

How some target date fund designs continue to miss the mark on providing retirement security to those who need it most



About J.P. Morgan Asset Management Global Multi-Asset Group

For over 30 years the Global Multi-Asset Group (GMAG) has been managing portfolios on behalf of institutional investors including defined contribution and defined benefit pension plans, endowments and foundations. GMAG, which consists of 43 investment professionals with an average of 15 years of industry experience, combines its capital markets, strategic and tactical asset allocation, portfolio construction and active risk budgeting capabilities with one of the broadest product offerings in the industry.

J.P. Morgan's activities extend across asset classes, geographies and proven investment methodologies. This global product palette provides GMAG's experienced investment specialists with access to the ideal low correlation building blocks necessary for structuring efficiently diversified portfolios.

SmartRetirement, our target date program, provides defined contribution plan sponsors and participants with defined benefit quality investment solutions. The GMAG management team draws on their skills and experience in managing asset classes once reserved for our most sophisticated defined benefit plans. With over 20 years of insights on participant behavior, we seek to develop portfolios that help plan participants achieve their retirement savings goals.

Foreword

In 2007, we published *Ready! Fire! Aim? How some target date fund designs are missing the mark on providing retirement security to those who need it most*. With that study, we addressed the question of whether target date strategies were delivering on their full potential to help 401(k) participants meet their retirement funding needs.

Our research analyzed actual participant behavior and found it to be much more varied and volatile than many of the standard industry assumptions about saving patterns. We also examined how this cash flow volatility interacted with market volatility in shaping potential participant outcomes at retirement.

The response to our initial study was positive, and we have updated our analysis with data from 2007 and 2008. This paper discusses our key findings:

- **Several changes in participant saving patterns may be reason for concern.** First, salary raises, on average, have become more uneven. Second, average starting contribution levels have declined and rise more slowly than in the last study. And third, while slightly fewer participants are taking loans from their accounts, those that do require a larger percentage of total portfolio assets.
- **Withdrawal patterns remain unpredictable.** This is true both pre- and post-retirement, but one trend is very clear: Once participants stop working, the majority – more than 80% – withdraw their entire account balances within just a few years.

- **Many target date strategies have too much volatility embedded in their portfolio design.** The markets in 2008 served as a powerful reminder of how potential volatility and downside exposure can determine participant outcomes. In our analysis, investing at controlled levels of risk, through broader diversification and relatively rapid reduction in equity exposure in the years leading up to retirement, continues to increase the potential number of participants reaching their retirement income goals.

We hope you find this research interesting and useful in helping your participants retire with the income they need. We also want to thank our clients for their continued support as well as their engagement with our portfolio management and research teams. The *Ready! Fire! Aim?* series exemplifies the kind of groundbreaking work that results from true partnership.

If you have any questions or would like further information on any of the topics covered in this study, please contact your J.P. Morgan Asset Management representative.

Sincerely,



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Table of contents

1 Foreword

3 Overview

5 Participant behavior patterns

6 Salary

Key finding #1: Salary raises have become more uneven

6 Contributions

Key finding #2: Contribution levels start even lower and rise more slowly

7 Loans

Key finding #3: Slightly fewer participants take loans, but those that do require a larger percentage of total portfolio assets

8 Pre-retirement withdrawals

Key finding #4: There continues to be a wide range of unpredictable pre-retirement withdrawal patterns

9 Post-retirement withdrawals

Key finding #5: A significant number of participants withdraw their entire account balances shortly after they stop working

10 Assessing participant behavior Comparing target date fund designs

11 Data analysis

14 Range of potential outcomes

Key finding #6: Investing at controlled levels of risk – through broader diversification and relatively rapid reduction in equity exposure in the years leading up to retirement – continues to result in the greatest number of participants likely to reach retirement income goals

16 Trend of lower contributions

Key finding #7: The potential long-term effects of lower contribution rates can be significant and reason for concern

17 Assessing these investment results Conclusion

Overview

The financial landscape has changed dramatically since March 2007 when we published *Ready! Fire! Aim? How some target date fund designs are missing the mark on providing retirement security to those who need it most*. We initially wrote that paper because we noted that many plan sponsors were grappling with how to best evaluate different target date strategies. Understanding the complexities behind these strategies can be challenging, and by default, some plan sponsors were using only easily identifiable target date characteristics, such as fee levels and active management versus indexing decisions, to lead their evaluation process. While these are important considerations, they do not directly address the most critical selection issue – whether or not the strategy is designed to accomplish what the plan hopes to achieve for participants.

Our original research was developed to help plan sponsors think about how to best match their plans' goals and objectives with the most appropriate target date strategy performance and volatility expectations. We wanted to base our analysis on real-life

participant usage of 401(k) accounts. To accomplish this, we researched the behavioral factors affecting 401(k) portfolio outcomes based on a rigorous, quantitative examination of participant saving and spending patterns. As recordkeeper to over 350 defined contribution plans with 1.7 million participants, J.P. Morgan Retirement Plan Services provided a robust source of raw data for our analysis.

We looked specifically at two key issues:

1. How realistic is the fund industry's modeling of participant behavior patterns?

We found that participant behavior was much more varied and volatile than many target date fund providers had assumed. Our research showed that a sizable number of participants contributed less, and borrowed and withdrew more, compared to common industry expectations (see Exhibit 1). This cash flow volatility amplified the effect of market volatility and played a significant role in shaping potential retirement outcomes.

Exhibit 1: Participant behavior assumptions from original study

	Simplified industry assumptions	versus...	Reality: J.P. Morgan research findings
Contributions	Rates start at 6%, increase year by year, reaching 10% of salary by age 35.		On average, contribution rates start at 6% and increase slowly, reaching 8% of salary by age 40, and 10% not until age 55.
Salary raises	Participants get a raise every year.		On average, participants get raises every 2 out of 3 years.
Loans	Participants don't borrow.		20% of participants borrow, on average, 15% of account balance.
Pre-retirement distributions	Premature distributions don't happen.		15% of participants over the age of 59½ withdraw, on average, 25% of assets.
In-retirement distributions	Participants withdraw a consistent 4%-5% annually.		The average participant withdraws over 20% per year at or soon after retirement.

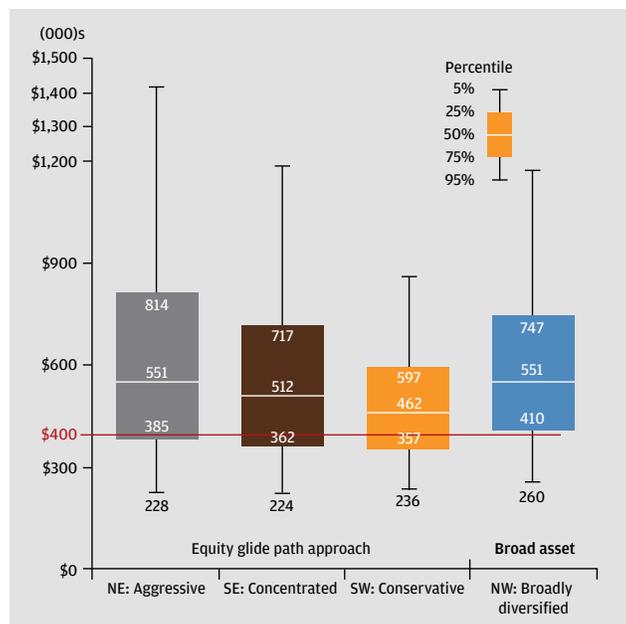
Sources: AllianceBernstein "Target-date Retirement Funds – A Blueprint for Effective Portfolio Construction," October 2005; J.P. Morgan Retirement Plan Services participant database, 2001-2006.

2. What is the target date portfolio design that may best stand up to the stresses of real-life saving and investing?

Using these findings, we assessed the outcomes of four different target date fund designs based on actual funds in the marketplace, including JPMorgan SmartRetirement Funds. It quickly became clear that the volatility embedded in many target date fund designs was counterproductive, especially in combination with participants' volatile cash flows (see Exhibit 2).

We believe a prudent measure for target date fund success is to maximize the number of individual participants who reach the minimum level of income replacement at the point of retirement. To quantify this objective for our research, we examined the target date fund design most likely to help the highest number of retirees reach an annuity funding level sufficient to maintain their pre-retirement lifestyle. By analyzing simulations of 10,000 participant portfolios using a wide range of behavior patterns and market scenarios, our study found that broadly diversified strategies – in which extended and alternative assets comprised over 20% of the portfolio for the entire investment horizon – may help the largest number of participants reach retirement income security. This held true even after accounting for the interaction of volatile participant behavior with volatile investment returns.

Exhibit 2: Range of expected account balances at retirement from original study (based on J.P. Morgan participant research findings)



Results are based on analysis derived from J.P. Morgan Asset Management long-term capital market assumptions – 2006, J.P. Morgan Asset Management and industry prospectuses.

We received a great deal of positive response to the original *Ready! Fire! Aim?* findings. Now, less than three years later, we find the industry facing a starkly different investment environment. Recent oft-reported “green shoots” of economic revival notwithstanding, the current recession has had a significant impact on retirement investors.

- **There have been steep declines in retirement assets.** About \$2.7 trillion was lost in 401(k) and individual retirement accounts between September 2007 and May 2009.¹
- **These losses have been compounded by the difficult housing market.** In 2008 alone, the U.S. housing market lost \$3.3 trillion in value, and almost one in six owners with mortgages owed more than their homes were worth.²
- **Investors at or near retirement have been particularly susceptible to these market shifts.** A report from the Center for Economic and Policy Research showed that turmoil in the housing and stock markets now threatens the retirement security of tens of millions of baby boomers who look to their houses and investments as sources of retirement wealth.³ Related findings come from a nationwide survey from Pew Research Center, which reported that nearly four in ten adults who are working past the median retirement age of 62 say they have delayed their retirement because of the recession, and among workers ages 50 to 61, 63% say they might have to push back their expected retirement date because of current economic conditions.⁴

Against this backdrop, we wanted to reassess our initial findings to see if they still held true under the current market conditions. We also wanted to evaluate how the extreme markets of 2008 may shape long-term outcomes of various target date fund designs. While many of the updated findings were consistent with our earlier study, there were several key points of interest that we examine in the sections that follow.

1. Source: Urban Institute. “Fact Sheet on Retirement Policy: Retirement Account Balances,” November 2009.
2. Source: Zillow.com as reported by Bloomberg. “U.S. Property Owners Lost \$3.3 Trillion in Home Value (Update1),” February 3, 2009.
3. Source: Center for Economic and Policy Research. “Housing Market Meltdown and Stock Market Collapse Threaten Retirement Wealth of Millions of Baby Boomers,” February 25, 2009.
4. Source: Pew Research Center. “Recession Turns a Graying Office Grayer,” September 3, 2009.

Participant behavior patterns

As we discussed in detail in our original study, plan sponsors need to ensure they understand all the important factors that may affect whether participants will be able to generate sufficient savings for a safe retirement. A significant driver of success is how the size and timing of portfolio inflows interact with the size and timing of market returns. Participants' initial choices around contribution levels and asset allocation, as well as their continual actions (e.g., contribution changes, loans and withdrawals), may have a material impact on the volatility of portfolio cash flows and investment outcomes.

Our original study examined participant behavior between 2001 and 2006, and found persistent and wide variations in saving and investment behaviors, which often compromised the likelihood of participant success. For this report, we updated our research using participant data for 2007 and 2008, and examined changes in four critical areas: salary growth, contribution levels, loans and withdrawals (original analysis averages are based on rolling five years of data).

2007 and 2008 participant behavior findings

- Salary raises have become more uneven.
- Contribution levels start even lower and rise more slowly.
- Slightly fewer participants take loans, but those that do require a larger percentage of total portfolio assets.
- There continues to be a wide range of unpredictable pre-retirement withdrawal patterns.
- A significant number of participants withdraw their entire account balances shortly after they stop working.

Exhibit 3: Participant behavior patterns

J.P. Morgan research findings	Original 2001-2006 analysis	2007 trends	2008 trends
Salary raises	On average, participants get raises every 2 out of 3 years.	On average, participants get raises every 2 out of 3 years.	On average, participants get raises every other year.
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 slowly, reaching 8% of salary by age 40, and 10% not until age 55.	On average, contribution rates start at 5.7% and increase even more slowly, reaching 8% of salary by age 45, and 10% not until age 57.
Loans	20% of participants borrow, on average, 15% of account balance.	18% of participants borrow, on average, 20% of account balance.	17% of participants borrow, on average, 25% of account balance.
Pre-retirement distributions	15% of participants over the age of 59½ withdraw, on average, 25% of assets.	16% of participants over the age of 59½ withdraw, on average, 25% of assets.	15% of participants over the age of 59½ withdraw, on average, 27% of assets.
Post-retirement distributions	The average participant withdraws over 20% per year at or soon after retirement.	The average participant withdraws over 18% per year at or soon after retirement.	The average participant withdraws over 20% per year at or soon after retirement.

Source: J.P. Morgan Retirement Plan Services participant database, 2001-2008.

Salary

Key finding #1: Salary raises have become more uneven

Salary is one of the most important factors in assessing participant behavior because it defines both the dollar levels of contributions and the standard of living that needs to be replaced in retirement. Given the pressures on the U.S. labor market over the last few years, we were interested to see how the recession has impacted participants' salary growth.

Unsurprisingly, we found that fewer people were getting raises in any given year. In our original research, the average participant received a raise about two out of every three years, or about 67% of the time. This figure declined somewhat in 2007 to 63%, with the average participant still receiving a similar, if slightly lower, raise frequency. In 2008, however, the frequency fell to 50%, and the average participant was only awarded a raise every other year.

This data illustrates that while some participants are seeing their standard of living increase, many are not. In fact, 50% received no wage increase between 2007 and 2008 – a sizeable percentage of the participant population.

Understanding participant behavior

Behavioral research offers some insights into why employees do not save enough. Several underlying principles of human behavior – including the temptation for immediate gratification, aversion to losses and the tendency toward inertia – have been found as psychological barriers to increasing contribution rates.

Plan sponsors, however, may be able to use these behaviors to actually help increase contribution rates through the effective use of automatic enrollment and escalation programs. The temptation for immediate gratification, for example, prevents people from saving today, but research suggests it does not prevent them from committing to saving more in the future. Similarly, inertia typically prevents people from revising their saving rate, and automatic increases may actually make use of inertia to help participants save more. In addition, by synchronizing contribution increases with salary raises, employees never see their take-home pay decline, and hence they are unlikely to view saving increases as a loss.

Contributions

Key finding #2: Contribution levels start even lower and rise more slowly

There is a wide range of research that illustrates how the average American is simply not saving enough for retirement. A rule of thumb among many financial planners holds that annual contributions between 10-12% are necessary to ensure an adequate retirement.

Unfortunately, our original data found that average participant contributions fell far below these hurdles. Contributions started, on average, at 6% of salary, increased to 8% by age 40, and reached 10% at age 55. Given the economic slowdown and difficult equity markets, we were interested to see if there were significant changes in contribution levels from the original research.

While there were no changes to contribution rates in 2007, there were notable declines in 2008:

- Initial contribution levels of those 20-25 years of age fell, on average, to 5.7%.
- The average time period to reach 8% stretched five years, from age 40 in the original data to age 45.5.
- The average time period to reach 10% increased two years, from age 55 in 2006 to age 57 in 2008.

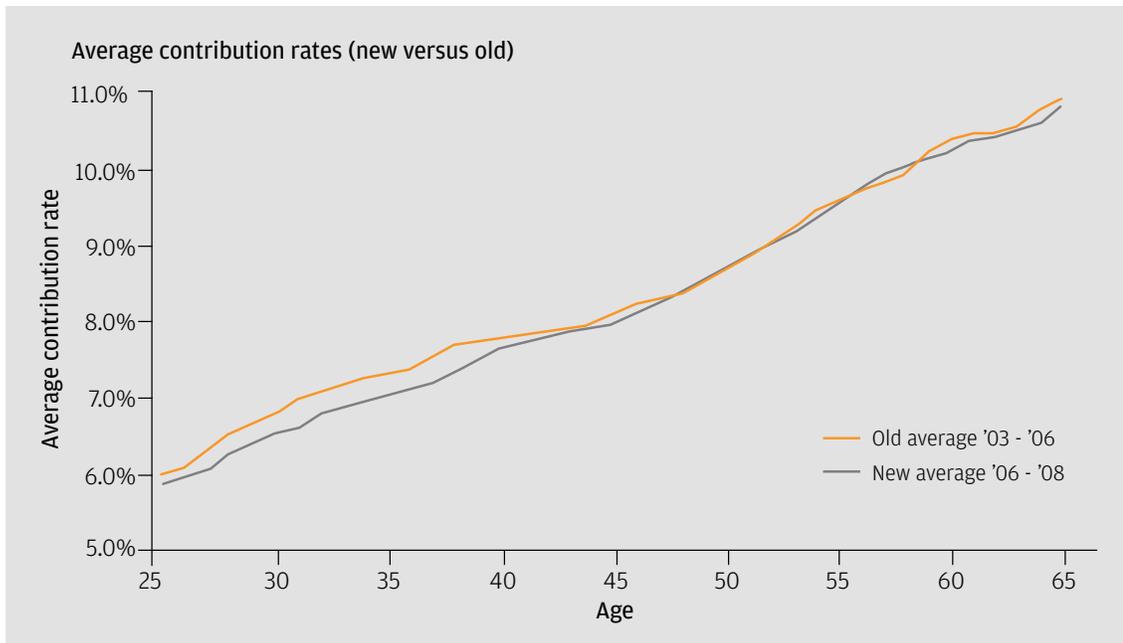
These differences may seem insignificant, but they may have sizable compounding effects (please see page 16 for a more detailed analysis of the potential long-term ramifications of these saving patterns).

Also, it is important to note that these changes were primarily driven by the 63% increase in the number of participants who lowered or stopped their contributions, up from 8% of participants in 2006 to 13% of participants in 2008. This negative shift was most apparent with younger participants (see Exhibit 4). This potentially disturbing trend could force younger investors to play a difficult game of “retirement catch-up” in their 40s and 50s. It also limits their ability to maximize the long-term investment potential of higher risk/reward assets without incurring inappropriate risk levels as they approach retirement.

Note: We want to note that increased use of auto enrollment in plans could have a negative impact on average initial savings rates, especially while the average auto enrolled contribution level starts at 3%. However, between 2006 and 2008, there was an even increase of about 25% in adoption of auto enrollment each year, while we observed a decrease in average initial contribution rates only by the end of 2008.

Source: Vanguard, How America Saves, 2007, 2008 and 2009

Exhibit 4: Average annual contribution by age



Source: J.P. Morgan Retirement Plan Services participant database, 2001-2008.

Loans

Key finding #3: Slightly fewer participants take loans, but those that do require a larger percentage of total portfolio assets

While many industry models assume that participants do not borrow against their 401(k) portfolios, our original study showed that, on average, 20% of participants actually had a loan outstanding in any given year. We were happy to find this figure fell to 18% in 2007 and 17% in 2008. However, the percentage of the average loan amount unfortunately climbed by 67%, from 15% of overall account balances in 2006 to 20% and 25% in 2007 and 2008, respectively. This increase may largely be the result of lower portfolio balances that require a higher loan percentage to match the same dollar figure from a few years earlier.

Balancing economic reality with retirement planning

It is easy to see how a sizable number of participants looked to their retirement accounts for their liquidity needs. Numerous studies show that most Americans are not only underfunding their retirement accounts, but fall short in all areas of savings.

As we reviewed our research data, we noted that participant behavior started to change when the housing market came under pressure, and these changes gained momentum as credit became more difficult to obtain. The hard reality may be that participants simply had no other place to go to access necessary cash.

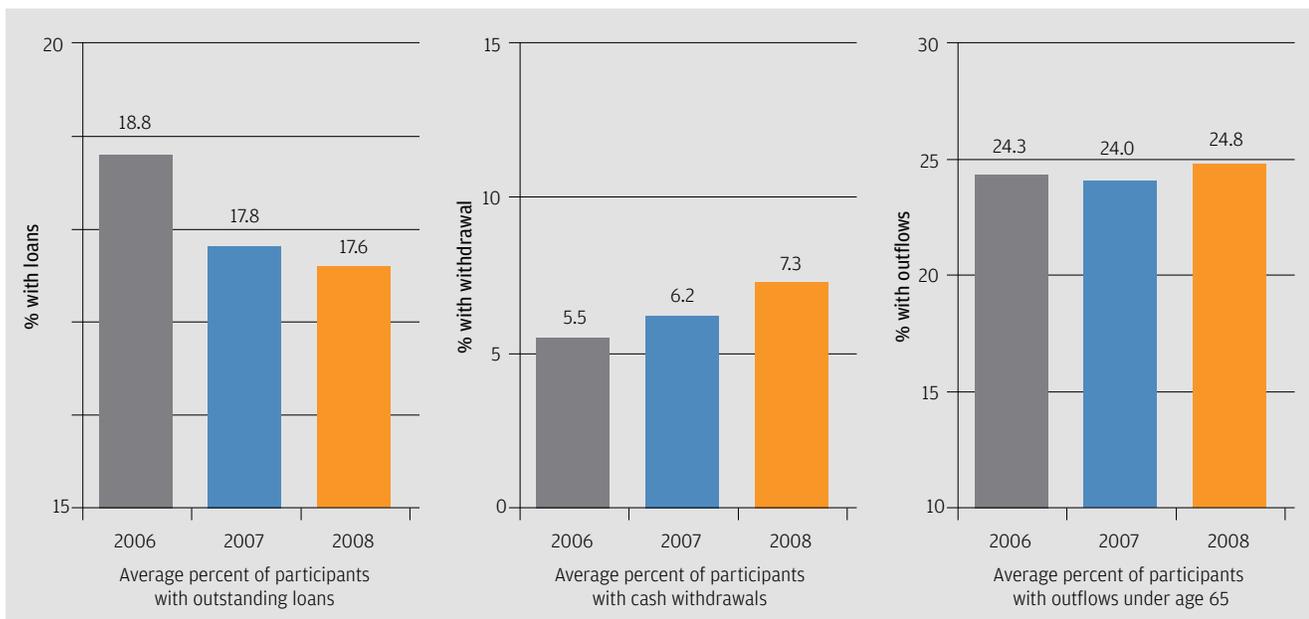
Pre-retirement withdrawals

Key finding #4: There continues to be a wide range of unpredictable pre-retirement withdrawal patterns

Withdrawals, of course, have the most significant impact on cash flow volatility because they permanently remove assets from the account. Our analysis highlights that there is a wide range of withdrawal patterns both before and during retirement. This makes it extremely problematic to assume that participants will stay fully invested or to accurately predict when they are likely to access their account balances.

Our original study showed that pre-retirement distributions were substantially higher than the average industry assumption. According to our 2006 data, once participants reached age 59½, approximately 15% withdrew, on average, 25% of their assets annually. Offsetting the slight decrease in loan levels noted above, withdrawal levels were slightly higher in 2007 (when 16% of participants withdrew, on average, 25% of their assets) and in 2008 (when 15% withdrew, on average, 27% of their assets). Of even more interest, however, is the sharp 33% rise in participants younger than 65 making withdrawals, increasing from 5.5% of participants in 2006 to 7.3% in 2008.

Exhibit 5: Loans and cash withdrawals under the age of 65



Source: J.P. Morgan Retirement Plan Services participant database, 2006-2008.

Post-retirement withdrawals

Key finding #5: A significant number of participants withdraw their entire account balances shortly after they stop working

The markets in 2008 refocused concerns about appropriate equity allocations for target date strategies, particularly at and near retirement. Much of this debate centers on whether strategies should focus on income replacement at retirement by maximizing savings up to retirement or establishing a lifelong investment program that maximizes savings throughout retirement. Target date managers who pursue the latter approach typically argue that higher equity allocations are necessary throughout the glide path – even through the target date – to help maintain savings throughout retirement.

Prior to our original study, conventional wisdom held that once participants reached age 65, they consistently withdraw 4-5% from their accounts on an annual basis. Our initial research found

post-retirement distributions to be dramatically higher, with the average participant withdrawing more than 20% per year at or soon after retirement. This average fell slightly in 2007 – to just over 18% – but rose back to more than 20% in 2008 (see Exhibit 6).

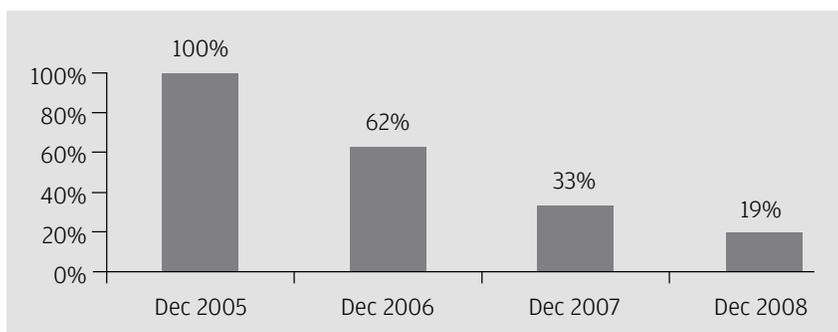
Given these withdrawal trends, we were interested to see how many participants remained with their plans once they retired. We examined the withdrawal patterns of participants over age 65 who stopped working in 2006, and the vast majority – more than 80% – withdrew their entire account balances within just three years (see Exhibit 7). Based on this analysis, we find it extremely problematic for target date strategies to develop asset allocation models that assume participants use their target date strategies for their post-retirement savings.

Exhibit 6: Post-retirement distributions

J.P. Morgan research findings	Original 2001-2006 analysis	2007 trends	2008 trends
Overall post-retirement distributions	The average participant withdraws over 20% per year at or soon after retirement.	The average participant withdraws over 18% per year at or soon after retirement.	The average participant withdraws over 20% per year at or soon after retirement.
Rollover distribution	15% of participants.	15% of participants.	14% of participants.
Cash lump sum distribution	8% of participants.	11% of participants.	11% of participants.
Cash partial distribution	13% of participants withdraw, on average, 20% of account balance.	11% of participants withdraw, on average, 18% of account balance.	10% of participants withdraw, on average, 20% of account balance.

Source: J.P. Morgan Retirement Plan Services participant database, 2001-2008.

Exhibit 7: Percentage of participants over age 65 who stopped working in 2006 and remained invested in their plan



Source: J.P. Morgan Retirement Plan Services participant database, 2005-2008.

Assessing participant behavior

The one clear trend across these findings is that cash flow volatility continues to be a major theme for a sizable number of participants:

- Participants continue to start saving too late and take too long to reach appropriate contribution levels.
- Across-the-board salary expectations are too optimistic based on how uneven raises have become.
- A sizable number of participants still take loans against their 401(k)s, and loan amounts have increased significantly compared to account balances.
- There continues to be a wide range of unpredictable withdrawal patterns; however, within several years of retirement, the majority of portfolio assets typically have been withdrawn.

In light of how difficult it is to change behavior, plan sponsors must do all they can to address behavioral influences using other measures. For example, plan sponsors can be proactive through automatic enrollment and contribution escalation. Equally important is the careful selection of a target date design that addresses these more realistic assumptions about participant contributions, loans and withdrawals.

Performance analysis findings

- Investment outcomes were generally lower using 2008 participant behavior compared to projections using 2006 data, given lower contribution and higher withdrawal patterns.
- Investing at controlled levels of risk – through broader diversification and relatively rapid reduction in equity exposure in the years leading up to retirement – continues to increase the number of participants likely to reach retirement income goals.
- The potential long-term effects of lower contribution rates can be significant and reason for concern.

Comparing target date designs

As we discussed in our original study, we believe that target date strategies represent one of the most important retirement investment strategies available to participants. The potential benefits of these strategies – professional management, easy-to-access asset class diversification and an increasingly conservative risk/reward profile as retirement approaches – represent significant advancements for defined contribution investments.

Our research, however, makes it clear that plan sponsors need to carefully weigh how different approaches to fundamental portfolio design may result in significantly different performance results. Long-term return potential is a critical component of this analysis, but equally important is how much volatility is embedded in the portfolio. Both factors are largely shaped by two key portfolio decisions: diversification level and equity exposure. How the manager approaches these fundamental issues ultimately determines the potential for participants to reach retirement income goals.

In our original analysis, we found that target date funds that relied too heavily on equity performance placed participants at significant risk by increasing potential overall volatility and exposing assets to steep market declines, especially in the crucial five to ten years before retirement. Portfolios that tempered risk purely with more conservative holdings were less volatile, but they also drastically curtailed long-term return potential.

Strategies that focused on increasing risk efficiency through broader diversification and relatively rapid reduction in equity exposure in the years leading up to retirement followed a more prudent path. By including asset classes such as emerging market equity, emerging market debt, direct real estate, REITs and high-yield fixed income, these portfolios reduced expected volatility without sacrificing long-term return potential.

This helped to strengthen the possibility that participants could meet their income replacement goals, largely as a result of three important factors:

1. Extended asset classes may offer attractive equity-like returns over distinct market cycles, often when equities are underperforming. Although volatile on their own, collectively they may help mitigate equity risk without restricting potential long-term performance.

2. Extended asset classes may offer the flexibility to be less reliant on equity markets, particularly in the years leading up to retirement when making disproportionately large equity bets can be risky.

3. Lower volatility may help minimize the long-term impact of negative participant behaviors, such as loans, withdrawals and contribution shortfalls. We found that increased cash flow volatility significantly amplified the risks of market volatility, and minimizing portfolio fluctuations helped a larger number of participants meet their retirement income goals across a broader range of ideal and less optimal saving patterns.

We conducted our original analysis during a very strong market environment, but our focus on volatility and participant outcomes proved timely. The markets in 2008 served as a powerful real-world example of how critical it is to carefully examine the potential downside exposure embedded in different target date designs. As we updated our research, we were interested to see if our original findings still held true given the evolving patterns we noted in participant saving behaviors, as well as the recent extreme market environment.

Data analysis

We began our evaluation by examining different types of target date asset allocation strategies. We employed the framework used by J.P. Morgan Asset Management's Target Date CompassSM, which maps target date strategies into one of four categories based on portfolio compositions of actual funds in the marketplace:

- **The Northeast (NE) quadrant represents aggressive strategies** with higher equity levels at retirement and a broader range of portfolio diversification, including a higher number of extended asset classes.
- **The Southeast (SE) quadrant consists of concentrated strategies** with higher equity levels at retirement and a focus primarily on core asset classes.
- **The Southwest (SW) quadrant captures conservative strategies** with lower equity levels at retirement and a focus primarily on core asset classes.
- **The Northwest (NW) quadrant includes strategies such as JPMorgan SmartRetirement Funds** with lower levels of equity exposure at retirement and a broader range of portfolio diversification, including a higher number of extended asset classes.

Equity path and glide path differences

Many investors focus on equity exposure when evaluating different glide path strategies. As a glide path lowers its higher risk/reward allocations, it typically lowers its equity exposure, but there are other higher risk/reward investments that seek to compete with equities on expected long-term returns, with little or no correlation to equity markets. While adding these to a strategy can potentially lower overall volatility without sacrificing returns, plan sponsors need to examine how a target date strategy shifts all higher risk/reward allocations (i.e., the glide path) in addition to considering how reliant a strategy is on equity performance (i.e., the equity path).

We then assessed the typical glide paths behind these strategies (see Exhibit 9), as well as the expected risk/reward characteristics associated with each type of portfolio (see Exhibit 10). Consistent with the findings from our original study, the NW-SmartRetirement, NE-Aggressive and SE-Concentrated portfolios all offered expected returns at the high end of the range, significantly outperforming the SW-Conservative portfolio. Analyzing how these returns were derived, however, uncovered key differences behind each strategy. Both the NE-Aggressive and SE-Concentrated portfolios have higher equity allocations across their glide paths, even up through their target dates. This resulted in significantly higher expected volatility, which could expose participants to more extreme

downside risk. At the other end of the spectrum, the SW-Conservative portfolio tempers equity volatility but does so purely with higher cash and fixed income allocations. This significantly curtailed the strategy’s expected long-term returns. The NW-SmartRetirement portfolio seeks to manage volatility more efficiently by using a broader range of asset classes than the degree found in many target date strategies. This approach captured expected returns similar to the NE-Aggressive and SE-Concentrated portfolios but with lower equity exposure and lower expected volatility. This smoothed out anticipated performance and helped establish a relatively steadier path to retirement without sacrificing long-term return potential.

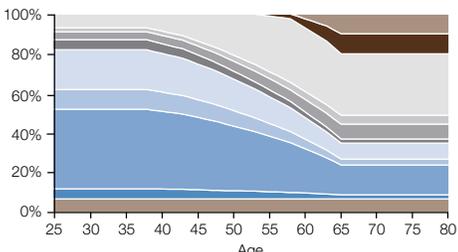
Exhibit 8: Target date types defined by J.P. Morgan Asset Management’s Target Date Compass

NW: JPMorgan SmartRetirement Fund	NE: Aggressive TDF
<p>Quadrant characteristics:</p> <ul style="list-style-type: none"> • Lower equity level at retirement • Higher number of asset classes – tend to include a higher number of extended asset classes <p>Investment orientation:</p> <ul style="list-style-type: none"> • Focus on ensuring income replacement at retirement • Focus on managing volatility more efficiently • Believe higher diversification may potentially create more optimal portfolios 	<p>Quadrant characteristics:</p> <ul style="list-style-type: none"> • Higher equity level at retirement • Higher number of asset classes – tend to include a higher number of extended asset classes <p>Investment orientation:</p> <ul style="list-style-type: none"> • Focus on managing longevity risk post-retirement • Focus on managing growth more efficiently • Believe higher diversification may potentially create more optimal portfolios
SW: Conservative TDF	SE: Concentrated TDF
<p>Quadrant characteristics:</p> <ul style="list-style-type: none"> • Lower equity level at retirement • Lower number of asset classes – tend to maintain focus on core asset classes <p>Investment orientation:</p> <ul style="list-style-type: none"> • Focus on ensuring income replacement at retirement • Focus on managing volatility • Believe lower diversification may provide appropriate levels of portfolio optimization 	<p>Quadrant characteristics:</p> <ul style="list-style-type: none"> • Higher equity level at retirement • Lower number of asset classes – tend to maintain focus on core asset classes <p>Investment orientation:</p> <ul style="list-style-type: none"> • Focus on managing longevity risk post-retirement • Focus on managing growth • Believe lower diversification may provide appropriate levels of portfolio optimization

The descriptions here generally represent broad characteristics of strategies within each quadrant. They are not intended to be absolute.

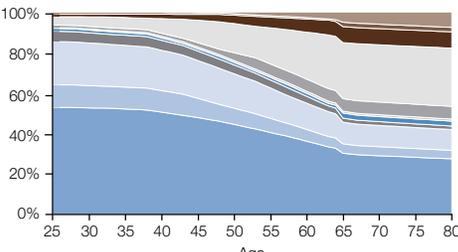
Exhibit 9: Comparing asset allocation glide paths

NW: JPMorgan SmartRetirement



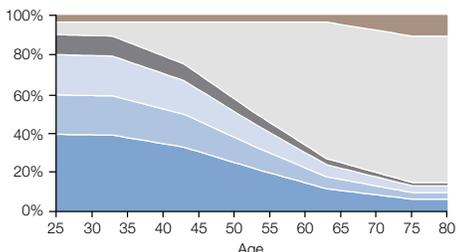
Asset class	25 yrs	65 yrs	80 yrs
Cash	0%	10%	10%
TIPS	0%	10%	10%
U.S. fixed-income	7%	31%	31%
Emerging debt	2%	4.5%	4.5%
High-yield	4%	7.5%	7.5%
Emerging equity	5%	2%	2%
EAFE	20%	8%	8%
U.S. small cap	10%	3%	3%
U.S. large cap	40%	15%	15%
REIT	5%	2%	2%
Real estate	7%	7%	7%

NE: Aggressive



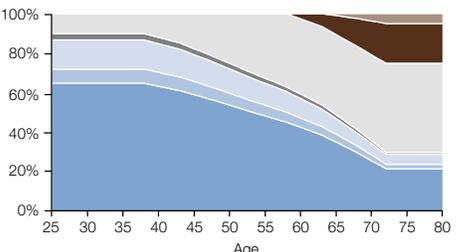
Asset class	25 yrs	65 yrs	80 yrs
Cash	0%	5%	8%
Comdty	1%	2%	2%
TIPS	1%	8%	8%
U.S. fixed-income	4%	28%	30%
Emerging debt	1%	1%	1%
High-yield	1%	6%	6%
Emerging equity	5%	2%	2%
EAFE	21%	11%	1%
U.S. small cap	11%	5%	4%
U.S. large cap	53%	30%	27%
REIT	1%	3%	2%

SW: Conservative



Asset class	25 yrs	65 yrs	80 yrs
Cash	4%	5%	11%
U.S. fixed-income	6%	70%	74%
Emerging equity	10%	3%	2%
EAFE	20%	6%	3%
U.S. small cap	20%	6%	3%
U.S. large cap	39%	11%	7%

SE: Concentrated



Asset class	25 yrs	65 yrs	80 yrs
Cash	0%	1%	5%
TIPS	0%	10%	20%
U.S. fixed-income	10%	40%	45%
Emerging equity	3%	2%	1%
EAFE	15%	8%	5%
U.S. small cap	7%	4%	2%
U.S. large cap	65%	35%	22%

Sources: J.P. Morgan Asset Management and industry prospectuses.

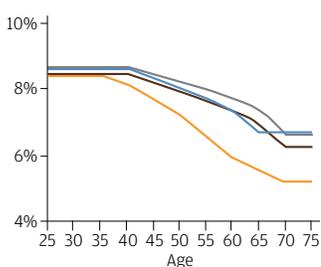
"Equity glide path" includes U.S. equity (large and small), EAFE, Emerging equity and REITS.

"Broad asset allocation glide path" includes all assets with expected volatility greater than 7.5%. Includes all asset classes listed above except cash, U.S. investment grade bonds and TIPS.

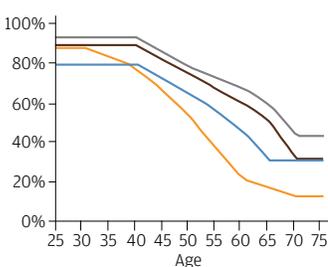
The NE glide path has been modified to reflect changes in the marketplace since our original paper was written.

Exhibit 10: Target date strategy characteristics

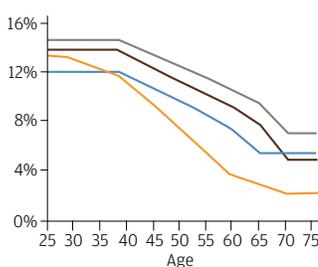
Panel 1: Expected returns



Panel 2: Allocation to equity assets



Panel 3: Expected volatility



— NE: Aggressive
 — SE: Concentrated
 — SW: Conservative
 — NW: SmartRetirement

Results based on analysis derived from J.P. Morgan Asset Management long-term capital market assumptions - 2008, J.P. Morgan Asset Management and industry prospectuses.

Range of potential outcomes

Key finding #6: Investing at controlled levels of risk – through broader diversification and relatively rapid reduction in equity exposure in the years leading up to retirement – continues to result in the greatest number of participants likely to reach retirement income goals

The past several years have illustrated how misleading short-term performance can be when evaluating target date strategies. While NE-Aggressive and SE-Concentrated portfolios tended to do extremely well during the strong equity market of 2006, their higher equity allocations exposed participants to extreme downside in 2008. Conversely, 2008 performance for the SW-Conservative portfolio was relatively strong. The strategy's focus on cash and fixed income served participants well during this extreme market environment, but it also significantly restricts the strategy's long-term upside potential, which may leave participants ultimately short of their retirement income goals.

We believe an effective target date strategy assessment requires evaluating results over a much longer time horizon. Our simulation was designed to track a lifetime of investment patterns across a range of different market environments. The results compared potential retirement outcomes (in current dollars) using the updated participant behavior patterns from 2008. Exhibit 11 illustrates our findings.

Investment outcomes using 2008 saving patterns were generally lower than the projections using 2006 data. We had expected this outcome given the lower contributions and higher withdrawals noted in the 2008 analysis. Broader comparative trends, however, were very similar to our earlier research.

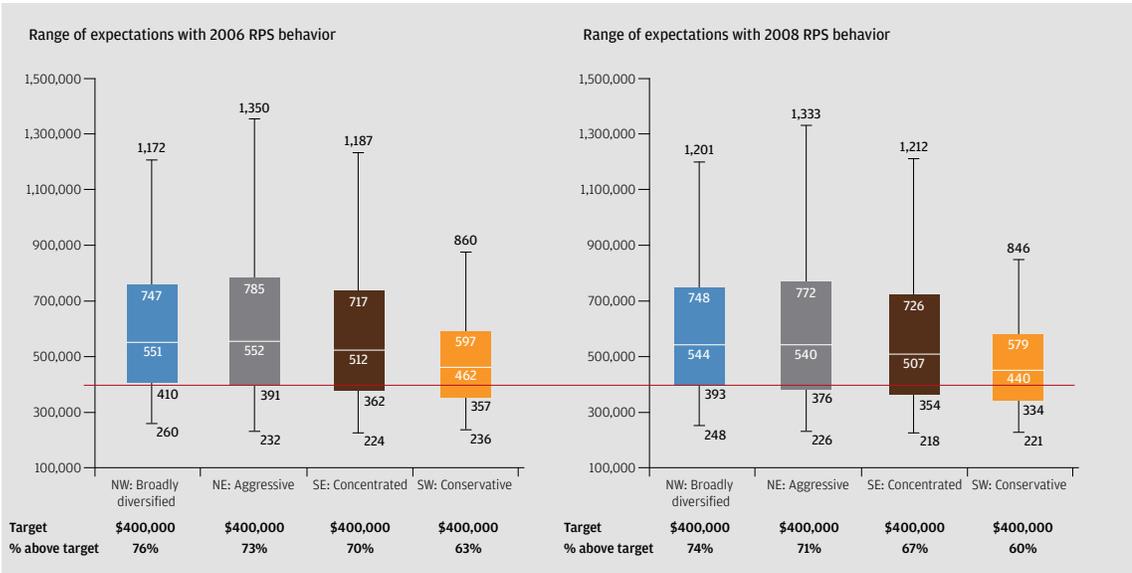
Using these glide paths, we then analyzed potential retirement outcomes for each target date archetype by combining our findings on participant behaviors with various market scenarios. Similar to our earlier research, our analysis included a statistical simulation of 10,000 participants to project a range of expected retirement account balances at age 65 (for a more detailed description about the Monte Carlo analysis method used in this evaluation, please see Appendix 2 in the original study).

Each employee started with the same salary, but the potential outcome ranges were actually quite wide. This is because we included a broad range of possible market conditions in the simulations, from strong rallies to market crashes. We also included all types of participant saving patterns based on the trends we noted earlier, from investors who contributed consistently and left accounts untouched, to those who saved more erratically, borrowed and/or made early withdrawals.

Forward-looking analysis

Our portfolio simulations used forward-looking capital market assumptions, rather than historical returns, based on J.P. Morgan Asset Management's long-term capital market outlooks. This asset class analysis is used by many institutional investors, including pension plans, who employ it to develop and support their anticipated return assumptions for financial reporting purposes.

Exhibit 11: Range of expected account balances at retirement



A guide to the “box-and-whisker” charts

The box marks the range of the 25th, 50th (median) and 75th percentile outcomes, from top (best) to bottom (worst). The whiskers reaching out from the top and bottom of the box show the range up to the 5th and down to the 95th percentiles of the distribution of outcomes. As the dispersion of returns increases, the “box-and-whisker” becomes more elongated.

Source: J.P. Morgan Retirement Plan Services participant database, 2006-2008.

The NE-Aggressive portfolio, with its higher equity allocations, performed better than the other portfolios under ideal market conditions and with ideal participant behaviors. It led the range of outcomes on the upside - with the top 25% of projected account balances over \$772,000 and the top 5% over \$1.3 million. This portfolio strategy seeks the highest return and risk, and thus it would be expected to outperform on the upside, benefiting the most from the simulations that contained the strongest markets. However, it also appeared less efficient in its use of risk, evidenced in its more extreme results on the downside.

The SE-Concentrated portfolio also performed well under ideal market conditions and with ideal participant behaviors, again a result of higher reliance on equity returns. However, unlike the NE-Aggressive portfolio, which includes extended asset classes to help supplement equity performance, the SE-Concentrated portfolio's glide path focuses on equity exposure for its high risk/reward allocation. As a result, its downside exposure under difficult market scenarios and less than ideal participant behaviors was the worst across strategies.

The maximum upside for **the SW-Conservative portfolio**, with its heavy reliance on cash and traditional fixed income, was much lower than the other portfolios. In fact, the majority of its outcomes were well below the other strategies, with the exception of its maximum downside, where it outperformed the SE-Concentrated portfolio.

While **the NW-SmartRetirement portfolio's** upside potential was comparable to the NE-Aggressive and SE-Concentrated portfolios, of more interest was its tighter range of outcomes. This is primarily a result of the strategy's focus on risk-adjusted performance. In addition, its sophisticated approach to risk efficiency kept the portfolio's potential outcomes from shifting lower on the expected value scale, in contrast to the consistently lower outcomes of the SW-Conservative portfolio.

Crossing the retirement finish line

In Exhibit 11, a red line crosses all four outcomes at \$400,000. In our analysis, the population of retirees earned, on average, \$65,000 (in current dollars). Conventional wisdom holds that people can maintain their working years' lifestyle with around 80% of their working income. A more rigorous analysis arrives at a replacement rate of about 77% for working incomes of around \$65,000, due to lower income tax rates in retirement and proportionally greater Social Security benefits. If Social Security provides approximately 43% of this replacement income, the remaining rate declines to about 34%. The red line represents the asset threshold needed to purchase an annuity to replace 34% of a \$65,000 working income in late 2008. This helps establish a baseline of measuring plan success for providing a minimum level of income replacement at retirement.

When analyzing these results, we believe plan sponsors should focus most of their attention on the outcomes for participants who end up below the median, particularly below this baseline. As a fiduciary, do you want to select a target date strategy that excels only on the upside, when stock markets are strong and participants are making maximum contributions? Or do you want to provide a broad base of participants with an investment strategy that performs well under many market conditions and gives the greatest number of participants the best chance of income replacement in retirement?

Source: The Aon Consulting/Georgia State University 2008 Retirement Income Replacement Ratio Study, Aon Consulting.

Note: Our analysis is based on a participant age 65 with a non-working spouse age 62. Annuity amounts assume a 4.75% return and 2.5% inflation rate. Academic research and industry pricing center around these numbers but can vary dramatically. Annuity amounts are inflation-adjusted and represented in today's dollars.

Quantifying the pain of downside risk

The pain of having less retirement income, say, \$5,000 per year below an equivalent working income, is far greater than the benefit of a \$5,000 per year surplus. In fact, by applying a methodology developed by behavioral economists Daniel Kahneman and Amos Tversky, we have found the investor pain of each dollar deficit to be about 2.5 times the pleasure of each dollar surplus.* To illustrate this point, imagine yourself at a cafeteria at lunchtime. A cheeseburger costs \$4, and you have \$5. You can get lunch and also a cookie. If you only have \$3, you can't afford the cheeseburger at all. Having \$1 too little hurts far more than the extra \$1 helps. Consider the cafeteria scenario, on a far bigger scale, in retirement.

* Kahneman, Daniel, and Amos Tversky, 1979, Prospect Theory: An Analysis of Decision Under Risk, *Econometrica* 47, 263-91.

By investing at controlled levels of risk – through broader diversification and relatively lower equity exposure in the years leading up to retirement – the SmartRetirement portfolio seeks to lower volatility without sacrificing long-term return potential. In our projected outcomes, this approach provided the most participants entering retirement with at least the minimum level of income replacement required to maintain their standard of living:

- The SmartRetirement strategy helped approximately 74% of participants meet their replacement income goals, compared to 71% in the NE-Aggressive portfolio, 67% in the SE-Concentrated portfolio and 60% in the SW-Conservative portfolio.

- The strategy posted median and 75th percentile outcomes higher than all three other portfolios.
- It also outperformed the other portfolios for participants unlucky enough to fall in the bottom quartile of returns, either as a result of difficult markets or poor investment behaviors.

For a plan with 10,000 participants, these percentage differences translate to an expected 300 to 1,400 more individuals reaching their retirement goals under the SmartRetirement strategy (see Exhibit 12).

Exhibit 12: Additional participants expected to cross the income replacement goal with the SmartRetirement design (plan with 10,000 lives; account balance goal of \$400,000)*

Other target date designs		SmartRetirement	
Strategy	Expected success rate	Expected success rate	Expected participant impact
NE-Aggressive	71%	74%	3% or 300 more successes
SE-Concentrated	67%	74%	7% or 700 more successes
SW-Conservative	60%	74%	14% or 1,400 more successes

*Results are based on analysis derived from J.P. Morgan Asset Management long-term capital market assumptions - 2008, J.P. Morgan Asset Management and industry prospectuses. See Exhibit 3 for participant assumptions.

What if the trend of lower contribution patterns continues?

Key finding #7: The potential long-term effects of lower contribution rates can be significant and reason for concern

As we developed our analysis, we were troubled by the lower average contribution rates compared to the findings from our earlier study, which were already, arguably, too low. The only way to be certain of retiring with more assets is to save more, and we wanted to further analyze how potential long-term outcomes might be restricted by lower starting saving rates and slower contribution increases.

As a starting point, we used the average participant contribution rate from our original 2001-2006 analysis, starting savings at 6% a year with annual increases of 0.5% until reaching 10% (a rate of savings increase much higher than we actually observed). We then looked at three additional scenarios and applied each one to the SmartRetirement range of participant outcomes. These scenarios isolate the effects of savings rates and do not reflect the impacts of loans or withdrawals:

- **Scenario 1:** Savings start at 5.5% and increase annually by 0.5% until reaching 10%.

- **Scenario 2:** Savings start at 6% and increase by only 0.25% annually, taking twice as long to reach 10%.
- **Scenario 3:** Savings start at 5.7% and increase by 0.25% annually.

These small variances may seem inconsequential, but over the long term they may have a substantial impact on participants' retirement balances. Under scenario 1, the median participant outcome fell by \$17,000. Scenario 2 posted an even steeper drop, with the median outcome falling by \$43,000. In scenario 3, which is based more closely on the actual contribution averages we observed in 2008, the median outcome was \$56,000 lower, and outcomes where markets performed strongly fell almost \$100,000.

Clearly, lower contributions, and the resulting lower outcome ranges, make it more unlikely that participants will be able to secure their retirement income needs. We believe plan sponsors must do everything they can to counteract this trend and help participants stay on track through automatic enrollment, escalation and active communication programs.

Assessing these investment results

We think the most important observation of this investment analysis is the wide variance in participant outcomes based on different approaches to fundamental portfolio design. These findings illustrate how critical it is for plan sponsors to define the types of performance outcomes they hope to achieve with a target date strategy. Without a clear understanding of these investment goals, how can plan sponsors identify the target date portfolio designed to produce the most appropriate outcomes for their plans?

We continue to believe that the most prudent measure for target date fund success is to seek to maximize the number of individual participants who reach a minimum level of income replacement at the point of retirement. Our updated research analysis confirms our earlier findings that investing at controlled levels of risk – through broader diversification and relatively swift reductions in equity allocations during the years leading up to retirement – increases the possibility that participants may be able to achieve their retirement funding objectives.

This sophisticated approach to risk efficiency is a key component of SmartRetirement's portfolio strategy. By targeting long-term returns competitive to more equity-concentrated target date strategies, but with lower volatility and more limited downside risk, these portfolios have been designed to address real-world market volatility *and* participant behavior patterns.

Conclusion

Most of the findings of this updated study are consistent with those identified in our *Ready! Fire! Aim?* research. As we pointed out then, a comprehensive, well-designed target date program seeks to provide plan sponsors with a compelling opportunity to offer employees the strongest chance for building their savings into a secure source of retirement income.

We believe this is still the case, but our current research reiterates how important it is for an effective target date design to be firmly grounded in the realities of the marketplace:

- **Target date design must be aligned to support fiduciary responsibilities.** Plan sponsors must carefully evaluate what different target date managers are trying to achieve and how they seek to accomplish it. Is the portfolio designed to maximize return or minimize risk? Is the strategy managed to the target date or through it? These are just a few of the variables plan sponsors need to consider, and appropriate fund selection starts with defining the types of outcomes they hope to provide participants and identifying the target date design that seeks to deliver these results.

- **Risk is as important as return – especially in the crucial years leading up to retirement.** Based on our more than ten years of experience delivering defined benefit solutions to the defined contribution world, we believe efficient volatility management is critical to help increase the possibility that participants will be able to meet their retirement income needs. It may seem intuitive that target date strategies should actively reduce risk in the years leading up to retirement, but our research found that many funds simply have too much volatility – especially in terms of equity exposure – embedded in their portfolio designs during this crucial period. This is particularly true given the wide range of participant withdrawal patterns we identified at and near retirement. However, the five to ten years before retirement is just one part of the picture. Our research also illustrates how cash flow volatility, through loans, early withdrawals and contribution fluctuations, can significantly amplify market volatility throughout the target date lifecycle. This can have a substantial negative impact on participants' long-term asset levels. Reducing portfolio volatility across the glide path can help mitigate this risk and provide a steadier path to retirement.

- **Target date funds must work harder to capture attractive levels of return at lower levels of volatility.** Participants, on average, are clearly not saving enough for their retirement needs, and our current research shows this may be getting worse for a sizable number of investors. In our opinion, this highlights the need for assets to be put to work as efficiently as possible. We developed the SmartRetirement strategies to offer individual 401(k) investors the diversification and risk efficiency characteristics of sophisticated institutional portfolios. This approach seeks to specifically address the importance of maximizing risk-adjusted performance in the early investor years and carefully controlling volatility exposure as retirement approaches.

While our updated analysis highlights several potential trends in participant behavior, it is important to remember that, similar to the financial markets, saving patterns are constantly evolving. If the current economy has indeed reached a turning point, it will be interesting to see how behaviors might change. Regardless, the conclusions from this analysis echo the findings from our original study. First, plan sponsors need to understand the wide variances in real-world participant behaviors and carefully weigh the implications of these patterns. Second, it is critical for plan sponsors to understand how fundamental target date design differences may shape participant outcomes, both from market volatility and cash volatility perspectives.

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