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The Vanguard Participant Saving Rate Index

- Saving rates are fundamental to retirement wealth accumulations. In this paper, we assess whether Vanguard defined contribution plan participants are saving optimally in their current workplace retirement plan.
- We find that 7 in 10 defined contribution plan participants are saving at rates that would enable them to attain a 65% replacement rate in retirement. Saving rates include both the employee elective contributions and any employer contributions.
- We find that a modest increase in participant elective deferral rates of 1, 2, or 3 percentage points would enable 7 in 10 plan participants to attain a 75% replacement rate in retirement. Four in 10 participants are enrolled in automatic annual saving rate escalation and will automatically see their saving rates rise.
- Plan design—both the default enrollment rate and the value of employer contributions—remains a powerful driver of participant saving rates. Strong automatic enrollment defaults and generous employer contributions predict saving effectively.

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Introduction

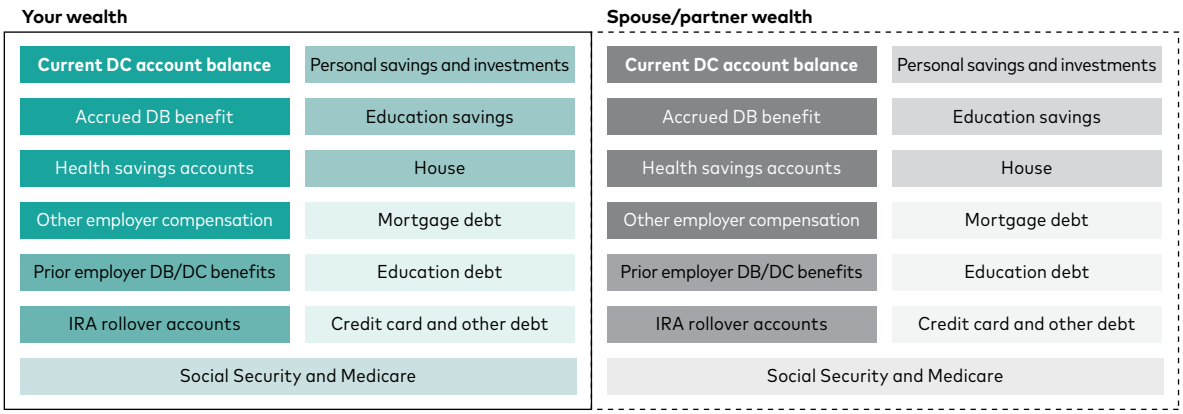
Retirement readiness is of interest to policymakers, academics, consultants, plan sponsors, and the media. Several assessments of retirement readiness in the U.S. have emerged. The assessments range from *there is no retirement crisis in the U.S.* to *half of workers are facing a retirement crisis in the future*. Among the assessments:

- The Boston College Center for Retirement Research produces a National Retirement Risk Index (NRRI) (Munnell, Chen, and Siliciano, 2021), which projects that about half of households are at risk of not being able to maintain their pre-retirement standard of living in retirement as measured by a target replacement ratio. Since the 2008 global financial crisis, the NRRI, published every three years, has hovered around half. The NRRI assumes that all wealth is annuitized.
- The Employee Benefits Research Institute (EBRI) has developed a model, the Retirement Security Projection Model (RSPM), which estimates that 41% are at risk of not being able to maintain their pre-retirement standard of living in retirement as measured by a target replacement ratio (VanDerhei, 2019). RSPM uses a 100% threshold of retirement readiness. In other words, if a replacement ratio falls a single percentage point short of the target, the retiree is considered at risk. In 2012 EBRI published sensitivity analysis; if an 80% threshold is used, then the percentage at risk declines by about 20 percentage points (VanDerhei, 2012).
- RAND, a global nonprofit research organization, models a consumption-based measure of retirement readiness. RAND estimates that 81% of couple households are economically prepared for retirement (Hurd and Rohwedder, 2015).
- Scholz and Seshadri (2008) use a life-cycle model to assess the adequacy of retirement readiness. They estimate that 90% of early boomers (born between 1946 and 1955) are saving optimally but note that with each successive generation, the proportion saving optimally declines.

It is not possible to estimate retirement readiness from the current employer defined contribution plan account balance. **Figure 1** shows how the current employer plan represents only a partial picture of retirement wealth—even for long-tenured full-career workers. Because over half of people enter retirement as a couple, the wealth picture becomes even more complex (Roberts et al., 2018). An assessment of retirement readiness requires a complete understanding of household wealth.

FIGURE 1.

A broader conception of retirement security



Note: The size of the boxes is not meant to represent proportional wealth or debt. *DC* is defined contribution plan; *DB* is defined benefit plan.
Source: Vanguard, 2022.

However, saving rates are fundamental to retirement wealth accumulations. In this paper, we assess whether Vanguard defined contribution plan participants are saving optimally in their current workplace retirement plan.

Data and baseline assumptions

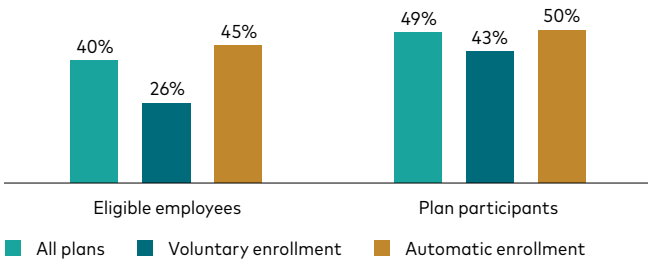
We analyze approximately 1.9 million eligible employees and 1.5 million actively contributing participants in approximately 880 plans for which we have completed compliance testing as of December 2020.[1] In our baseline model, the target saving rates are 9% where income is less than $50,000, 12% where income is between $50,000 and $100,000, and 15% where income is more than $100,000. For participants with lower wages, Social Security is expected to replace a higher percentage of income, so a lower retirement saving rate may be appropriate. Higher-income participants may not be able to attain the target saving rate within the plan but are considered to be saving effectively if they reach the regulatory limits. The target saving rate includes both employee elective contributions and the value of any employer contributions. The baseline model assumes a 75% target replacement ratio, 4% real return, 1% real wage growth, 40 years of saving (from age 27 to 67), and a 4% withdrawal rate at retirement.

Vanguard Participant Saving Rate Index

We present the baseline results for the Vanguard Participant Saving Rate Index (VPSRI) in **Figure 2**. One half of Vanguard plan participants are saving at or above their income-based target saving rates and are saving effectively. When we analyze all employees eligible to participate in the plan, including those who choose not to, the rate drops to 40%. Across all eligible employees in plans with automatic enrollment, employees are 70% more likely to be saving effectively (45%, compared with 26% in plans without automatic enrollment), primarily because of the significant difference in participation between employees in the two plan designs (Vanguard, 2022). Plan size did not affect the results.

FIGURE 2.

Vanguard Participant Saving Rate Index—baseline model results



Note: VPSRI baseline assumptions: 75% target replacement ratio, 4% real return, 1% real wage growth, 40 years of saving (from age 27 to 67), and a 4% withdrawal rate at retirement.

Source: Vanguard, 2022.

1 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. No single plan's population exceeds 5% of the total observed population by plan design type; this is to prevent very large plans from skewing our results. See **Appendix 1** for sample characteristics.

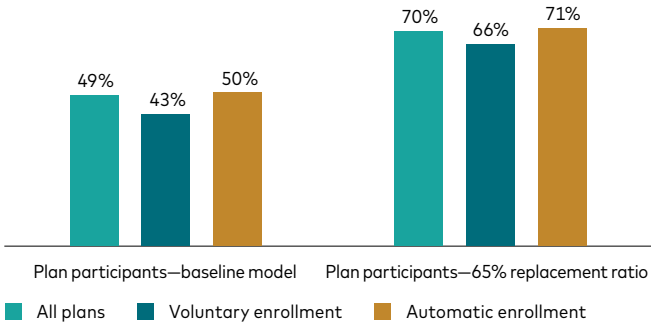
In the remainder of this analysis, we will focus on plan participants rather than all eligible employees because we are interested in the retirement saver population. We also know that 6 in 10 employees who quit an automatic enrollment plan or who fail to join a voluntary enrollment plan terminate the employer plan sponsor within a year (Proctor and Young, 2021).

A 75% target replacement ratio is a common rule of thumb. Studies have shown that the most commonly suggested replacement ratios fall between 70% and 85% of pre-retirement income (U.S. Government Accountability Office, 2016). Target replacement ratios are useful in setting target saving rates, particularly for workers who are decades from retirement and would have difficulty predicting their consumption at age 67. It's easier for workers in their late 50s and 60s to predict the retirement consumption needed to maintain their pre-retirement standard of living. Vanguard Personal Advisor Services® uses cash-flow modeling to predict whether a household is on track to meet its goals.

What if the target replacement ratio is set at 65%? For a worker earning $50,000, a 75% replacement ratio translates to $37,500 and a 65% replacement ratio translates to $32,000. The average annual expenditures for one-person households 65 years and older are $34,443 (U.S. Bureau of Labor Statistics, 2021). This suggests that a target replacement ratio of 65% could enable workers to approximately maintain their pre-retirement standard of living. In our 65% model, the target saving rates are 6% where income is less than $50,000, 9% where income is between $50,000 and $100,000, and 11% where income is more than $100,000. As depicted in **Figure 3**, 7 in 10 Vanguard plan participants are saving effectively in this model.

FIGURE 3.

Vanguard Participant Saving Rate Index—65% replacement ratio model results



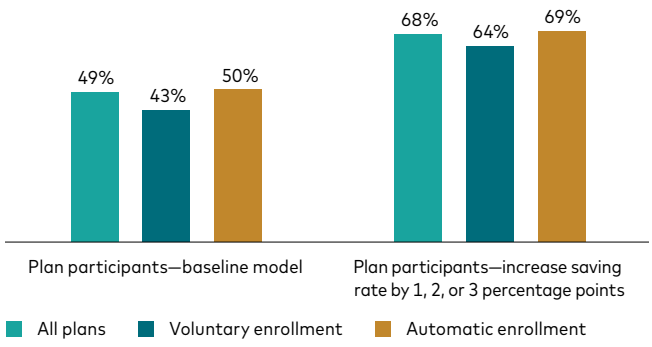
Note: VPSRI baseline assumptions: 75% target replacement ratio, 4% real return, 1% real wage growth, 40 years of saving (from age 27 to 67), and a 4% withdrawal rate at retirement.

Source: Vanguard, 2022.

In addition, although some participants may not be saving at or above their target rate, many are close. What if plan participants increase their saving rate by just 1, 2, or 3 percentage points? Four in 10 participants are enrolled in automatic annual saving rate escalation and will automatically see their saving rate rise by 1, 2, or 3 percentage points over the next few years. As depicted in **Figure 4**, when taking into account the impact of automatic escalation in the original 75% replacement ratio scenario, an additional 20% of participants will reach their target saving rate, resulting in nearly 7 in 10 Vanguard plan participants saving effectively.

FIGURE 4.

Vanguard Participant Saving Rate Index—increasing the saving rate results



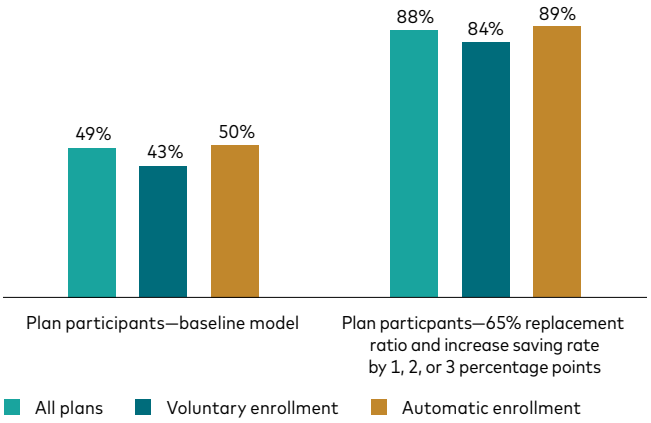
Note: VPSRI baseline assumptions: 75% target replacement ratio, 4% real return, 1% real wage growth, 40 years of saving (from age 27 to 67), and a 4% withdrawal rate at retirement.

Source: Vanguard, 2022.

Finally, what if we set the target replacement ratio at 65% and the plan participants increase their saving rate by 1, 2, or 3 percentage points? As depicted in **Figure 5**, nearly 9 in 10 Vanguard plan participants are saving effectively.

FIGURE 5.

Vanguard Participant Saving Rate Index—targeting 65% and increasing the saving rate results



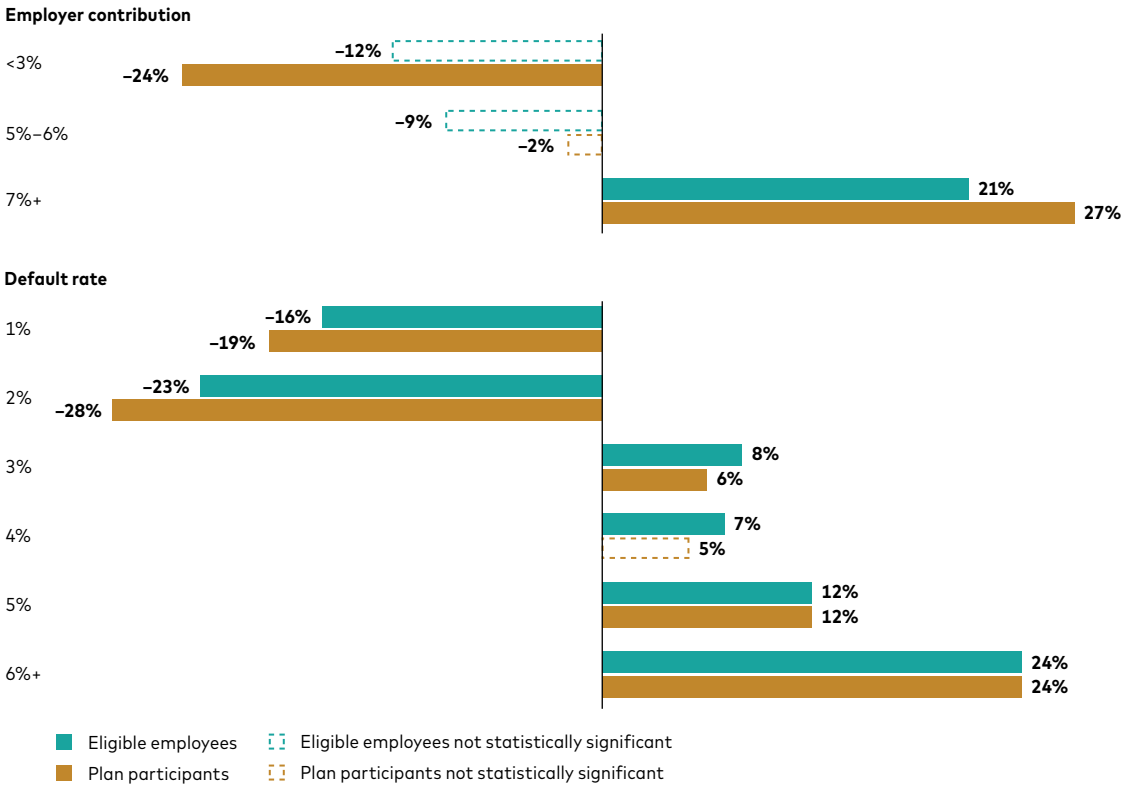
Note: VPSRI baseline assumptions: 75% target replacement ratio, 4% real return, 1% real wage growth, 40 years of saving (from age 27 to 67), and a 4% withdrawal rate at retirement.

Source: Vanguard, 2022.

What predicts saving effectively?

We ran regressions to elicit what plan design features and demographic variables are correlated with saving effectively. Plan design—namely, automatic enrollment—and the generosity of employer contributions predict saving effectively (**Figure 6**).

FIGURE 6.
What predicts saving effectively?



Notes: Saving effectively equates to aggregate employee plus employer contribution of 9% where income is less than $50,000, 12% where income is between $50,000 and $100,000, and 15% when income is greater than $100,000. Regression fixed effects include employer, age, tenure, compensation, and gender (see **Appendix 2**). Solid bars are statistically significant at the 95% level. Dashed bars are not statistically significant. Plan design features are measured against a reference of 4% for employer contributions and voluntary enrollment for defaults. In a voluntary enrollment design, the default rate is 0%. Predicted probability of saving effectively is 40% for employees and 50% for plan participants. See **Appendix 3** for model specification.

Source: Vanguard, 2022.

Over the past 15 years, plan sponsors have continued to adopt automatic enrollment plan designs. As of year-end 2021, 56% of plans (and 75% of plans with 1,000 or more participants) had adopted automatic enrollment, a trend that increases year over year (Vanguard, 2022). However, there is some hesitancy among a minority of plan sponsors to adopt such a design. For example, implementing an automatic enrollment design typically increases employer matching costs. However, it is also important to consider that the employees who would be brought into the plan are typically lower paid, and therefore the total additional costs may not be as large as expected. Furthermore, plan sponsors have been increasing the initial default percentage to help encourage stronger savings. As of year-end 2021, 58% of plans default at a rate of 4% or higher, compared with just 32% 10 years ago. An automatic enrollment default of 6% or higher was a strong predictor of participants saving effectively.

Employer contributions, both matching and nonmatching, of 7% or more were also an impactful factor.[2]

Strikingly, these results indicate that automatic enrollment designs where the default is 1% or 2% lead to fewer participants saving effectively than when the default deferral design is 0%, as it is under voluntary enrollment. Participation rates in automatic enrollment plans with low defaults are higher than those in the typical voluntary enrollment plan, although when focusing on participant total saving rates, setting low enrollment defaults can underserve many participants who would be more likely to save at higher levels in a voluntary enrollment plan. Plan sponsors may expect that higher default rates could lead to more employees opting out of their plan; however, opt-out rates do not vary in response to a plan sponsor's default rate (Clark and Young, 2021). As of year-end 2021, only 6% of plans default at 1% or 2%, down from 15% of plans 10 years ago.

2 Vanguard recordkeeps over 100 unique combinations of match formulas and/or other nonmatching employer contributions. Accordingly, we add together the value of any matching and nonmatching contributions for comparison purposes.

What if real returns are lower or higher than 4%?

The average participant-weighted equity allocation is 77%, and the median is 87%. The Vanguard Capital Markets Model® (VCMM) estimates projected 10-year annualized nominal returns, and we believe that returns will be muted over the next decade (Davis et al., 2020). For an 80% equity allocation, the projected 10-year nominal annualized return is between 3.6% at the 25th percentile and 7.3% at the 75th percentile.

The median projected return is 5.5%. Long-term inflation is expected to be in the 2% range. This suggests real returns for an 80% equity allocation of between 1.6% and 5.3%, or 3.5% at the median. **Figure 7** depicts the sensitivity of saving rate to return assumptions. For a middle-income saver targeting a 75% replacement ratio, the total saving rate rises to 13% (from 12% in our baseline model), and for a high-income saver it rises to 16% (from 15%)—and fewer participants are saving effectively.

FIGURE 7.
Returns and replacement ratios

	Target total saving rate			Percentage of participants saving effectively		
Replacement ratio	**65%**	**75%**	**85%**	**65%**	**75%**	**85%**
Income <$50,000						
3.5% real return	6%	9%	13%	66%	46%	21%
4.5% real return	5%	7%	10%	73%	58%	38%
5.5% real return	4%	6%	8%	84%	66%	52%
Income $50,000–$100,000						
3.5% real return	9%	13%	16%	70%	40%	23%
4.5% real return	8%	11%	13%	75%	53%	40%
5.5% real return	6%	8%	11%	86%	75%	53%
Income $100,000+						
3.5% real return	12%	16%	19%	69%	51%	43%
4.5% real return	10%	13%	16%	79%	64%	51%
5.5% real return	8%	10%	13%	88%	79%	64%

Source: Vanguard, 2022.

IMPORTANT: The projections and other information generated by the VCMM regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Distribution of return outcomes from VCMM are derived from 10,000 simulations for each modeled asset class. Simulations as of September 20, 2020. Results from the model may vary with each use and over time. For more information, please see Appendix 4, "About the Vanguard Capital Markets Model."

What if sustainable withdrawal rates are lower or higher than 4%?

Recently the 4% withdrawal rate has been challenged.[3] Vanguard also examined sustainable withdrawal rates given the subdued return expectations from the VCMM. Vanguard estimates downside, baseline, and upside sustainable withdrawal rates of 2.8%, 3.0%, and 3.3%, respectively (Clarke, Khang, and Pakula, 2022). Targeted saving rates are also sensitive to withdrawal assumptions (**Figure 8**). For a middle-income saver targeting a 75% replacement ratio, the total saving rate rises to 13% (from 12% in our baseline model) under a 3.5% withdrawal rate assumption and to 19% under a 2.5% assumption. For a high-income saver, it rises to 16% (from 15%) under a 3.5% assumption and 23% under a 2.5% assumption—and again, fewer participants are saving effectively.

FIGURE 8.
Withdrawal rates and replacement ratios

	Target total saving rate			Percentage of participants saving effectively		
Replacement ratio	**65%**	**75%**	**85%**	**65%**	**75%**	**85%**
Income <$50,000						
4.5% withdrawal rate	5%	7%	10%	73%	58%	38%
3.5% withdrawal rate	6%	9%	13%	66%	46%	21%
2.5% withdrawal rate	8%	13%	18%	52%	21%	6%
Income $50,000–$100,000						
4.5% withdrawal rate	8%	11%	13%	75%	53%	40%
3.5% withdrawal rate	10%	13%	17%	61%	40%	19%
2.5% withdrawal rate	14%	19%	24%	33%	14%	6%
Income $100,000+						
4.5% withdrawal rate	10%	13%	16%	79%	53%	51%
3.5% withdrawal rate	13%	16%	20%	64%	51%	41%
2.5% withdrawal rate	18%	23%	29%	46%	38%	37%

Source: Vanguard, 2022.

3 For example, Morningstar published a paper that estimates that the standard rule of thumb should be lowered to 3.3% from 4% (Benz, Ptak, and Rekenthaler, 2021).

Implications

Saving rates are fundamental to retirement wealth accumulation and are the most important factor to consider when assessing how workers are preparing for retirement. Our examination of the total saving rates of Vanguard defined contribution plan participants indicates that 7 in 10 are saving optimally in their current workplace retirement plan. Targeting both a lower replacement rate and modest increases in saving rates indicates that 9 in 10 participants can achieve optimal saving rates in their current workplace retirement plan.

Plan design—both the default enrollment rate and the value of employer contributions—remains a powerful driver of participant saving rates. Higher automatic enrollment defaults and generous employer contributions, in the form of incentive matching contributions and/or other nonmatching employer contributions, increase the probability that participants will save effectively.

The default automatic enrollment and annual increase rate of any plan, therefore, should be set no lower than the levels whereby employer contributions are maximized and a participant's total saving rate can reach at least 12% to 15% within five years. Given subdued return expectations over the next decade and more modest withdrawal rates, higher-income participants should focus on maximizing their contributions in their retirement plan as well as consider retirement savings options outside of the plan.

Appendix 1

FIGURE A-1.

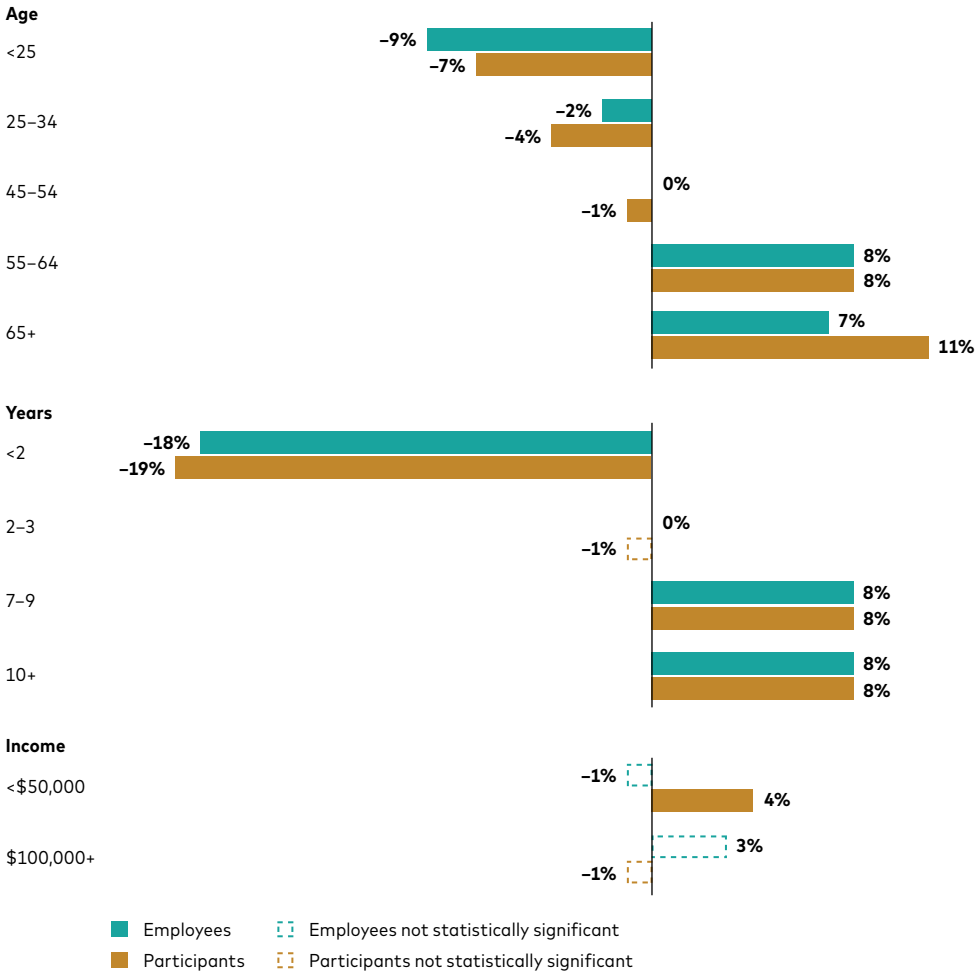
Sample characteristics

	Eligible employees	Plan participants
Median age	42.6	43.3
Median tenure (years)	5.4	5.8
Median income	$71,351	$75,711
Median total saving rate	9.4%	10.8%
Percentage female	38%	38%
Percentage male	62%	62%
Percent with balanced portfolios	—	79%
Average equity allocation	—	77%
Median equity allocation	—	87%

Source: Vanguard, 2022.

Appendix 2

FIGURE A-2.
Demographic factors and saving effectively



Notes: Saving effectively equates to aggregate employee plus employer contribution of 9% where income is less than $50,000, 12% where income is between $50,000 and $100,000, and 15% where income is greater than $100,000. Regression fixed effects include employer, age measured against a reference of 35–44, tenure measured against a reference of 4–6 years, compensation measured against a reference of $50,000–$100,000, and gender (omitted as not significant). Solid bars are statistically significant at the 95% level. Dashed bars are not statistically significant. Plan design features include employer contributions and plan design defaults. In a voluntary enrollment design, the default rate is 0% (see Figure 6). The predicted probability of saving effectively is 40% for employees and 50% for plan participants. See Appendix 3 for model specification.

Source: Vanguard, 2022.

Appendix 3

Regression model

For the predicting saving effectively model, a fixed-effect logistic regression model (clustered on plans) was generated to determine the probability of participants saving effectively. Saving effectively is a binary variable. Categorical variables included in the model (along with their corresponding reference group) are as follows:

Demographic

Age (35–44)
Tenure (4–6 years)
Compensation ($50,000–$100,000)
Gender (Male)

Plan design

Employer contribution (3%–4%)
Employer match (Yes)
Automatic enrollment default (0%–voluntary)

Probability of saving effectively = log [p / (1-p)] = B_0 + B_1*(age) +B_2*(tenure) + B_3*(compensation) + B_4*(gender) + B_5*(employer contribution) + B_6*(employer match) + B_7*(automatic enrollment default)

Appendix 4

About the Vanguard Capital Markets Model

IMPORTANT: The projections and other information generated by the Vanguard Capital Markets Model regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. VCMM results will vary with each use and over time.

The VCMM projections are based on a statistical analysis of historical data. Future returns may behave differently from the historical patterns captured in the VCMM. More important, the VCMM may be underestimating extreme negative scenarios unobserved in the historical period on which the model estimation is based.

The Vanguard Capital Markets Model® is a proprietary financial simulation tool developed and maintained by Vanguard's primary investment research and advice teams. The model forecasts distributions of future returns for a wide array of broad asset classes. Those asset classes include U.S. and international equity markets, several maturities of the U.S. Treasury and corporate fixed income markets, international fixed income markets, U.S. money markets, commodities, and certain alternative investment strategies. The theoretical and empirical foundation for the Vanguard Capital Markets Model is that the returns of various asset classes reflect the compensation investors require for bearing different types of systematic risk (beta). At the core of the model are estimates of the dynamic statistical relationship between risk factors and asset returns, obtained from statistical analysis based on available monthly financial and economic data from as early as 1960. Using a system of estimated equations, the model then applies a Monte Carlo simulation method to project the estimated interrelationships among risk factors and asset classes as well as uncertainty and randomness over time. The model generates a large set of simulated outcomes for each asset class over several time horizons. Forecasts are obtained by computing measures of central tendency in these simulations. Results produced by the tool will vary with each use and over time.

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