

# Automatic escalation and DC saving rates

- The case for automatic escalation, or automatic increases, dates to the late 1990s and the Save More Tomorrow plan conceptualized by Shlomo Benartzi and Richard Thaler.<sup>1</sup> In this report, we take a close look at how these increases affect participant contribution rates in defined contribution (DC) plans.
- Most participants in automatic enrollment plans with automatic escalation eventually override the default payroll deferral design—while at the same time most tend to let the default increase design ride.
- In comparing contribution rates for plans with automatic enrollment and voluntary enrollment, we consider all eligible employees, including nonparticipants. After five years, median eligible employee deferral rates are highest (8.0%) in plans with both automatic enrollment and automatic escalation, followed by plans with automatic enrollment and voluntary annual increases (7.0%), plans with voluntary enrollment only (6.0%), and plans with voluntary enrollment and voluntary annual increases (4.0%).
- Quitting an automatic enrollment plan or failing to join a voluntary enrollment plan both appear to signal a lack of commitment to the plan sponsor employer. Nonparticipants are 63% more likely to leave within one year, and 76% more likely to leave within three years, than participants.
- Our research underscores the importance of plan design—especially when it comes to setting an annual increase cap that supports a healthy savings rate. Most plans should not set the cap on annual increases lower than 10%. Most plans with automatic enrollment should also use automatic annual increases. The default automatic enrollment deferral and annual increase rates should be set at or above minimum levels whereby employer contributions are maximized and total savings rates can reach 12% to 15% within five years. All plans would benefit from having—at the very least—voluntary automatic annual increases.

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<sup>1</sup> See Thaler and Benartzi (2004).

## Background

The case for automatic escalation, or automatic increases in a retirement plan participant's savings rate, dates to the late 1990s with the Save More Tomorrow plan devised by Shlomo Benartzi and Richard Thaler. The first test of the plan occurred in 1998 at a small manufacturing firm where plan participants were encouraged to either increase their savings rate "today" or sign up for an automatic increase "tomorrow." Most elected "tomorrow" and remained in the plan for four increases. Strikingly, those who opted for "tomorrow" had higher saving rates in 2002 than those who chose to increase their savings rate "today."

Vanguard conducted the third test of Save More Tomorrow in 2002.<sup>2</sup> The success of this test—at the time, the largest private-sector test of automatic escalation to date—motivated Vanguard to become an early proponent of the autopilot 401(k) plan.<sup>3</sup> An autopilot 401(k) is designed to respond to the behavioral biases of reluctant savers by altering plan-default decisions. Unlike a traditional 401(k), which relies on active decision-making, an autopilot 401(k) makes all critical choices for participants: Eligible employees are automatically enrolled, participant contribution rates are automatically increased each year, and participant accounts are automatically invested in a balanced fund. At any point, participants can "opt out" of these default options and make their own independent choices.

By the end of 2020, 54% of Vanguard 401(k) plans had adopted automatic enrollment.<sup>4</sup> Sixty-nine percent of these plans had an autopilot design. Automatic increases also exist in traditional, or voluntary enrollment, plan designs: Thirty-three percent of voluntary enrollment plans also offer voluntary automatic increases, and 24% of plans with automatic enrollment also offer voluntary automatic increases. Participants changing a contribution rate are given the option of electing a 1%, 2%, or 3% annual increase. They are also given the option of personalizing the annual increase cap.

We have extensively analyzed automatic enrollment.<sup>5</sup> However, to the best of our knowledge, the effect of automatic annual increases has not been directly examined since the first test of Save More Tomorrow was published in 2004. In this report, we take a deep dive into how automatic increases affect participant contribution rates. Our research provides plan sponsors and consultants with insights into plan designs that maximize participants' chance of saving at the rates necessary for a secure retirement. We also explore what motivates participants to override automatic deferral rates and annual increases, and how these decisions affect savings rates.

<sup>2</sup> In the second test, the program was introduced to a union workforce at a manufacturing firm. It was communicated exclusively through a print campaign and endorsed by the local union leadership. See Utkus (2002).

<sup>3</sup> See Utkus and Young (2004).

<sup>4</sup> See Vanguard (2021).

<sup>5</sup> See Clark and Young (2021) and Vanguard (2021).

## The data set

Our analysis of automatic increases is based on Vanguard recordkeeping data as of December 2020. Recordkeeping services were provided for 1,700 plans. There were 4.7 million participants in these plans. Our interest is in how demographic and plan design features affect the savings decisions of eligible employees, with a special focus on how automatic annual increases affect saving rates. Accordingly, we limit our analysis to

a subset of 350 continuous plans for which we have completed compliance testing for the 2015 plan year and where we were able to track employee-elected payroll deferral percentages.<sup>6</sup> These plans had approximately 88,000 newly eligible employees in 2015 (**Figure 1**).<sup>7</sup> We follow these newly eligible employees through the end of 2020. After five years, 60% of them have left the plan sponsor employer.

**FIGURE 1.**  
**Plan population**

Participants who were newly eligible in 2015

	All	Automatic enrollment with automatic increases	Automatic enrollment with voluntary automatic annual increases	Voluntary enrollment with voluntary automatic annual increases	Voluntary enrollment only
<b>Number of plans</b>	350	205	48	59	38
<b>Number of employees who were newly eligible in 2015</b>	88,537	67,051	8,659	10,169	2,658
<b>Number of employees who were newly eligible in 2015 remaining eligible in 2020</b>	35,198	26,348	4,039	3,657	1,154
<b>Percentage of employees who were newly eligible in 2015 remaining eligible in 2020</b>	40%	39%	47%	36%	43%

Source: Vanguard, 2021.

- <sup>6</sup> We limit the population to plans for which we provided compliance testing because we receive records of eligible employee wages in the course of providing this service. We limit the population to plans for which we provided payroll deferral tracking so that we can compare employee-elected deferral rates with the deferral rates set by the plan design.
- <sup>7</sup> No single plan's population exceeds 5% of total observed population by plan design type; this is in order to prevent very large plans from skewing our results. Between 2015 and 2020, 54 voluntary enrollment plans adopted automatic enrollment. These plans are also excluded from our analysis.

We are interested in the plan design in 2015. **Figure 2** depicts the 2015 designs for the 350 plans in our analysis. These plans have 82 unique designs (before factoring in how employer contributions are structured). In 2015, the most common design for plans with automatic enrollment and automatic annual increases was default automatic enrollment at 3%, a default automatic increase of 1%, a 10% cap on annual increases, and investment in a target-date fund (23% of these plans). The most common design

for plans with automatic enrollment and voluntary annual increases was default automatic enrollment at 6%, no cap on annual increases, and investment in a target-date fund (17% of these plans). The most common design for plans with voluntary enrollment and voluntary increases was no cap on annual increases (44% of these plans). When participants elect voluntary increases, they have the option to personalize the cap to fit their target savings rate.

**FIGURE 2.**  
**Plan design**

As of December 31, 2015

	Automatic enrollment with automatic increases	Automatic enrollment with voluntary automatic annual increases	Voluntary enrollment with voluntary automatic annual increases	
<b>Default automatic enrollment rate</b>	1 percent	1%	4%	—
	2 percent	4%	4%	—
	3 percent	52%	32%	—
	4 percent	17%	9%	—
	5 percent	10%	9%	—
	6 percent	16%	38%	—
	7 percent	—	2%	—
	10 percent	—	2%	—
<b>Default automatic increase rate</b>	1 percent	97%	—	—
	2 percent	3%	—	—
<b>Default automatic increase cap</b>	<6 percent	2%	4%	7%
	6 percent	16%	17%	4%
	7 to 9 percent	8%	—	2%
	10 percent	42%	11%	16%
	11 to 14 percent	4%	2%	—
	15 percent	12%	8%	16%
	16 to 25 percent	8%	2%	5%
	26 to 99 percent	—	11%	4%
	No cap	8%	45%	46%
<b>Default fund</b>	Target-date fund	99%	98%	—
	Other balanced fund	1%	2%	—

Source: Vanguard, 2021.

## Demographics

Figure 3 contains key characteristics for our employees who are newly eligible in 2015 and remain employed by the plan sponsor at the end of 2020. Automatic enrollment plans have higher participation rates and higher deferral rates.

(Note that when we calculate the deferral rate for the eligible employee population, we include nonparticipants, assigning them a 0% deferral rate.) Participants subject to the voluntary-enrollment-only design have the highest wages and the highest account balances.

**FIGURE 3.**  
**Demographics**

Participants who were newly eligible in 2015 and remained eligible in 2020

	Automatic enrollment plans		Voluntary enrollment plans		All plans
	With automatic increases	With voluntary automatic annual increases	With voluntary automatic annual increases	Without voluntary automatic increases	
<b>Participation rate, 2020</b>	92%	92%	62%	73%	89%
<b>Median participant deferral rate, 2020</b>	8.0%	8.0%	7.0%	7.0%	8.0%
<b>Median eligible employee deferral rate, 2020</b>	8.0%	7.0%	4.0%	6.0%	8.0%
<b>Median age, 2015</b>	35	35	35	36	35
<b>Median income, 2015</b>	\$48,798	\$54,586	\$50,220	\$65,767	\$50,204
<b>Female, 2020</b>	38%	46%	33%	35%	38%
<b>Male, 2020</b>	62%	54%	67%	65%	62%
<b>Median participant account balance, 2020</b>	\$44,650	\$49,503	\$34,308	\$67,587	\$44,817

Source: Vanguard, 2021.

## What changes do automatically enrolled participants make to saving rates?

With respect to saving rates, participants automatically enrolled in 401(k) plans have four options:

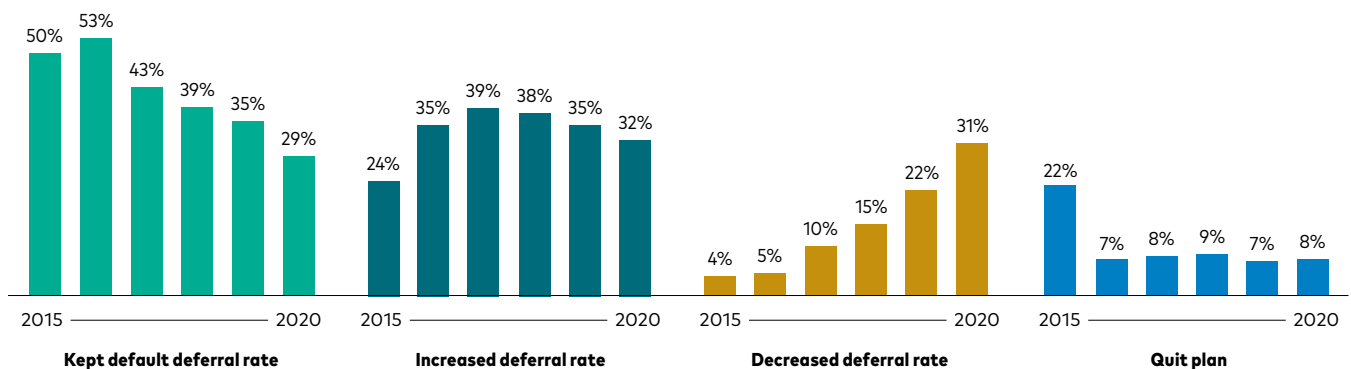
1. Do nothing and remain at the default deferral rate.
2. Increase the deferral rate.
3. Decrease the deferral rate below the default.
4. Quit the plan.

As **Figure 4** shows, over time most participants do override the default deferral rate design. Most commonly they increase their deferral rate above their projected rate—especially in plans with automatic enrollment and voluntary annual increases. This is even more striking when you consider that these plans have stronger, or higher, automatic enrollment default rates than plans with automatic enrollment and automatic increases.

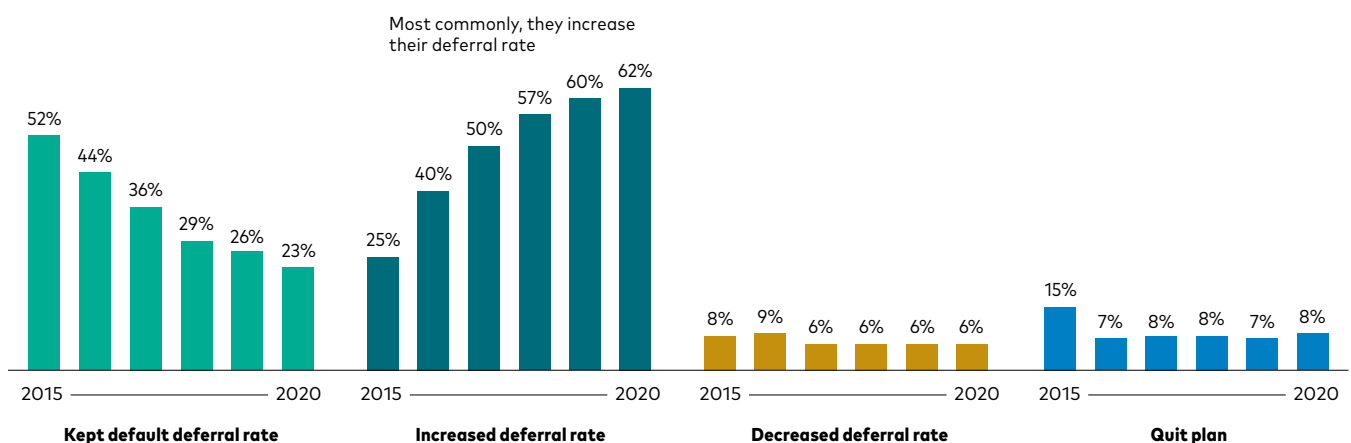
**FIGURE 4.**  
**What changes do participants make to saving rates?**

Participants who were newly eligible in 2015

*Panel A. Plans with automatic enrollment and automatic annual increases (cumulative)*



*Panel B. Plans with automatic enrollment and voluntary annual increases (cumulative)*



**Notes:** Changes to deferral rates are measured against what the plan design default would have been. For example, in a plan defaulting participants at 3% and automatically increasing by 1 percentage point with a 6% cap, the default design would have resulted in a deferral rate of 3% in 2015, a 4% rate in 2016, a 5% rate in 2017, a 6% rate in 2018, a 6% rate in 2019, and a 6% rate in 2020, and the participant would have reached the cap in 2018. If the participant did not make any changes, they remained in the default deferral rate.

**Source:** Vanguard, 2021.

In **Figure 5** we explore the changes automatically enrolled participants make to automatic annual increases. These individuals have five options:

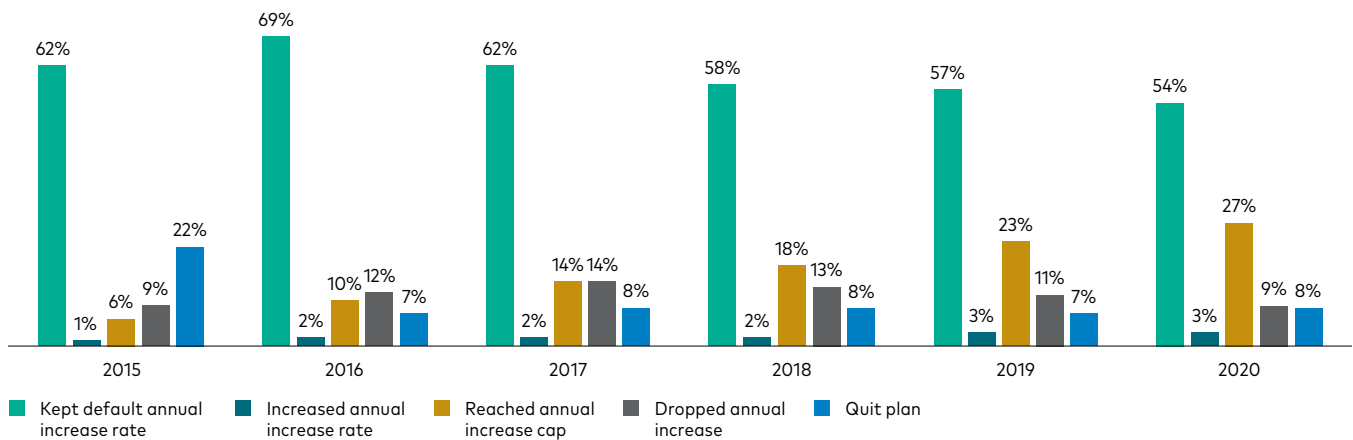
1. Do nothing and remain at the default automatic annual increase rate (typically 1 percentage point).
2. Increase the automatic annual increase rate to 2 or 3 percentage points.
3. Reach the annual increase cap, at which time no more automatic increases occur.
4. Drop the annual increases.
5. Quit the plan.

Most commonly, participants do nothing and let the automatic annual increases persist. After five years, 54% remain in the default design, while 27% have reached the plan cap. This tendency underscores the importance of setting the cap at a level that supports a healthy savings rate.

**FIGURE 5.**  
**What changes do participants make to the automatic annual increases?**

Participants who were newly eligible in 2015

*Plans with automatic enrollment and automatic annual increases (cumulative)*



Source: Vanguard, 2021.

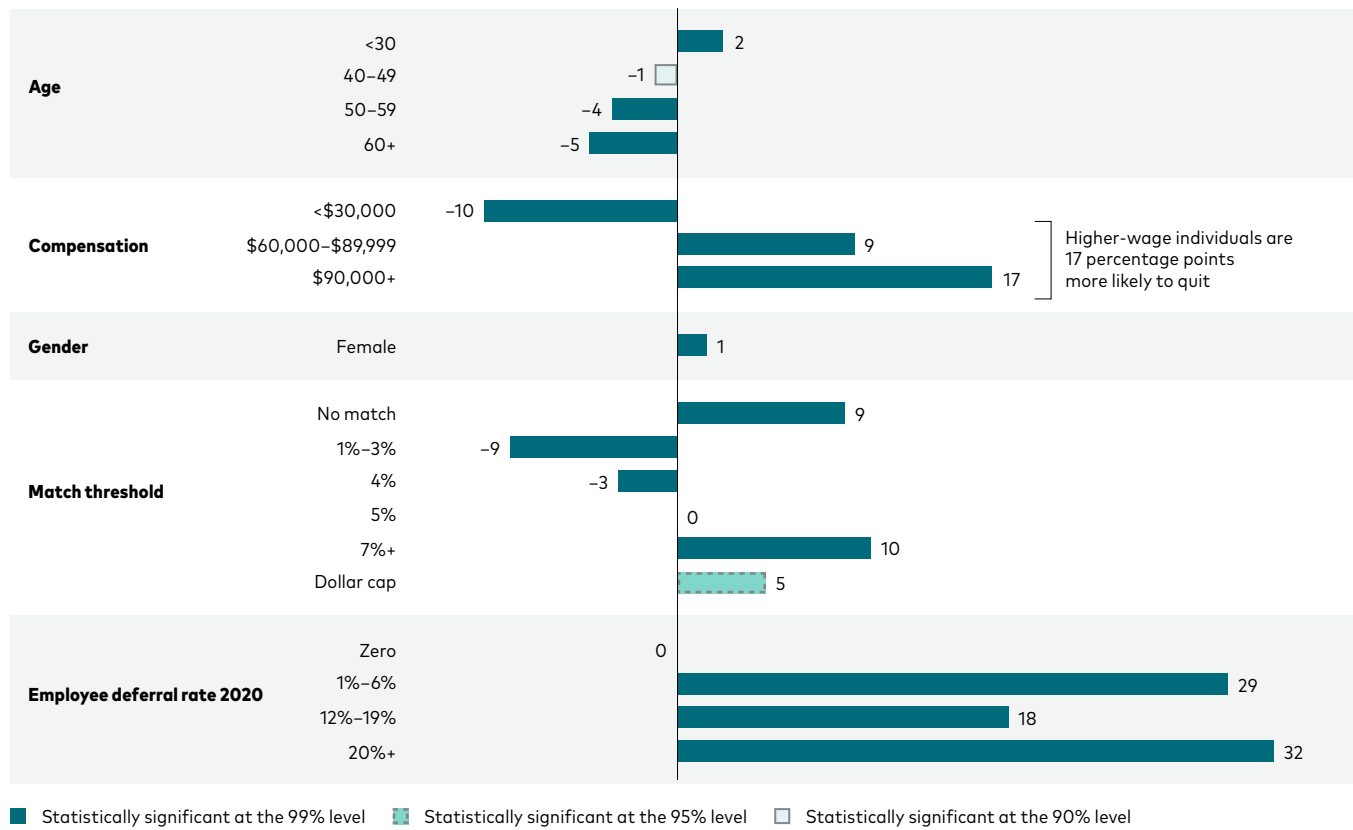
We ran a regression assessing the factors that are correlated with "quitting" automatic annual increases (**Figure 6**). The predicted probability of quitting is 22%. Higher-wage individuals are 17 percentage points more likely to quit, while lower wage individuals are 10 percentage points

less likely to quit. Participants with double-digit elected deferral rates are also more likely to quit; we hypothesize that participants from this group who quit are choosing to instead set their contribution rates at higher levels.

**FIGURE 6.**  
**What predicts "quitting" automatic annual increases?**

Plans with automatic enrollment and automatic annual increases (cumulative)

*Predicted probability of quitting automatic annual increases: 22%*



**Notes:** Quitters are measured against a reference of: age 30-39, compensation \$30,000-\$59,999, and male. Plan effects are measured against a reference of match threshold of 6%. The employee deferral rate is measured against a reference of 7%-11%. The zero employee deferral rate 2020 is statistically insignificant. See Appendix on pages 15-16 for model specification.

**Source:** Vanguard, 2021.

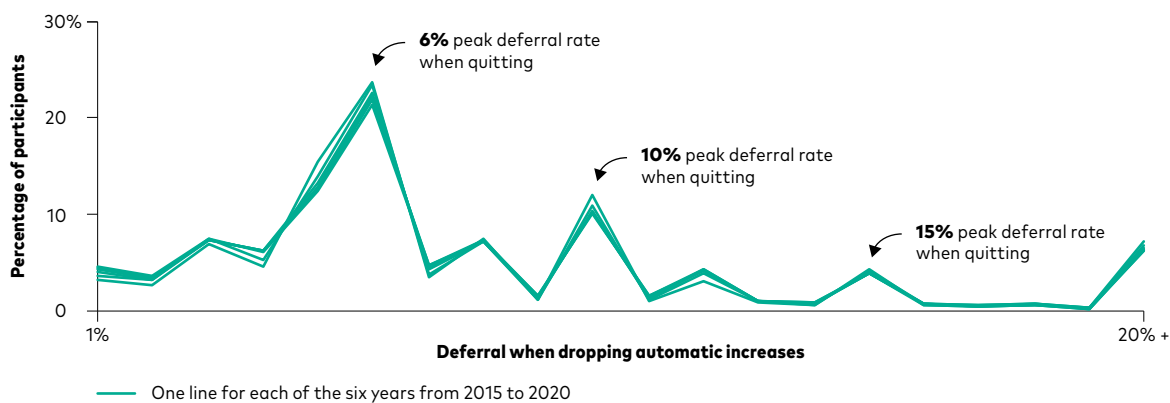


**Figure 7** plots the deferral rates for participants when they quit automatic annual increases. It is striking that whether they quit in 2015 or 2020, or any year in between, participants generally quit at similar levels. The peak deferral rate when quitting is 6%, which is also the most common deferral rate where the employer match is maximized. There are also peaks at 10% and 15%. These three peaks are a function of the power of the default design. The most common automatic annual increase cap is 10%, followed by 6% and then 15%. These peaks are another indication of the importance of setting the cap rate at a level that can lead to a secure retirement.

In **Figure 8** we show the proportion of participants enrolling in voluntary annual increases. Participants in voluntary enrollment designs enroll earlier (when they make their plan deferral rate elections), while those in automatic enrollment designs are slower to customize their plan deferral rate elections and slower to enroll in voluntary annual increases. However, after five years, about 35% of participants offered the feature have enrolled. Participant adoption rates of voluntary annual increases suggest that the service should be made available in all plans that do not have automatic annual increases.

**FIGURE 7.**  
**What is the participant deferral rate when they drop automatic increases?**

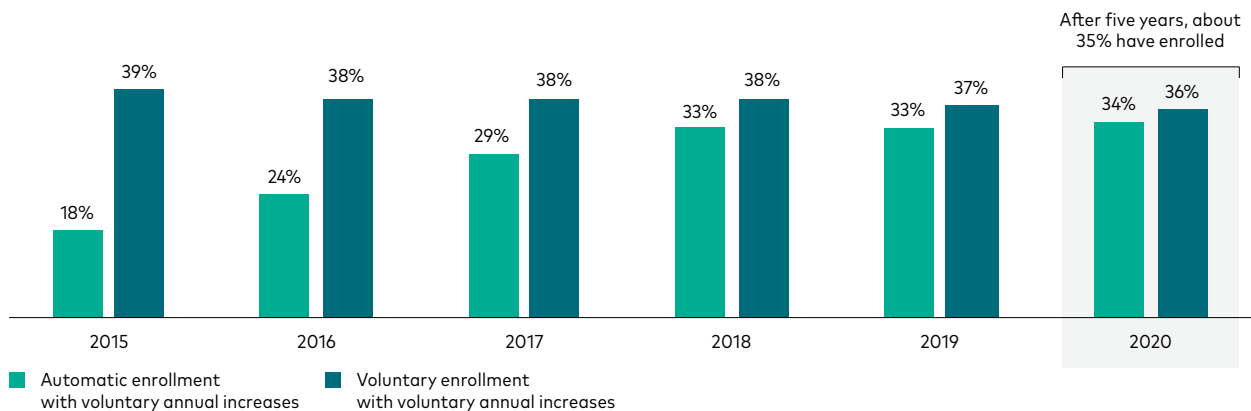
Plans with automatic enrollment and automatic annual increases (cumulative)



Source: Vanguard, 2021.

**FIGURE 8.**  
**Do participants choose voluntary annual increases?**

Plans with voluntary annual increases (cumulative)



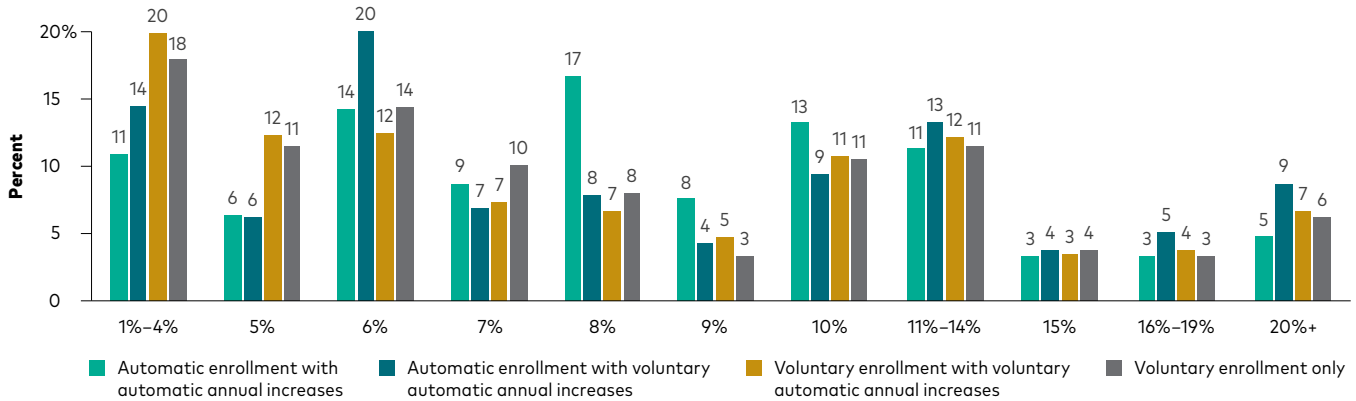
Source: Vanguard, 2021.

In **Figure 9** we show the distribution of 2020 elected deferral rates by plan design. Here, deferral rates skew higher for automatic enrollment designs and lower for voluntary

enrollment designs. This tendency is even more evident when we look at the full eligible employee population, including nonparticipants and their 0% saving rates (**Figure 10**).

**FIGURE 9.**  
**Distribution of plan participant deferral rates by plan design**

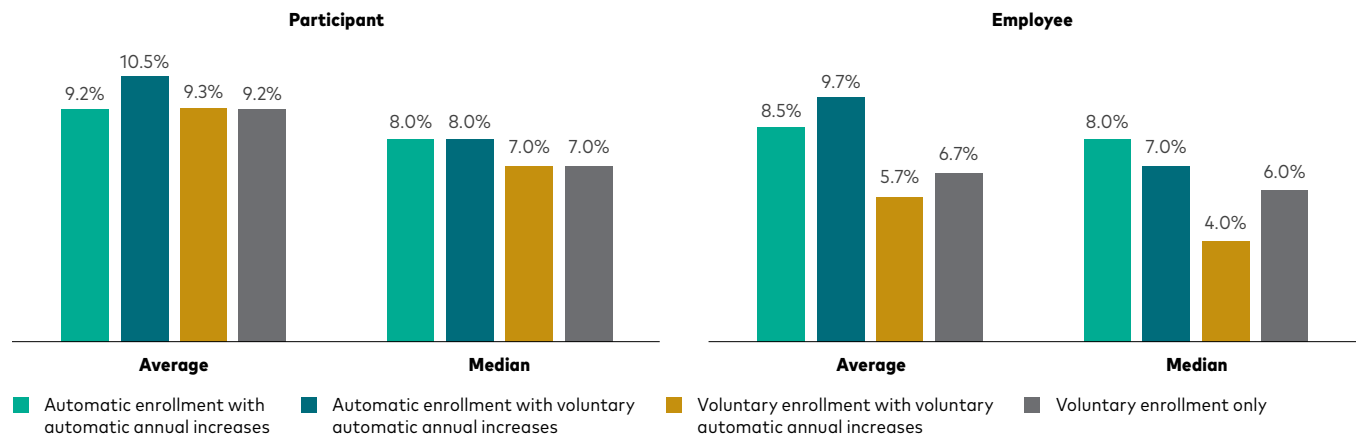
Percentage distribution, as of December 31, 2020



Source: Vanguard, 2021.

**FIGURE 10.**  
**Average and median deferral rates by plan design**

As of December 31, 2020



Source: Vanguard, 2021.

Finally, we ran regressions to elicit what demographic variables are correlated with saving rates (Figure 11). For the eligible population in automatic enrollment plans, the predicted

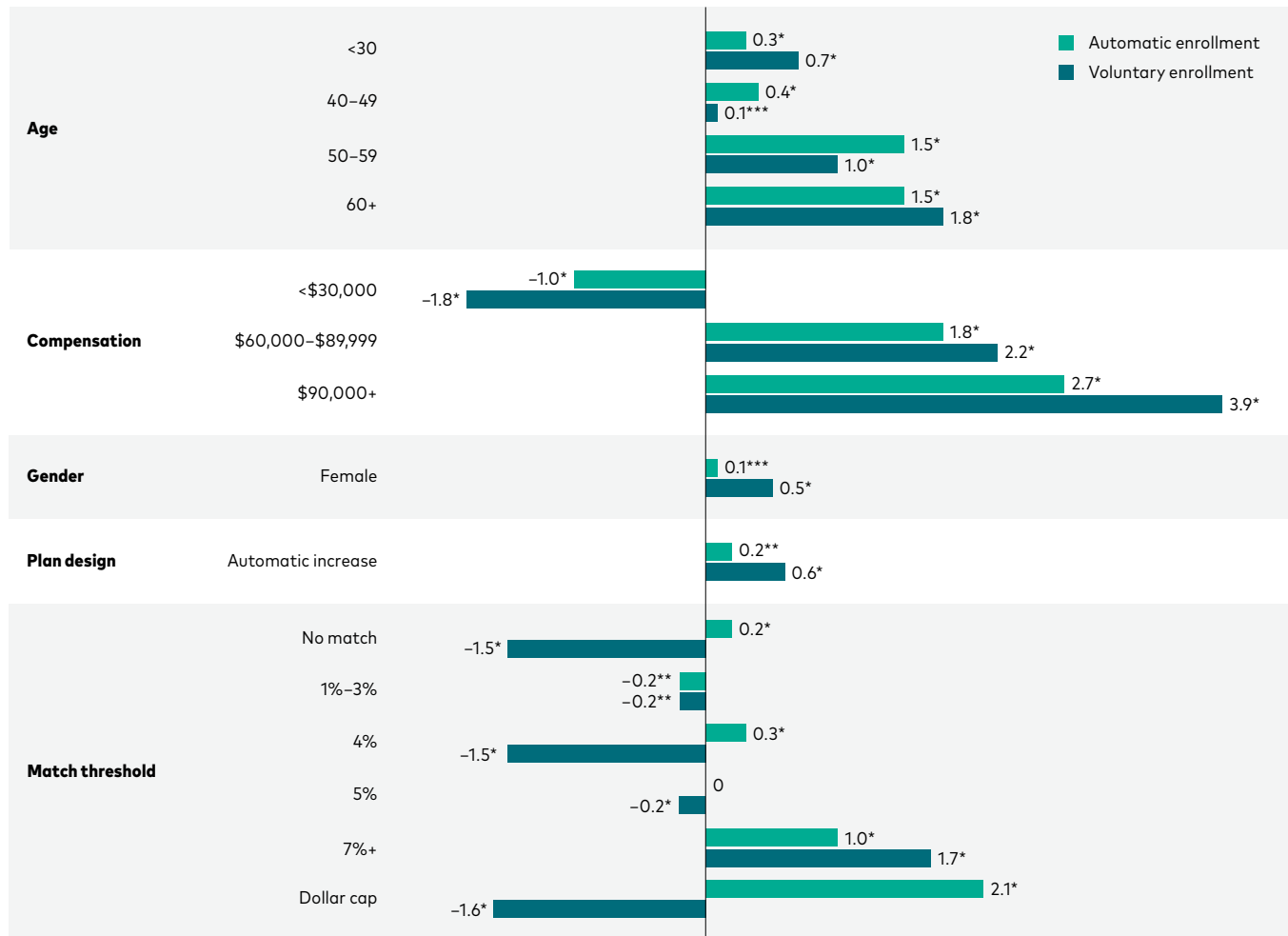
saving rate was 8.2%; for those in voluntary enrollment plans, it was 5.4%. Higher wages predict higher saving rates and lower wages predict lower saving rates.

**FIGURE 11.**  
**What predicts saving rates?**

All eligible employees, 2020

Predicted automatic enrollment saving rate: 8.2%

Predicted voluntary enrollment saving rate: 5.4%



**Notes:** Participant characteristics are measured against a reference of age 30-39, compensation \$30,000-\$59,999, and male. Plan effects are measured against a reference of no automatic annual increase and match threshold of 6%. \* Statistically significant at the 99% level. \*\* Statistically significant at the 95% level. \*\*\* Not statistically significant. See Appendix on pages 15-16 for model specification.

**Source:** Vanguard, 2021.

## Stepping off . . . and stepping out!

Individuals automatically enrolled in a 401(k) have four options at any given time:

1. Remain in the default design.
2. Modify the default design.
3. Quit the plan.
4. Leave the plan sponsor employer (terminate employment).

Figure 12 suggests that individuals quitting the plan end up leaving their employer.

The same is true for eligible employees with voluntary enrollment plans. Here, individuals have three options:

1. Join the plan.
2. Do nothing and remain a nonparticipant.
3. Leave the plan sponsor employer.

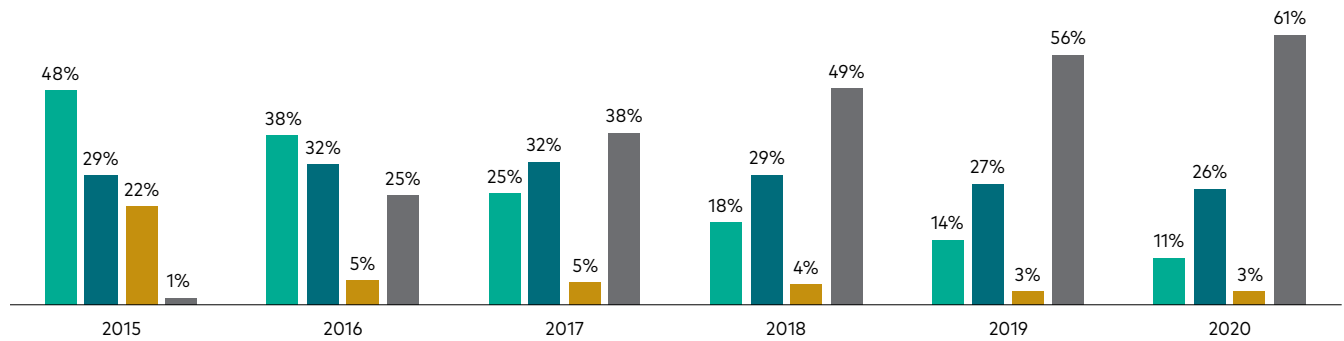
Figure 13 suggests that nonparticipants appear to end up leaving the employer.

FIGURE 12.

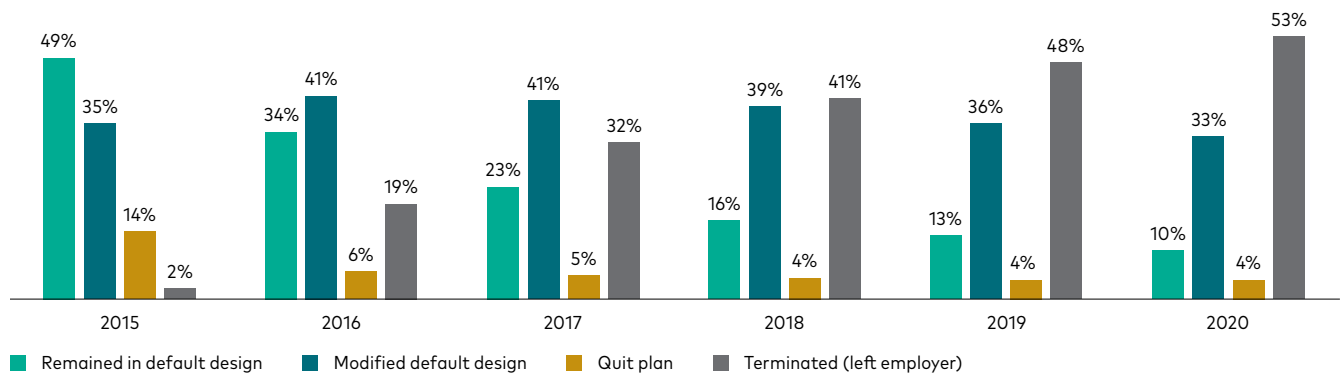
### Stepping off and stepping out!

Participants who were newly eligible in 2015

Panel A. Employees with plans with automatic enrollment and automatic annual increases (cumulative)



Panel B. Employees with plans with automatic enrollment and voluntary annual increases (cumulative)

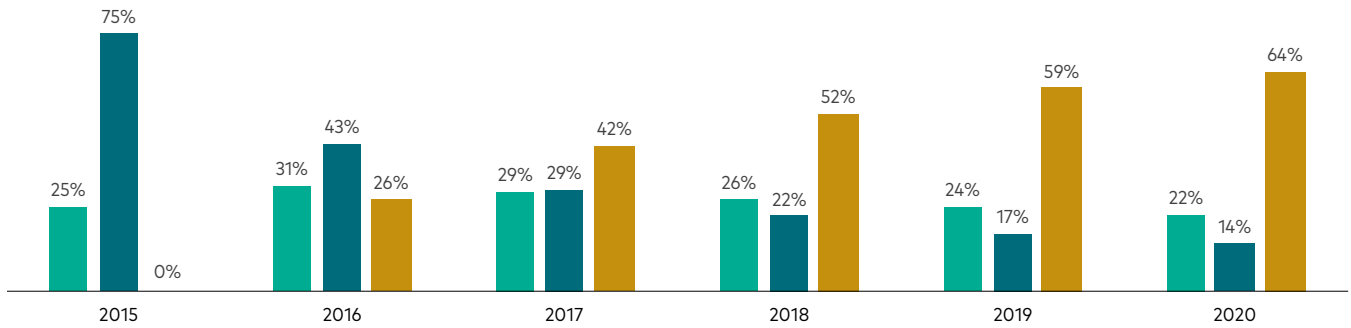


Source: Vanguard, 2021.

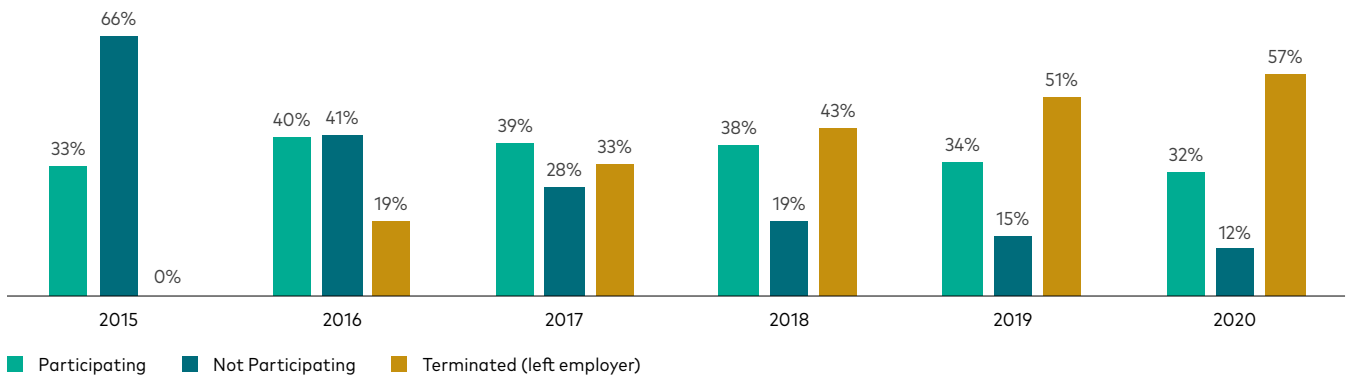
**FIGURE 13.**  
**Not participating? Leaving the company!**

Employees who were newly eligible in 2015

*Panel A. Employees with plans with voluntary enrollment and voluntary annual increases (cumulative)*



*Panel B. Employees with plans with voluntary enrollment only (cumulative)*

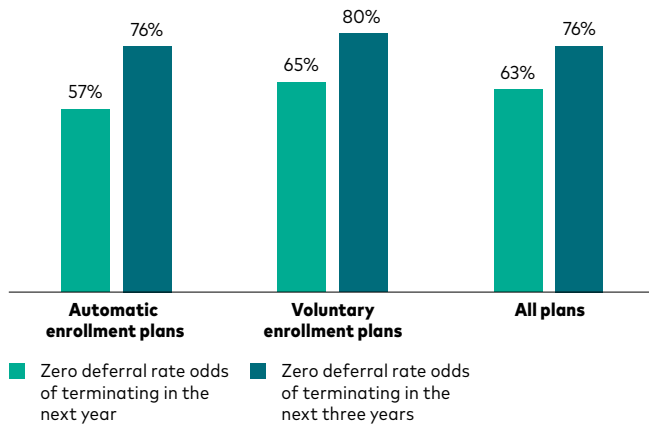


Source: Vanguard, 2021.

We ran a regression to predict the probability of terminating in cases where an eligible employee chooses to not participate in their retirement plan. **Figure 14** shows that across all plans, individuals with a 0% deferral rate are 63% more likely to leave within one year and 76% more likely to leave within three years. Nonparticipation doesn't necessarily reflect flaws in plan design. Rather, it may simply be a signal that an employee will soon leave the employer.

**FIGURE 14.**  
**Probability of terminating employment**

Not participating or electing a zero deferral rate



**Notes:** A binary logit model was used to predict the probability of terminating (leaving employer). Does choosing to not participate one year predict terminating in the next year? Does choosing to not participate in one year predict terminating during the next three years? All results are statistically significant at the 99% level. See Appendix on pages 15–16 for model specification.

**Source:** Vanguard, 2021.

## Implications

Our examination of automatic and voluntary annual increases supports the case for autopilot 401(k). Plan design is powerful—and plans that include automatic features improve contribution rates. Where annual increases are automatic, participants tend to let them ride; for 8 in 10 participants, these increases are still in effect after five years—or the cap has been reached. Participants and eligible employees in these plans have average deferral rates of 9.2% and 8.5%, respectively. Where annual increases are voluntary, about 35% of participants have enrolled in them after five years. The robust adoption rates of voluntary annual increases suggest that this service should be made available in all plans that do not have automatic annual increases. More plans with automatic enrollment should add automatic annual increases, and most plans should not cap annual increases at a rate lower than 10%.

Vanguard estimates that a typical participant seeking to meet income needs in retirement should target a total contribution rate of 12% to 15%. This total rate includes both employee and employer contributions. The default automatic enrollment deferral and annual increase rates of any plan, therefore, should be set no lower than the levels whereby employer contributions are maximized and a participant's total savings rates can reach at least 12% to 15% within five years.

## References

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## Appendix

Our analysis is based on Vanguard recordkeeping data as of December 2020. Recordkeeping services were provided for 1,700 plans. There were 4.7 million participants in these plans. Our interest is in how demographic and plan design features affect eligible employee saving decisions, with a special focus on how automatic annual increases impact savings rates. Accordingly, we limit our analysis to a subset of 350 continuous plans for which we have completed compliance testing for the 2015 plan year. These plans had approximately 88,000 newly eligible employees in 2015. No single plan's population exceeds 5% of total observed population by plan design type; this is in order to prevent very large plans from skewing our results.

For the **employee attrition** model, a simple logistic regression was generated utilizing a single independent variable—a participant reducing their contributions to 0% in the current year—to determine the probability of terminating employment during 1) the following calendar year, or 2) the third calendar year following this behavior. The general form of the resulting equations is:

$$\text{Probability of termination in year } x = \log [p / (1 - p)] = \beta_0 + \beta_1 * (0\% \text{ deferrals})$$

For the **dropping automatic increase** model, a multinomial logistic regression was generated in order to determine the probability of participants dropping automatic annual increases to their deferral rate. Only participants in plans with automatic enrollment and automatic escalation were evaluated. Categorical variables included in the model (along with their corresponding reference group) are as follows:

### Demographic

- Age (30–39)
- Compensation (\$30,000–\$59,999)
- Gender (male)

### Plan design

- Match threshold, defined as the contribution required to get the maximum match as a percentage of compensation (6%–6.99%)
- Behavioral—final deferral rate (7%–11%)

The general form of the resulting probability equation is:

$$\text{Probability of dropping auto increase} = \log [p / (1 - p)] = \beta_0 + \beta_1 * (\text{age}) + \beta_2 * (\text{income}) + \beta_3 * (\text{gender}) + \beta_4 * (\text{match threshold}) + \beta_5 * (\text{final deferral rate})$$

For our **final savings rate models**, we ran a separate multiple linear regression for automatic enrollment plans and voluntary enrollment plans. Categorical variables included in the model (along with their corresponding reference group) are as follows:

### Demographic

- Age (30–39)
- Compensation (\$30,000–\$59,999)
- Gender (male)

### Plan design

- Automatic annual deferral rate increase offered (not offered)
- Match threshold, defined as the contribution required to get the maximum match as a percentage of compensation (6%–6.99%)

The general form of the resulting probability equation is:

Final deferral rate =  $\beta_0 + \beta_1 * (\text{age}) + \beta_2 * (\text{income}) + \beta_3 * (\text{gender}) + \beta_4 * (\text{match threshold}) + \beta_5 * (\text{auto increase offered})$

Complete regression results, including coefficients, standard errors, and marginal effects, are available from the authors.

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