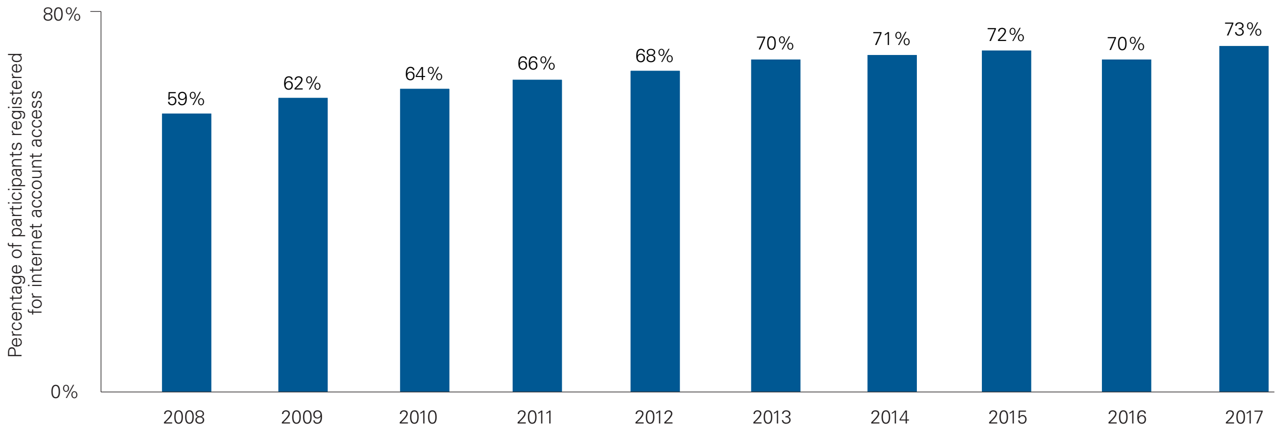
Percentage of participants contacting Vanguard via . . .

	2008	2017	Change
Voice, telephone associate, or internet	57%	64%	12%
Telephone associate	26	10	(62)
Voice-response unit	6	13	117
Mobile		23	
Internet	45	53	18
Participants registered for internet access	59	73	24

Source: Vanguard, 2018.

Figure 121. Internet access trend

Vanguard defined contribution plans

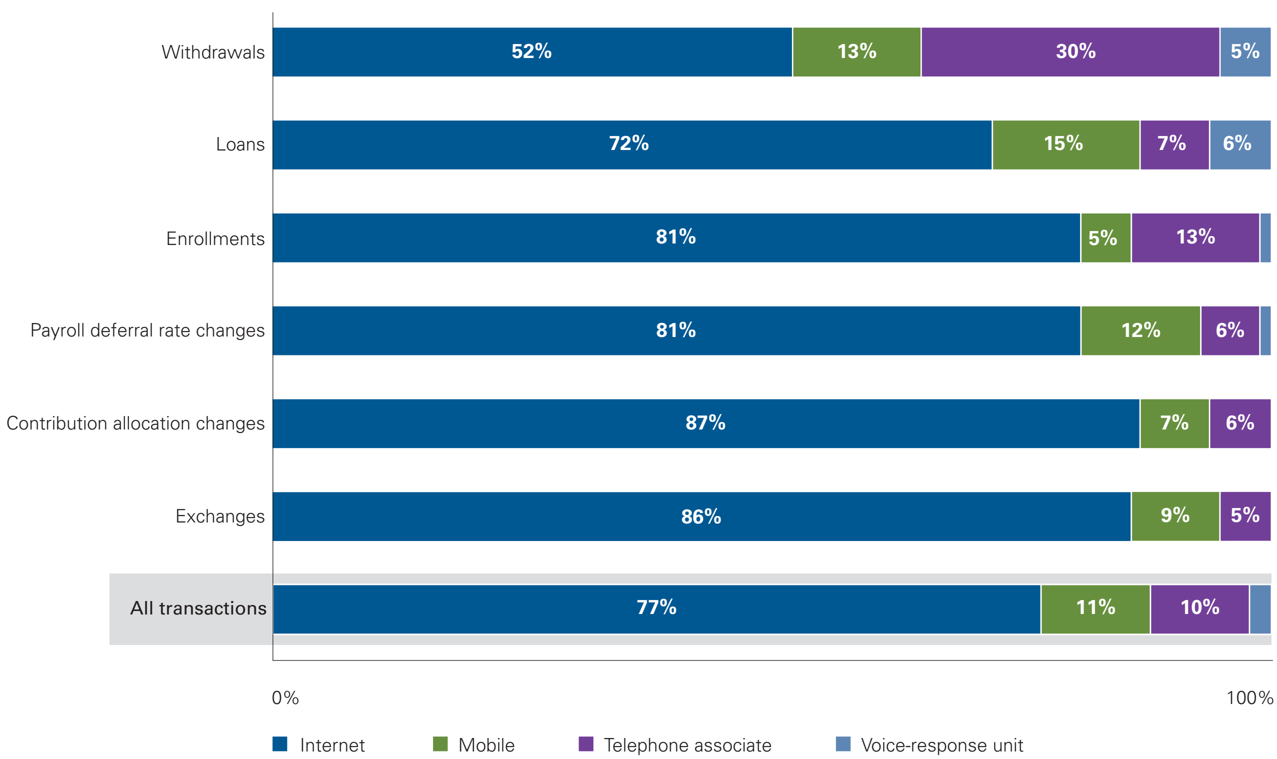


Source: Vanguard, 2018.

Figure 122. Participant channel utilization, 2017

Vanguard defined contribution plans

Percentage of transactions processed by channel



Source: Vanguard, 2018.

Methodology

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

Defined contribution clients. This universe consists of about 1,900 qualified plans, 1,500 clients, and 4.6 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, 2017.

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 2017 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 2018, the participation rates improve. Plan design features derived from this data also improve.

Based on the trends experienced over the prior three years, we have estimated participation and deferral rates for 2017. 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 2016 restated analysis includes approximately 1,000 plans and 2.5 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.

Household income data. Household income data for asset allocation and loan demographics is from an external source overlaid onto Vanguard participant data. This external household income data covers approximately 55% of the Vanguard participant universe and is the most recent data available.

How America Saves: Small business edition

We also make available *How America Saves: Small business edition* which is a benchmarking analysis for the small business plans for which we provide service. Launched in 2011, the Vanguard Retirement Plan Access™ offer is a comprehensive service for retirement plans with up to $20-plus million in assets. Ascensus, Inc.—a nationally recognized recordkeeping firm—provides the administration of these plans on Vanguard's behalf. Through VRPA, we served an additional 8,900 plan sponsors with more than 370,000 participants as of year-end 2017.

Industry benchmark data supplements to *How America Saves*

Industry benchmark data supplements to *How America Saves* are available for the following sectors:

- Ambulatory health care services
- Engineering
- Finance and insurance
- Information firms
- Legal services
- Manufacturing
- Mining, oil, and gas extraction
- Technology

If the sector you are interested in is not available at this time, please contact your sales executive or relationship manager.

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The cover of *How America Saves 2018* features a variety of well-known and distinctive buildings, structures, and landmarks from around the country.

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Los Angeles, California

Golden Gate Bridge
San Francisco, California

West Mitten Butte at Monument Valley Navajo Tribal Park
Arizona/Utah

Gateway Arch
St. Louis, Missouri

Space Needle
Seattle, Washington

Willis Tower
Chicago, Illinois

Washington Monument
Washington, D.C.

United States Capitol Building
Washington, D.C.

Liberty Bell
Philadelphia, Pennsylvania

Statue of Liberty
New York, New York

Empire State Building
New York, New York

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