
Ready! Fire! *Aim?* 2018

Incorporating insights from more than a decade of real-world participant behavior

Name, Title, Group

Agenda

- Purpose of our research
- 2018 key findings
- The way forward

Purpose of our research

“Evaluating real-world participant behavior to inform effective target date fund design”

- Help plan sponsors and advisors
 - Understand how participants are realistically interacting with their retirement plans
 - Evaluate the impact different glide path designs might have on participant outcomes
 - Assess how the relationship between glide path designs and varied participant investment behaviors shape long-term outcomes

- Key component of the *SmartRetirement*® investment process
 - Helps define our objectives as target date fund investors
 - Informs our glide path design

What’s new for 2018?

- Expanded participant universe drawing from MassMutual Financial Group and Empower Retirement
- Diverse data set allowing for analysis with perspectives on how enrollment and salary can shape behaviors

2018 key findings

More than a decade of insights into participant saving and withdrawal patterns

	2007 study 2001-06 trends	2009 study 2007-08 trends	2012 study 2009-11 trends	2015 study 2012-14 trends	2018 study 2015-17 trends
Salary raises	On average, participants get raises every two out of three years.	On average, participants get raises every other year.	On average, participants get raises every year.	On average, participants get raises every two to three years.	On average, participants get raises every two out of three years.
Contributions	On average, contribution rates start at 6% and increase slowly, reaching 8% of salary by age 40 and 10% not until age 55.	On average, contribution rates start at 6% and increase even more slowly, reaching 8% of salary by age 45 and 10% not until age 57.	On average, contribution rates start at 5% and increase slowly, reaching 8% of salary by age 44 and 10% not until age 59.	On average, contribution rates start at 5% and increase slowly, reaching 8% of salary by age 50 and do not reach 10% before retirement.	On average, contribution rates start at 5% and increase slowly, reaching 6% of salary by age 50 and do not reach 10% before retirement.
Loans	19% of participants borrow, on average, 21% of account balance ¹ .	18% of participants borrow, on average, 25% of account balance.	18% of participants borrow, on average, 22% of account balance.	23% of participants borrow, on average, 20% of account balance.	18% of participants borrow, on average, 20% of their account balance.
Pre-retirement distributions	12% of participants over the age of 59.5 withdraw, on average, 25% of assets.	13% of participants over the age of 59.5 withdraw, on average 27% of assets.	12% of participants over the age of 59.5 withdraw, on average, 18% of assets.	14% of participants over the age of 59.5 withdraw, on average 30% of assets.	A range of 7% to 12% of participants over the age of 59½ withdrew, on average, 55% of assets.
Post-retirement distributions	The average participant withdraws over 20% per year at or soon after retirement.	The average participant withdraws over 20% per year at or soon after retirement.	The average participant withdraws over 20% per year at or soon after retirement.	The average participant withdraws over 26% per year at or soon after retirement.	The average participant withdrew more than 55% in any given year at or soon after retirement.
Remain in plan three years after retirement	Not available (began tracking in 2006).	20% of participants remain in the plan.	17% of participants remain in the plan.	32% of participants remain the plan.	28% of participants remain in the plan.

Source: J.P. Morgan retirement research, 2001–17.

Slight differences in numbers reported from earlier studies may exist due to the reclassification of certain participant behavior. Those differences are not material.

¹ Due to a methodology change, 15% of account balance reported in 2006 is revised to 21% in this presentation.

Many participant behaviors are not in line with retirement savings best practices

Our more diverse data set examined approximately **4,000 DC plans** serving more than **2 million participants**

Participants typically contribute just **5%** of their paycheck at the start, reach **6%** by age 50 and do not reach 10% before retirement.¹

18% borrow on average **20%** of their account balance.¹

Around **10%** over age 59½ withdraw on average **55%** of assets.¹

Just **28%** of participants remain in plan 3 years after retirement.¹

¹J.P. Morgan retirement research, 2015-2017

Automatic enrollment continues to expand engagement... ...but it's also weighing on lower contribution rates

WHAT DOES THIS MEAN FOR PLAN SPONSORS?

Getting employees into the plan is a good first step, but increasing contribution rates is another important factor in being positioned for retirement funding success.

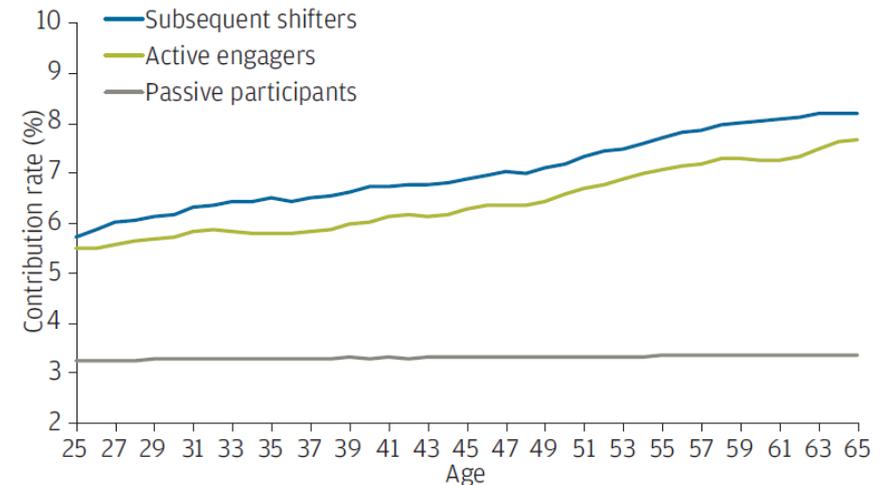
Participant segments

Passive participants – automatically enrolled in their plans and never made contribution changes beyond their initial default rates

Subsequent shifters – automatically enrolled but had a later rate change (either through automatic contribution escalation or by making a change on their own)

Active engagers – enrolled in their plans and set their contribution rates on their own

Average contribution rates by enrollment type



Source: J.P. Morgan retirement research, 2015-2017

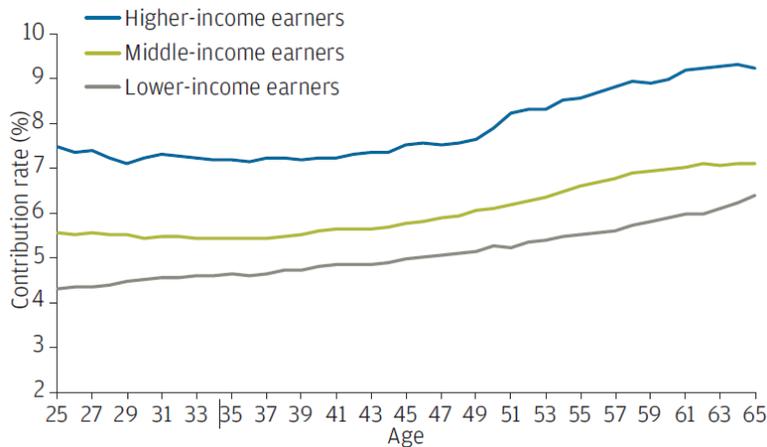
Distinct behaviors and patterns were observed across salary levels

WHAT DOES THIS MEAN FOR PLAN SPONSORS?

Cash flow volatility is prevalent throughout the population, but employees at middle and lower salary levels tend to save less, borrow more, and withdraw earlier.

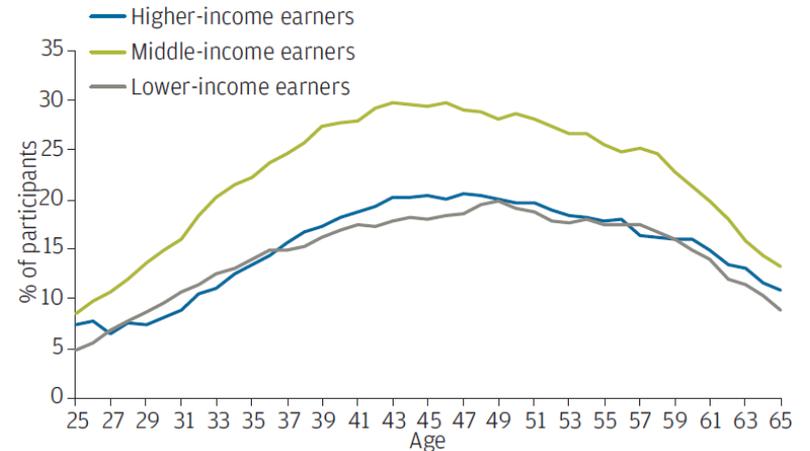
Higher-income earners tend to contribute the highest rates

Average contribution rates by salary level



Middle-income earners are most likely to take a loan

Percentage of participants with loans by salary level



Source: J.P. Morgan retirement research, 2015-2017

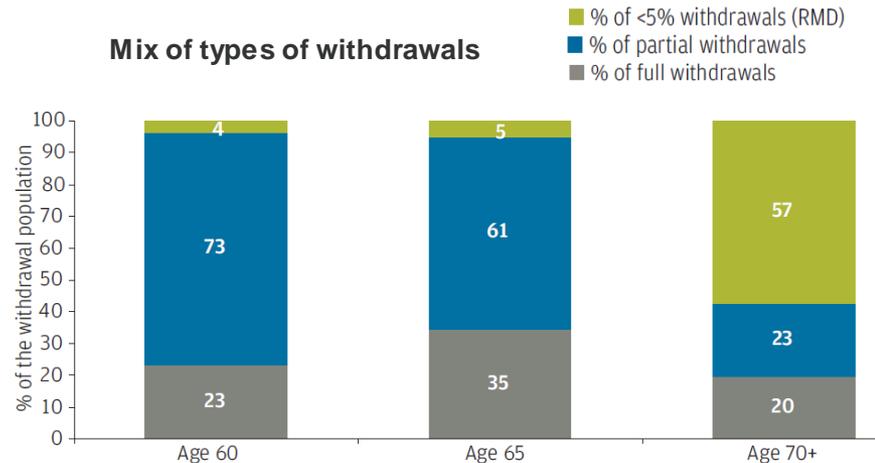
Most assets leave the plan within three years of retirement

WHAT DOES THIS MEAN FOR PLAN SPONSORS?

Participants still withdraw most of their assets around retirement, but we continue to see great variability of how people withdraw. Both factors are considered and incorporated in our glide path design and equity exposure around retirement.

Key findings

- The average participant withdrew more than **55%** in any given year at or soon after retirement
- Only **28%** of participants remained in the plan three years after retirement
- Most participants who remained in the plan after age 70 started to follow required minimum distribution (RMD) withdrawal rates, though there is some variability
- When people withdraw, how soon and how much they withdraw are dramatically different
 - At age 60, 20K of our population withdrew
 - At age 65, 9.5K of the population withdrew
 - At age 70+, 5K of the population withdrew

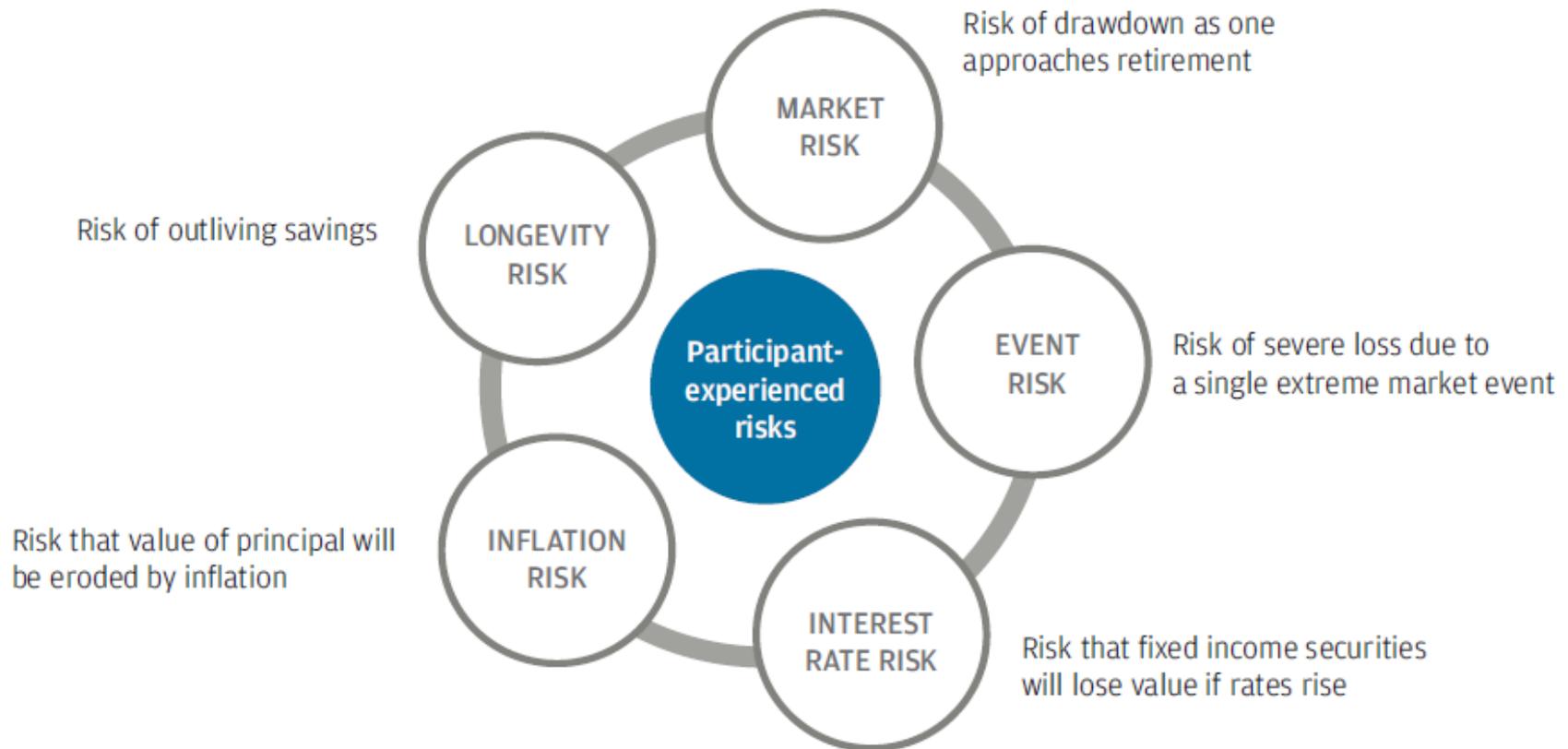


Note: Due to full withdrawals, at age 65, the number of participants included in the analysis decreases to 47% of the population we examined at age 60. At age 70+, the population has decreased to 24%. Total may be more than 100% due to rounding.

Source: J.P. Morgan retirement research, 2015-2017

The way forward

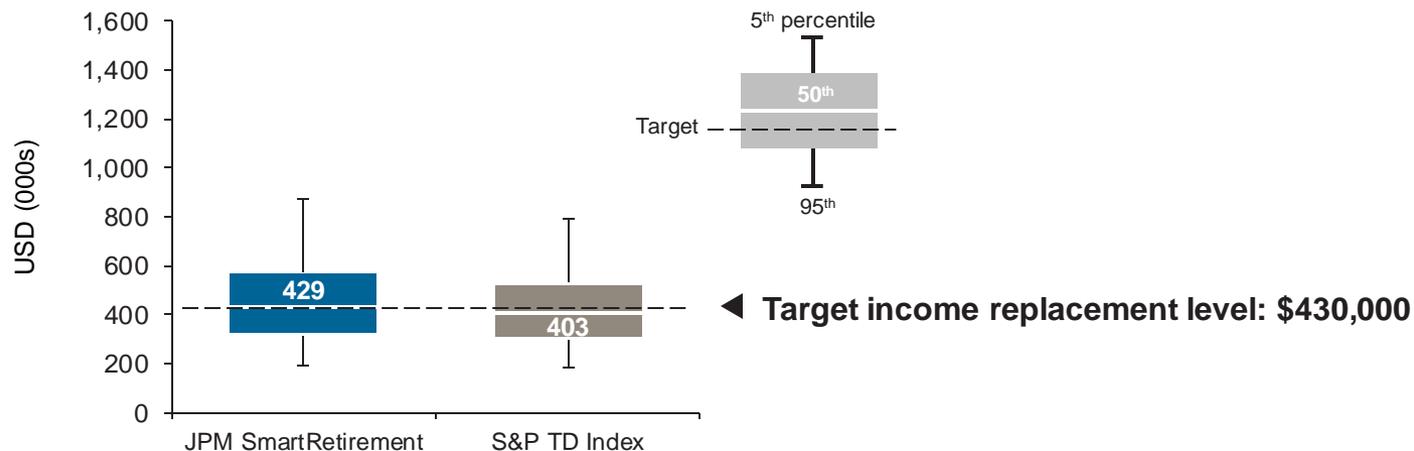
Understanding target date fund design in the context of risk exposure is crucial



Source: J.P. Morgan Asset Management. For illustrative purposes only.

Across *all* levels of engagement, *SmartRetirement* helped position more participants for retirement funding success...

Range of expected account balances at retirement by engagement type



USD (000s)	JPM SmartRetirement	S&P TD Index
5 th percentile	874	794
50th percentile	429	403
95 th percentile	189	181
Target	430	430
% above target	50%	44%
Prob of Loss +3yr	8.3%	10.5%

Percentage of employees over the retirement finish line

Source: J.P. Morgan retirement research, 2015-2017

How participant behavior informs our glide path

BEHAVIORS

Participants typically contribute 5% of their paycheck at the start, reach 6% by age 45 and only reach 7% before retirement.

19% borrow, on average, 20% of their account balance.

10% over age 59½ withdraw, on average, 55% of their assets.

About 28% of participants remain in plan three years after retirement.

KEY INSIGHT

Most investors are not saving enough. Early growth from their investments and protection from loss when approaching retirement are crucial to success.

Tight volatility controls are crucial to help manage the amplifying effects of cash flow volatility on market volatility.

Sharp risk reduction in the years leading up to retirement is crucial.

The majority are not using the investment vehicle post-retirement.

GLIDE PATH IMPLICATION

Higher equity allocation early in the glide path allows for growth.

Diversification and risk management are important to glide path design.

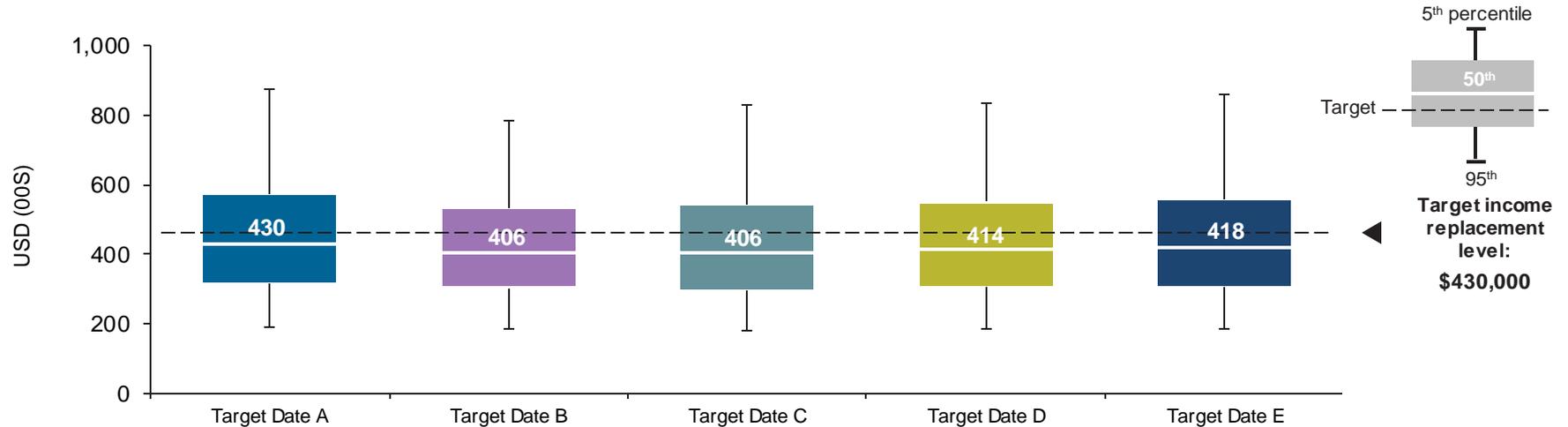
Shape and slope of the glide path near retirement and diversification are key.

Shape of glide path (static glide path) is appropriate given high levels of cash flow volatility.

Source: J.P. Morgan retirement research, 2015-2017

SmartRetirement delivers

On a risk-adjusted basis, SmartRetirement gets more participants across the finish line than other TDFs



USD (000s)	Target Date A	Target Date B	Target Date C	Target Date D	Target Date E
5 th percentile	874	786	830	835	856
50 th percentile	429	406	406	414	418
95 th percentile	189	185	177	184	183
Target	430	430	430	430	430
% above target	50%	44%	45%	47%	47%
Prob of Loss +3yr	8.3%	8.1%	13.0%	10.5%	12.0%

Percent of employees over the retirement finish line

Source: J.P. Morgan Asset Management analysis, 2019. Household income replacement rates are derived from an inflation-adjusted analysis of: Consumer Expenditure Survey (BLS) data (2013-2016); Social Security benefits using modified scaled earnings in 2019 for a single wage earner at age 65 and a spousal benefit at age 62 reduced by Medicare Part B premiums; and 2019 OASDI and FICA taxes. The income replacement needs may be lower for households in which both spouses are working and the second spouse's individual benefits are greater than their spousal benefit. Single household income replacement needs may vary as spending is typically less than a two-spouse household; however, the loss of the Social Security spousal benefit may offset the spending reduction. Percentages and values may not sum due to rounding.

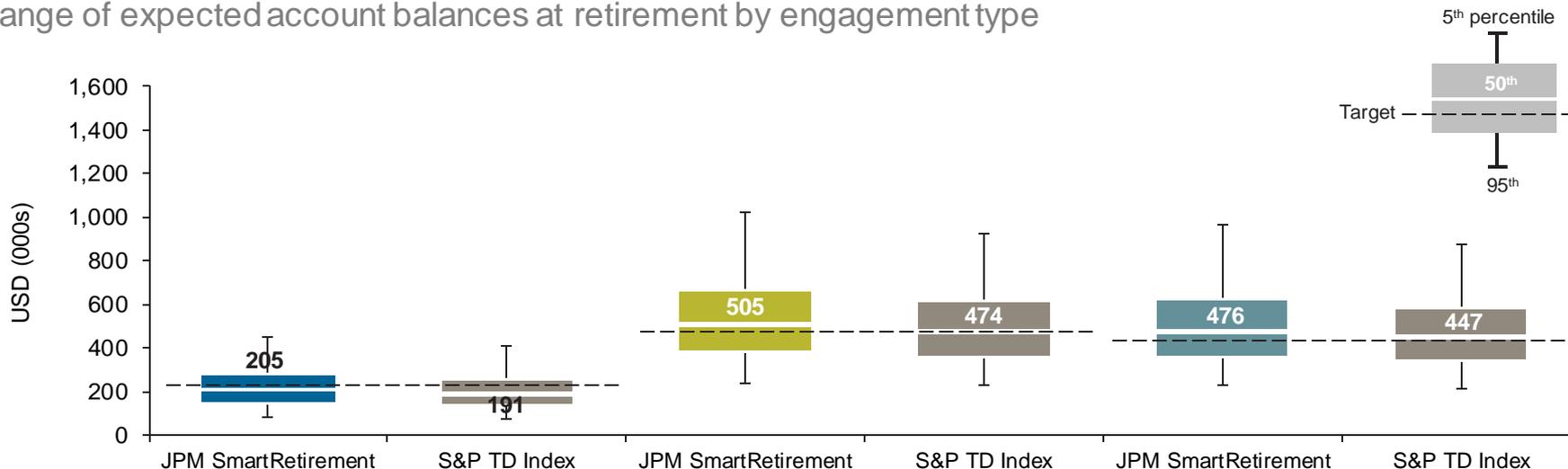
Strengthen retirement outcomes by focusing on effective levers to help combat participant-controlled and participant-experienced risks

- 1 ADOPT AUTOMATIC FEATURES
- 2 SELECT THE MOST APPROPRIATE TARGET DATE FUND
- 3 CONDUCT A RE-ENROLLMENT

Appendix

Across *all* levels of engagement, *SmartRetirement* helped position more participants for retirement funding success...

Range of expected account balances at retirement by engagement type



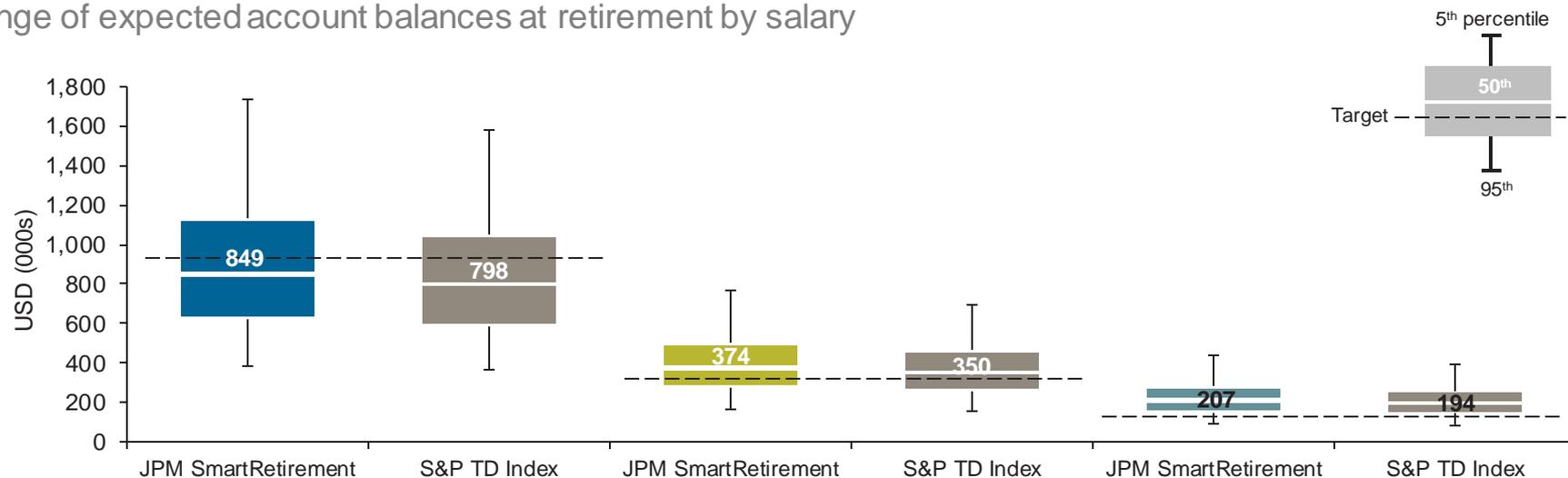
	Passive participants		Subsequent shifters		Active engagers	
USD (000s)	JPM SmartRetirement	S&P TD Index	JPM SmartRetirement	S&P TD Index	JPM SmartRetirement	S&P TD Index
5 th percentile	453	411	1,025	927	964	875
50 th percentile	205	191	505	474	476	447
95 th percentile	80	76	236	225	225	216
Target	255	255	480	480	440	440
% above target	33%	27%	55%	49%	57%	51%
Prob of Loss +3yr	8.3%	10.5%	8.3%	10.5%	8.3%	10.5%

Note: These target lines correspond to peak salaries of passive participants, subsequent shifters and active engagers. We derive the income replacement rate for various income levels by considering reductions in income tax and expenditures in retirement. Social Security and private savings such as defined contribution plans together need to meet the income replacement rate. We define the target portfolio values based on the annuity cost required to meet an adequate level of retirement income.

Source: J.P. Morgan retirement research, 2015-2017

...and across *all* salary levels

Range of expected account balances at retirement by salary

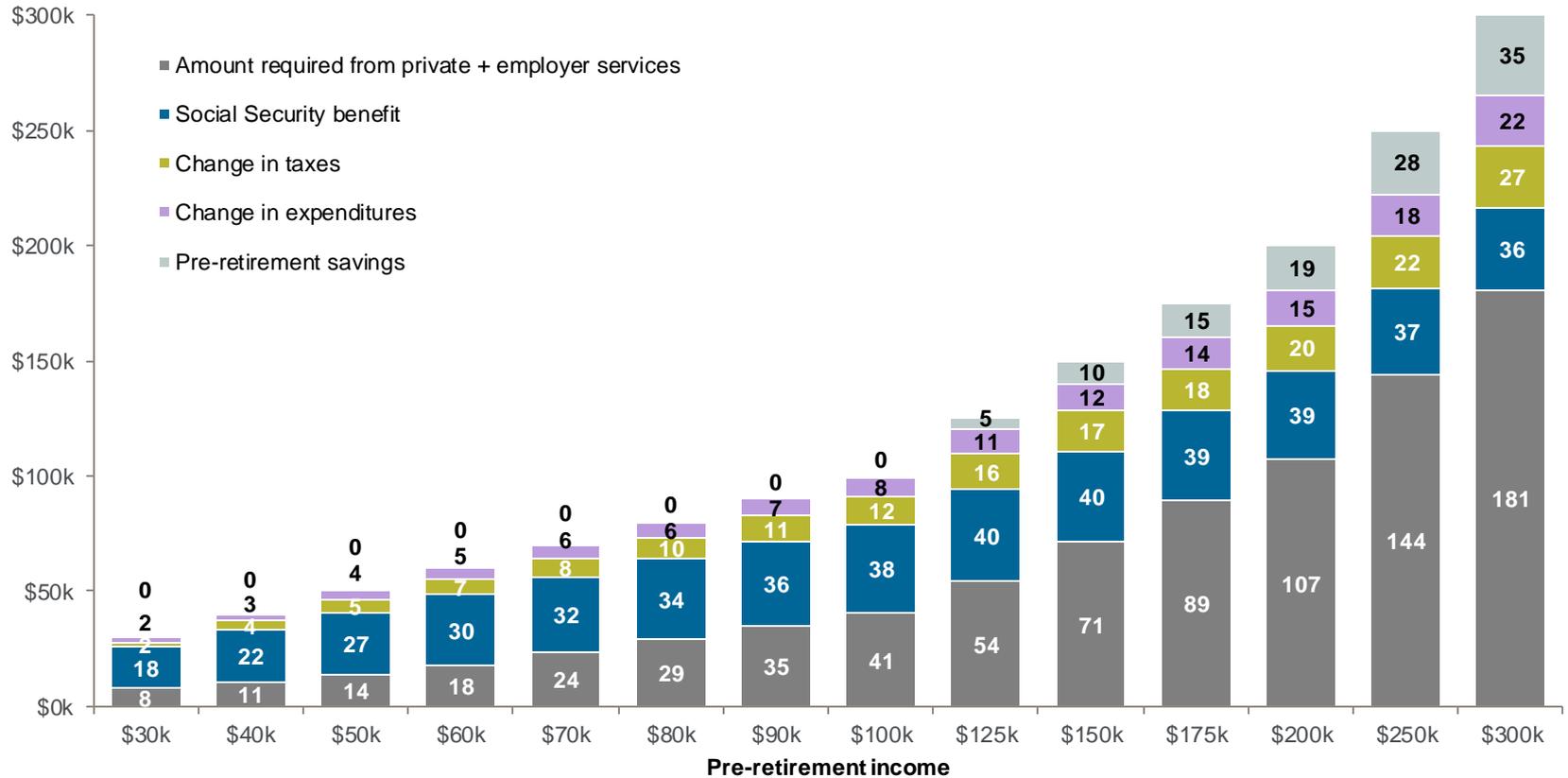


	Higher-income earners		Middle-income earners		Lower-income earners	
USD (000s)	JPM SmartRetirement	S&P TD Index	JPM SmartRetirement	S&P TD Index	JPM SmartRetirement	S&P TD Index
5 th percentile	1,735	1,582	764	690	435	393
50th percentile	849	798	374	350	207	194
95 th percentile	382	364	168	160	90	86
Target	970	970	330	330	130	130
% above target	38%	31%	61%	56%	83%	80%
Prob of Loss +3yr	8.3%	10.5%	8.3%	10.5%	8.3%	10.5%

Source: J.P. Morgan retirement research, 2015-2017

The target: income replacement

Replacement rate detail by household income



Source: J.P. Morgan Asset Management analysis, 2018. Household income replacement rates are derived from an inflation-adjusted analysis of: Consumer Expenditure Survey (BLS) data (2014-2017); Social Security benefits using modified scaled earnings in 2018 for a single wage earner at age 65 and a spousal benefit at age 62 reduced by Medicare Part B premiums; and 2018 OASDI and FICA taxes. The income replacement needs may be lower for households in which both spouses are working and the second spouse's individual benefits are greater than their spousal benefit. Single household income replacement needs may vary as spending is typically less than a two-spouse household; however, the loss of the Social Security spousal benefit may offset the spending reduction. Percentages and values may not sum due to rounding.

Getting to the savings finish line

Salary	TDF total at 65	Social Security	DC Balance/ Other Savings	Total income replacement ratio
\$30,000	\$140,000	60%	26%	86%
\$40,000	\$195,000	56%	27%	83%
\$50,000	\$255,000	54%	28%	82%
\$60,000	\$330,000	51%	30%	81%
\$70,000	\$430,000	46%	34%	80%
\$80,000	\$540,000	43%	37%	80%
\$90,000	\$640,000	41%	39%	80%
\$100,000	\$750,000	38%	41%	79%
\$125,000	\$970,000	32%	43%	75%
\$150,000	\$1,300,000	27%	47%	74%
\$175,000	\$1,600,000	22%	51%	73%
\$200,000	\$2,000,000	19%	54%	73%
\$250,000	\$2,650,000	15%	58%	73%
\$300,000	\$3,300,000	12%	60%	72%

Source: J.P. Morgan Asset Management analysis, 2019. Household income replacement rates are derived from an inflation-adjusted analysis of: Consumer Expenditure Survey (BLS) data (2013-2016); Social Security benefits using modified scaled earnings in 2019 for a single wage earner at age 65 and a spousal benefit at age 62 reduced by Medicare Part B premiums; and 2019 OASDI and FICA taxes. The income replacement needs may be lower for households in which both spouses are working and the second spouse's individual benefits are greater than their spousal benefit. Single household income replacement needs may vary as spending is typically less than a two-spouse household; however, the loss of the Social Security spousal benefit may offset the spending reduction. Percentages and values may not sum due to rounding.0000

What are Monte Carlo simulations?

Monte Carlo simulations incorporate both randomness and repetitiveness to create large samples of observations and minimize the influence of outlier values in returns or the order of returns. By using a series of repeating computations, the simulations create a large number of outcomes for the portfolio, each with an independent path of returns which combined have a specified average and volatility. In our modeling, we use changing, or stochastic, return patterns to generate 10,000 different possible portfolio outcomes.

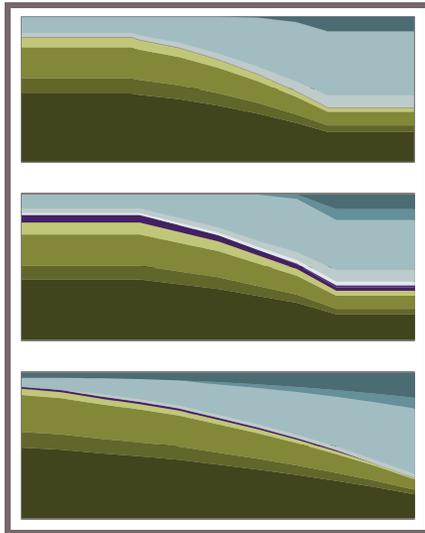
The projections or other information generated by regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results and are not guarantees of future results. Other investments not considered may have characteristics similar or superior to those being analyzed. The results may vary with each use and over time.

Monte Carlo Simulation Process

Objective: Random variables are used as inputs to simulate real life outcomes because markets and how people invest are unpredictable.

1. Pick base glide paths

Choose between glide paths with different asset classes and risk levels at certain ages



2. Run Simulations

Use randomized variables for market expectations and participant investing behaviors

A Long Term Capital Markets Assumptions

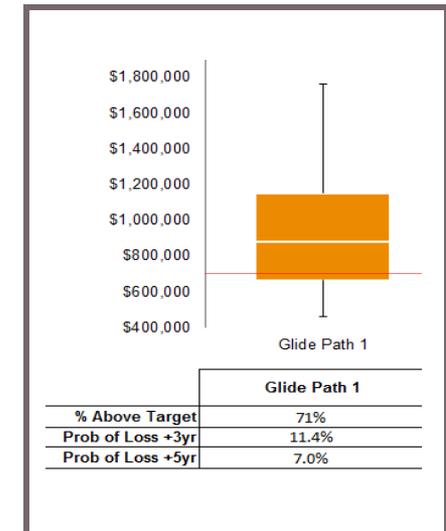
10 to 15 year risk, return, and correlation assumptions on a variety of asset classes and currencies

B Participant Behavior Research

10,000 scenarios based on a range of real participants: Contributions, salary, plan withdrawals

3. Analyse the results

Analyze the results relative to the specified objective & select optimal glide path



Monte Carlo simulations

Monte Carlo Simulations generate 10,000 possible portfolio outcomes using:

- **Different market environments:** each simulation has an independent path of returns, which, when combined, exhibit the average return, volatility and correlation characteristics set forth in our Long-Term Capital Markets Assumptions.
 - Return generator: Asset returns were generated so that future values were dependent on previous values and the long-term mean and volatility levels of the assets remained near their desired levels.
 - Market environment generator: We incorporated correlations among assets so that over time, asset returns maintained the desired relationships. For example, high U.S. equity returns were unlikely to correspond to low or negative international equity returns.
- **Participant Behavior:** In order to best reflect the diversity of behavior in the simulations, we have not assumed “average” contributions or withdrawals, but instead created a distribution of participant behaviors that collectively has the same characteristics as our sample population. To model a participant base that resembled the real world, we generated simulated values for several variables:
 - Participant contribution rate and changes to that rate over time
 - Frequency of salary growth
 - Event and size of loans
 - Event and size of near-retirement withdrawals
 - Event and size of post-retirement withdrawals

For example, if 20% of 60 year olds in the pre-determined data set took withdrawals each year, then about 2,000 of the 10,000 simulations will make withdrawals at age 60.

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Monte Carlo methods are a broad class of computational algorithms that rely on repeated random sampling to obtain numerical results. Their essential idea is using randomness to solve problems that might be deterministic in principle.

TARGET DATE FUNDS. Target date funds are funds with the target date being the approximate date when investors plan to start withdrawing their money. Generally, the asset allocation of each fund will change on an annual basis with the asset allocation becoming more conservative as the fund nears the target retirement date. The principal value of the fund(s) is not guaranteed at any time, including at the target date.

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