

TARGET DATE FUND RESEARCH

INSIGHTS

Sharpening Your Aim

Selecting the best
target date strategy
for your participants

About JPMorgan Asset Management — Global Multi-Asset Group

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 for more than 25 years. The group, which consists of more than 40 investment professionals with an average of 10 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. JPMorgan's variety of return sources extends across asset classes, geographies and proven investment methodologies. This global product palette provides GMAG's experienced multi-asset class investment specialists with access to the ideal, low correlation building blocks necessary for structuring efficiently diversified portfolios.

SmartRetirement, the group's target date strategy, provides defined contribution plan sponsors and participants with institutional-quality investment solutions. Our fund design combines the skills and asset classes to which our most sophisticated defined benefit plans have access, with nearly 20 years of insights on participant behavior from JPMorgan Retirement Plan Services, recognized as one of the most innovative and participant-focused recordkeepers in the industry.

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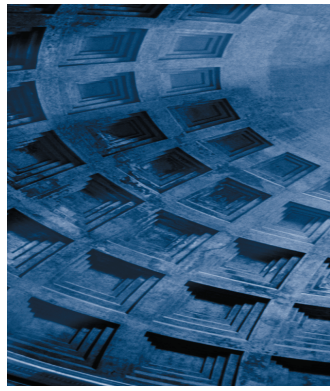
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Foreword

In our recent research paper — *Ready! Fire! Aim?* — JPMorgan Asset Management addressed the question of whether target date strategies are delivering on their full potential to help 401(k) participants meet retirement funding needs. There were two key findings in that paper:

- 401(k) participant behavior is much more varied and volatile than most standard industry models assume. These conclusions were based on a rigorous, quantitative examination of the contribution and withdrawal patterns of 1.3 million 401(k) participants — a proprietary database of participants whose accounts are administered by JPMorgan Retirement Plan Services.
- Highly diversified target date strategies that include extended and alternative assets (e.g., emerging equity, emerging debt, direct real estate, REITs, and high yield fixed income) may help a higher percentage of participants reach retirement with the 401(k) balance necessary to provide income security and maintain their lifestyle — an important measure of success for plan sponsors.

We received a great deal of positive response to that paper, as well as questions about how to apply this knowledge. Many questions centered on the issue of variability among individual companies or industry groups, and whether that variance might impact target date strategy selection for a particular plan. The most efficient way to address these questions was to analyze industry cohorts and then compare them to profiles of individual companies in those industries. Based on these comparisons, we concluded that industry data does provide a useful proxy for individual companies. This paper reports the results of our industry-level analysis.

In brief, while we were able to identify industry variations, these findings did not change our original conclusions about the benefits of highly diversified target date strategies, specifically those that include substantive allocations to extended and alternative assets throughout the investment horizon. Our latest analysis demonstrates that these types of products — which can offer comparable returns with lower volatility than more traditional designs — may give participants the greatest downside protection, regardless of industry. In addition, throughout this paper, we emphasize the difficulty of changing participant behavior, which makes target date design an even more critical decision for plan sponsors. Choosing a well-designed target date strategy is one way that sponsors can reliably offset behavioral influences and help participants reach their retirement funding targets — a key measure of plan success.

We hope that both of these papers will be useful in choosing the best and most appropriate products for your participants, and in helping them retire with the income they need. In addition, we owe our clients a great deal of thanks for their continued support as well as their engagement with our portfolio management and research teams. This paper exemplifies the kind of groundbreaking work that results from true partnership.

If you have any questions, or would like further information on any of these topics, please contact your JPMorgan Asset Management representative.

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Sharpening Your Aim

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Overview

For many people, defined contribution (DC) plans have supplanted defined benefit (DB) plans as a primary source of retirement income. As a result, plan sponsors are under increasing pressure to demonstrate DC plan success, which is ultimately determined by the level of comfort and security achieved by participants at retirement.

With 25 years of experience managing multi-asset portfolios for institutional investors, JPMorgan Asset Management is uniquely positioned to help address this challenge. Our Global Multi-Asset Group consists of more than 40 investment professionals, with an average of 10 years of industry experience, and a range of capabilities that spans capital markets, strategic and tactical asset allocation, portfolio construction and active risk budgeting. Likewise, JPMorgan Retirement Plan Services (RPS), with nearly 20 years of DC plan experience, is recognized as one of the most innovative and participant-focused recordkeepers in the industry.

In our previous paper — *Ready! Fire! Aim?* — we used our proprietary recordkeeping database to develop groundbreaking research into the behavioral

factors affecting 401(k) portfolio outcomes — and hence the ultimate “success” of those plans.

We propose that a reasonable measure of success — and a definable, prudent objective for plan sponsors — is to help the highest number of retirees achieve an annuity funding level sufficient to maintain their pre-retirement lifestyles.

In trying to achieve this goal, however, sponsors can be undermined by participants’ own behavior, which is much more volatile and varied than the simplified assumptions built into many target date fund simulations. Our data show that participant behavior diverges significantly from simplified assumptions in five key areas (Exhibit 1), any one of which could have a material impact on success rates. Moreover, our experience suggests to us that these behavioral variations are likely to persist, in spite of plan features (e.g., auto-enrollment, auto-escalation) designed to address some of them. Taken all together, these issues present not only a serious plan management challenge, but also point to flaws in the industry’s current analytical framework.

Exhibit 1 — Participant behavior assumptions

	Simplified assumptions	<i>versus...</i>	Reality: JPMorgan All Industries 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; 35% repeated
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; JPMorgan Retirement Plan Services participant database, 2001–2006

* These numbers do not include employer contributions, which we assume for modeling purposes in our research to be 3%.

** Throughout this research, the JPMorgan All Industries behavior composite is an aggregate measure of behavior characteristics over the entire RPS population from 2001 to 2006, with insignificant variations from aggregate behaviors observed during the period 2003–2006. This total population includes a limited number of companies outside of the ten industries discussed in this research.

Plan success means helping the most participants achieve retirement income security

Against this backdrop, we evaluated the performance potential of a current industry favorite: target date strategies. (See *Ready! Fire! Aim?* — March 2007.) We found that broadly diversified strategies — in which extended and alternative assets comprise over 20% of the portfolio for the entire investment horizon — may help the largest number of participants reach their annuity targets. This beneficial effect held true even after accounting for the interaction of volatile participant behavior with volatile investment returns.

These earlier findings, however, did not address questions of company and industry variance, which were raised by JPMorgan Asset Management clients:

- If actual participant behavior varies significantly from current models, could there be even more variance hiding within specific companies or industries?
- Would this variance affect the selection of appropriate target date strategies for those plans?

As recordkeeper to nearly 200 firms offering 401(k) plans to 1.3 million participants, JPMorgan Retirement Plan Services provides a robust database for answering these questions. We went back to the original population sample, used in the previous paper, but this time we were not interested in average behavior. The target was industry-specific behavior, and the key elements of our approach included:

- Breaking nearly 200 clients into ten different groups (Exhibit 2), as determined by the Global Industry Classification System (GICS) sector and industry definitions.

- Shortening the time period to 2003–2006, to take advantage of the recent growth of JPMorgan Retirement Plan Services and maximize the size, consistency, and statistical significance of the population sample within each industry.¹
- Analyzing characteristics of participant behavior, to distinguish any clear industry-specific behaviors from random noise, especially in the areas of cash inflows (e.g., contribution rates), outflows (e.g., loans and withdrawals), and salary growth.
- Performing scenario-testing of the same four target date designs as in our original research (Aggressive, Conservative, Concentrated, and broadly diversified SmartRetirement) — this time using specific behavior data for ten different industries.

In the end, we found that there is considerable variability in behavior across industries. However, unless a plan’s participant behavior/pattern of cash flows is very different from the average plan, the result (i.e., the best choice for a target date strategy) is likely to be the same. And given the persistence of less-than-ideal participant behavior — which appears to be having a material effect on success rates — choosing the right target date design may be one of the most important decisions a plan sponsor can make. Over the long term, diversification into extended and alternative assets, not merely a higher allocation to equities, is still the most effective tool for improving risk-adjusted returns and providing the downside protection needed by most participants.

Exhibit 2 — Industry groups within the sample population

Name	GICS industry group	Number of clients	Participant size	Average plan asset size (\$)
Consumer Durables	Consumer Durables & Apparel/Retail	26	191,023	327,957,397
Consumer Services	Media/Consumer Services	13	81,616	321,181,345
Consumer Staples	Food Beverage/Household Products	12	114,803	1,271,980,894
Energy	Energy	8	34,220	353,780,422
Financials	Bank	11	188,988	1,279,207,546
Healthcare	Healthcare Equipment and Services	16	107,468	396,210,501
Industrials	Capital Goods/Comm Svcs & Supplies	43	126,992	292,960,013
Information Technology	Semiconductors & Semi Equipment	19	87,062	381,407,897
Materials	Materials	21	119,871	431,886,237
Utilities	Utilities	9	37,707	455,166,517

Source: JPMorgan Retirement Plan Services participant database, 2003–2006

¹ Behavior observed over this time period was not materially different from that observed using the previously employed 2001–2006 time frame.

Industry-specific behavior patterns

The growing importance of wealth accumulation in 401(k) plans puts increasing pressure on sponsors to understand all the factors — behavioral as well as investment — that can affect plan success.

To begin, we know that a significant driver of success is how the size and timing of portfolio inflows and outflows interact with the size and timing of market returns. Portfolio transactions, however, are in a participant's control, not the sponsor's. Participants' explicit preliminary choices (initial contribution levels and asset allocation) and their continual actions (changes in contributions, loans and withdrawals) can have a material impact on the volatility of portfolio cash flows, and thereby the portfolio itself.

Unfortunately, experience has taught us that participants' saving and investing behaviors are hard to change without direct intervention. Plan sponsors have tried to promote change using plan features, such as auto-enrollment and auto-escalation. But our latest real-world observations show persistent and wide variations in savings and investment behaviors, which, in many cases, are compromising participants' success.

In light of how difficult it is to change behavior, and in lieu of comprehensive progress in this area, plan sponsors must do all they can to address behavioral influences using other measures. One of the most important measures is adopting target date fund

designs that can provide optimal downside protection to participants whose behavior makes them vulnerable to shortfalls in retirement funding. In the end, we found that across all industries target date strategies emphasizing diversification and downside protection were most likely to help the greatest number of participants achieve retirement funding success.

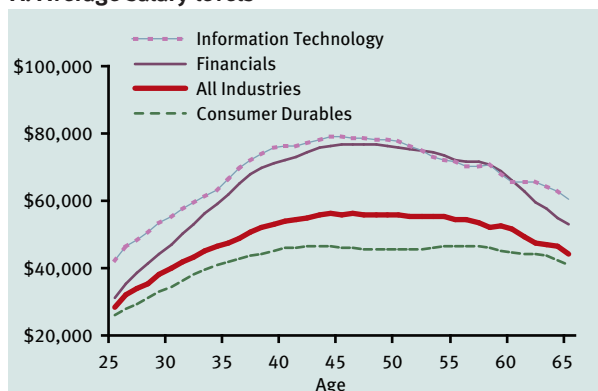
The following discussion and illustrations highlight the wide range of dispersion we found in participant behavior across a number of industries. Our cohort research focused on four critical behavioral areas: salary, contributions, 401(k) loans, and withdrawals.

Salary

Salary is one of the most critical drivers of participant behavior because it defines the limit on the pool of available assets. In this latest analysis, the data suggests a wide dispersion of salaries across ages and industries (Exhibit 3-A). Comparing average salaries across different participant groups and ages can be difficult, due to varying demographics or generational influences. The data, however, does describe a clear and drastic variability of salaries that can occur between different subgroups of participants.

While the salaries of retiring participants can vary across industry, the speed and path of participants getting to those salaries may vary even more. In addition,

Exhibit 3: Salary by industry
A: Average salary levels*

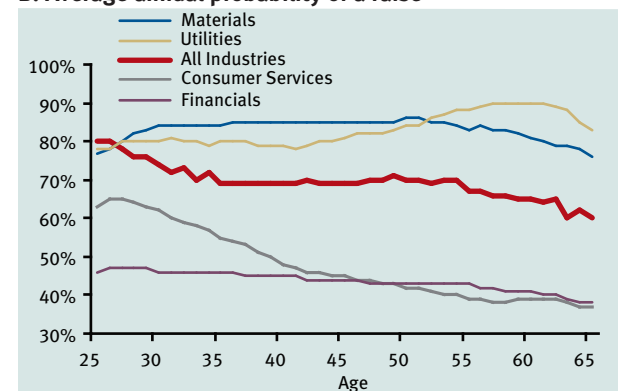


Source: JPMorgan Retirement Plan Services participant data base, 2003–2006

We do not show results for all ten industries; we include only the high and low outliers and the median. Industries not shown can be assumed to lie between the highest and lowest results.

* The decline in average salary with age is due to the earlier retirement of higher (versus lower) salaried employees.

B: Average annual probability of a raise



a large amount of dispersion was found across ages and industries with respect to the frequency of raises (Exhibit 3-B). While the average participant will receive a raise about two out of every three years, or about 67% of the time, the frequency of raises can range from only 50% (every other year) up to nearly 100% (every year).

The dispersion around the size of raises (as a percentage of current salary) is just as diverse as their frequency. Many industries see relatively frequent wage growth of close to inflation. Some receive wage growth below inflation, depending on market conditions. Still other industries experience much larger but less frequent salary increases.

On average, the frequency of raises is inversely related to the size of those raises. That relationship, however, can change dramatically over the length of a participant's career. In several industries, such as Financials, annual salary growth starts out at over 15% early in a participant's career, but then quickly declines to a more normal rate.

Contributions

The next big question is: What do participants in different industries do with their pool of available resources? How much do they contribute and how often do their contributions change?

Despite significant differences in the average contribution rates from industry to industry, contributions for participants first entering their plans are relatively similar (Exhibit 4-A). Across all industries, participants who contribute begin with an annual contribution rate of about 6% of salary, on average.² Contribution rates, however, gradually diverge as retirement approaches.

The percentage of participants each year on average, making changes to their contribution rates varies significantly across industries (Exhibit 4-B). For example, on average, 30% of all participants in our sample changed their contribution rates in a given year. However, within

Industrials, the average rate was 35%. By comparison, only 20% of participants in the Consumer Staples industry change their contribution rates.

401(k) Loans

While, on average, 20% of participants have a loan outstanding in any given year, and most industries huddle around this average during the peak ages for loans, some industries' participants have more unique behavior (Exhibit 5-A). The Materials industry, for example, takes loans more frequently, reaching 30% of participants between the ages of 35 and 50. Participants in industries such as Consumer Services and Info Tech are about a third as likely (10%) to take out a loan.

There is similar variability in the tendency toward taking multiple loans (Exhibit 5-B). Going back to the Info Tech industry, only 20% of participants with loans will have more than one loan outstanding in a year. In contrast, in the Financials industry, an average of 20% of participants will take a loan, but 60% of those participants will have multiple loans outstanding in a year.

Withdrawals

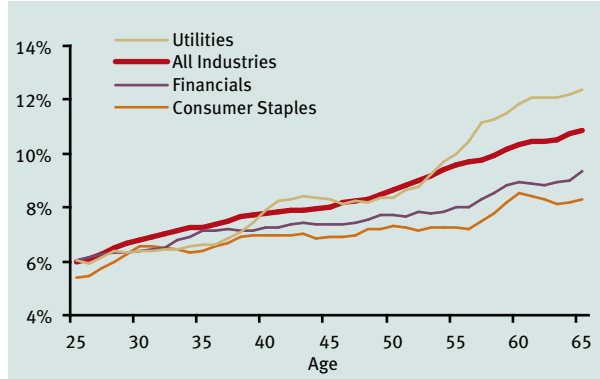
The behavior with the most significant impact on cash-flow volatility is account withdrawals. Again, we see a significant level of variability in the frequency and size of withdrawals across industries (Exhibit 6-A). Most industries hover around the average: Each year 15% of participants between the ages of 59½ and 65 take withdrawals. Yet industries such as Consumer Durables have almost twice as many participants, or 25%, making withdrawals, and those withdrawals average 25% of their balance (Exhibit 6-B).

(We note that plan design itself may be a contributing factor in the wide dispersion we see across industries. For example, if certain plan features were more common in a specific industry — e.g., allowing/disallowing 401(k) loans — then that industry's preferences in plan design would be a strong contributor to its participant behavior profile.)

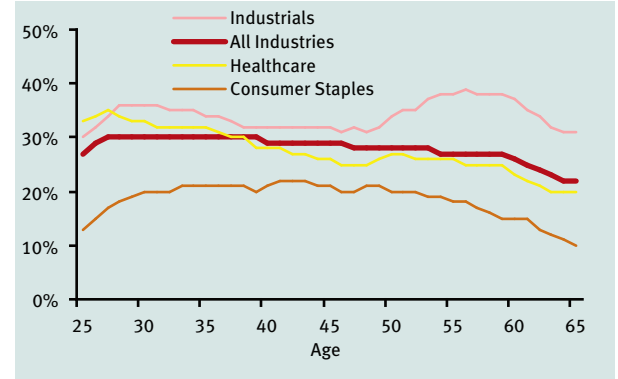
² These numbers do not include employer contributions, which we assume for modeling purposes in this research to be 3%.

There is wide dispersion in participant behavior across industries

Exhibit 4: Contributions by industry
A: Average contribution rate

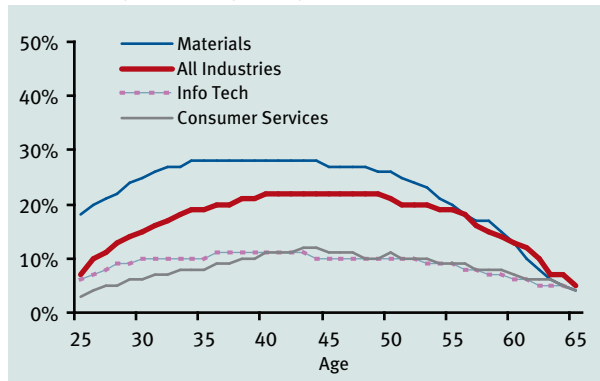


B: Average percent of participants changing contribution rate

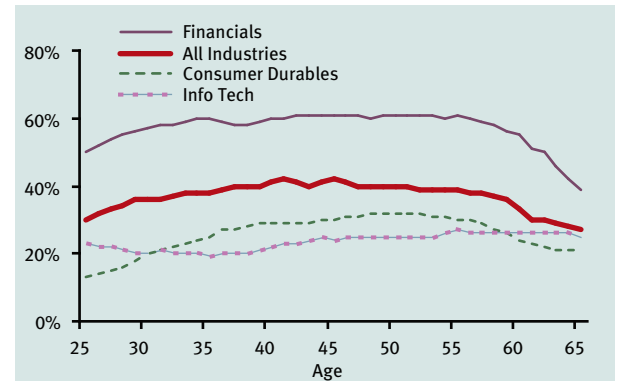


Source: JPMorgan Retirement Plan Services participant data base, 2003–2006

Exhibit 5: Loans by industry
A: Average percent of participants taking loans

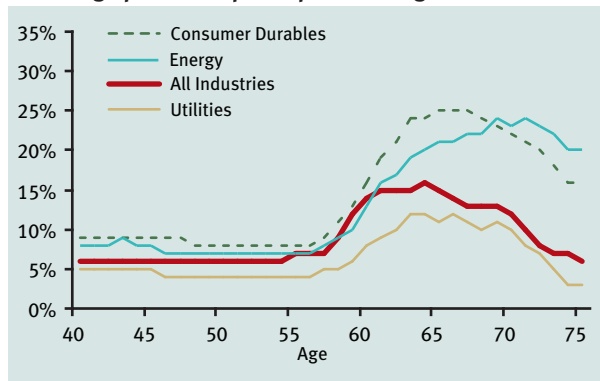


B: Average percent of borrowers with multiple loans outstanding

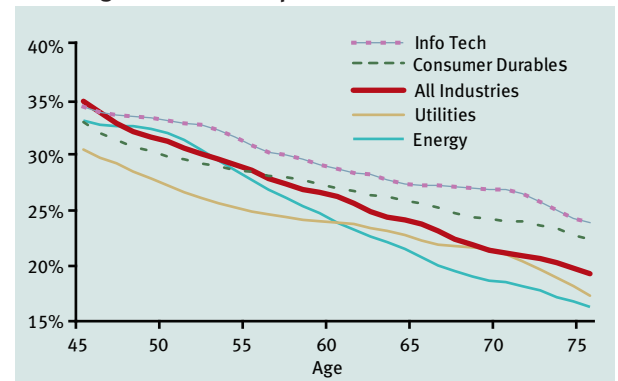


Source: JPMorgan Retirement Plan Services participant data base, 2003–2006

Exhibit 6: Withdrawals by industry
A: Average percent of participants taking withdrawals



B: Average withdrawal as percent of total balance



Source: JPMorgan Retirement Plan Services participant data base, 2003–2006

Our intent in all line graphs — Exhibits 3, 4, 5 and 6 — is to show the wide range of results among the industries we studied. Therefore, we do not show results for all ten industries; we only include the high and low outliers and the median. If an industry is not shown on the graph, assume that it would be plotted somewhere between the highest and lowest results. For further details, see Exhibit 13 on page 12 or the supplemental industry summary sheets — available at jpmorgan.com/insight or through your JPMorgan representative, if not provided with this report.

Interaction of multiple behaviors

While individual behaviors may add to portfolio volatility and impact expected outcomes, the cumulative impact of multiple behaviors (on the portfolio and each other) can be even more dramatic.

For example, consider the effect of loan behavior on contribution rates. Not only does a loan reduce the amount of the portfolio experiencing market movements, it also has a negative impact on contribution rates. The majority of participants taking loans lower their contribution rates, or even stop contributing altogether during the repayment period. This combined behavior can produce significant negative effects if the loan coincides with strong market performance.

Another interaction we observed was that low savings often correlated with low withdrawals and high savings with high withdrawals. An example of an industry with low savings combined with low withdrawals is Consumer Staples (Exhibit 7). Participants in this

industry begin contributing at an average rate of 6%, similar to the overall population average. But a lower-than-average share of these participants make annual changes to their contribution rates. As a result, the average participant in this industry reaches a contribution rate of only 8%, and does so much later than average, by age 50. However, while the participants in this industry save less, they also withdraw less prior to retirement. This behavior counters some of the effect of saving less by leaving more of their balance intact for retirement.

How might those balances be affected if these participants were forced to save more? One could speculate that forcing increases in savings could result in higher withdrawal rates. In other words, even where plan sponsors achieve a higher savings rate through plan design, if it is not accompanied by changes in participants' attitudes and behaviors, sponsors cannot count on those hard-won savings actually staying in the plan.

Participant behavior is difficult to modify and can materially impact portfolio results

Exhibit 7 — Cumulative behaviors in the Consumer Staples industry

	Simplified assumptions	JPMorgan All Industries	JPMorgan Consumer Staples industry
Contributions	Rates start at 6%, increase year-by-year, reaching 10% of salary by age 35	Contribution rates start at 6% and increase slowly, reaching 8% of salary by age 40, and 10% not until age 55	Contribution rates start near 6% and increase slowly, reaching 8% of salary by age 50
Salary raises	Participants get a raise every year	On average, participants get raises every 2 out of 3 years	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; 35% repeated	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	15% of participants over the age of 59½ withdraw, on average, 20% of assets
In retirement distributions	Participants withdraw a consistent 4%–5% annually	The average participant withdraws over 20% at or soon after retirement	The average participant withdraws over 20% at or soon after retirement

Sources: AllianceBernstein “Target-Date Retirement Funds — A Blueprint for Effective Portfolio Construction,” October 2005; JPMorgan Retirement Plan Services participant database, 2003–2006

Testing target date designs across industries and companies

We now know that industries can have very different behavior profiles varying across multiple behavior dimensions. The open question is: *Should any of these industry-specific behavior patterns impact plan sponsors' target date strategy selections?*

To get an answer, we compared potential portfolio outcomes for participants in ten different industries, under four different target date strategies (Aggressive, Concentrated, Conservative, and broadly diversified SmartRetirement). The results of our scenario testing confirm that behavioral differences across industries should not materially impact the selection of a target date design. To illustrate, we offer two examples of industry-specific portfolio outcomes (Consumer Staples and Financials) compared to the JPMorgan All Industries average. By “outcome” we mean the group’s distribution of 401(k) balances at retirement, relative to its income replacement target.

In the sidebar on the following page, we show the allocation glide paths for each of the four strategies — indicating key differences in their strategic asset allocations over a participant’s working life and beyond. It is notable that the SmartRetirement design holds a wider spectrum of assets over the participant’s entire career. It holds fewer equities at the outset than the other strategies and decreases equity allocation more rapidly than Aggressive and Concentrated designs. Extended and alternative assets, on the other hand, are a sizeable,

diversifying component of the SmartRetirement design across the investment horizon.

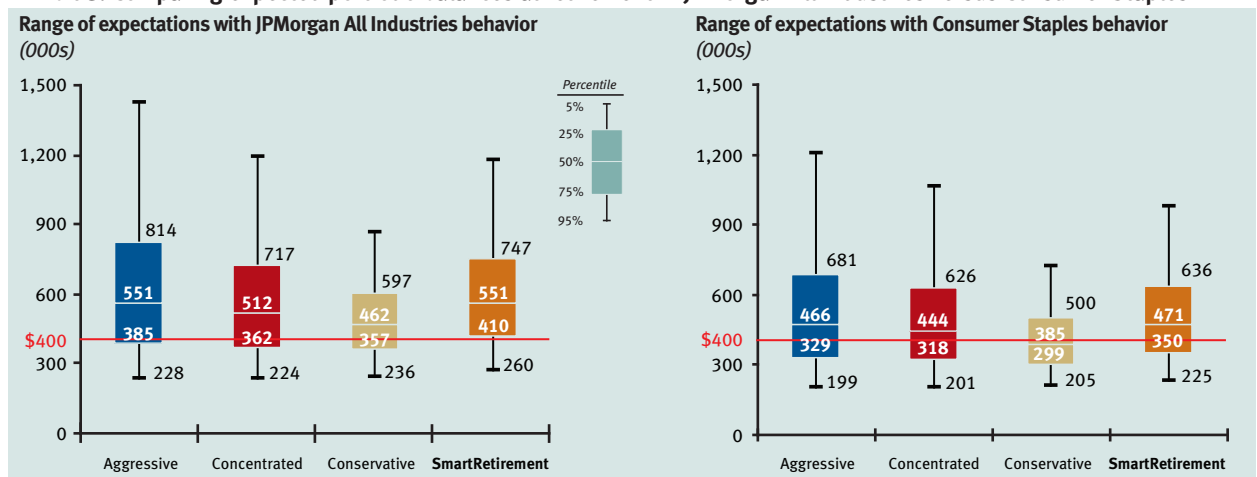
In a similar approach to our initial paper, we put our model to work combining each industry’s participant cash flow volatility with the volatility and sequence of market returns. The model output was a range of expected portfolio outcomes, based on 10,000 simulated market environments.

Exhibit 8 compares the expected portfolio outcomes for Consumer Staples versus the JPMorgan All Industries total. The red line on each chart marks the income replacement target — the balance at retirement needed to purchase an annuity to generate the roughly 40% of pre-retirement income required, in addition to Social Security, to maintain a pre-retirement lifestyle. (See Appendices A and C for notes on reading these charts and calculating income replacement targets.)

Average salary growth in the Consumer Staples industry (Exhibit 7) results in an income replacement target similar to the JPMorgan All Industries average of \$400,000. However, despite lower-than-average withdrawals, industry participants’ below-average savings decreases median expected portfolio balances by almost \$80,000 on average versus the All Industries medians. Lower-than-average expected portfolio balances mean a lower expected success rate in reaching income replacement targets, emphasizing the need to focus on downside protection.

Cross-industry variations in behavior do not imply differences in the target date strategy most likely to help participants succeed

Exhibit 8: Comparing expected portfolio balances at retirement — JPMorgan All Industries versus Consumer Staples



Results are based on JPMorgan Asset Management Long-Term Capital Market Return Assumptions, 2006, JPMorgan Asset Management and industry prospectuses. See Exhibit 7 for Consumer Staples participant behavior assumptions. All dollar values are inflation-adjusted.

Comparing asset allocation glide paths

In researching the portfolio composition and simulated investment outcomes of target date funds, we have identified three common categories of fund design that we will refer to as *Aggressive*, *Concentrated* and *Conservative*. Each strategy starts out holding mostly equities and then switches over to large allocations of bonds or cash at the end. But the dynamics of the shift, as well as the addition of diversifying extended and alternative assets, vary considerably across the three fund designs and make a significant difference to the overall results.

Based on actual funds in the marketplace, the graphs below illustrate the projected portfolio allocations over time for the three types of strategies, as well as the SmartRetirement design. Given our stated objective of helping the greatest number of participants reach their replacement income goals at retirement, we will focus primarily on these glide paths through age 65.

Cash and bonds

- Cash
- TIPS
- U.S. fixed income

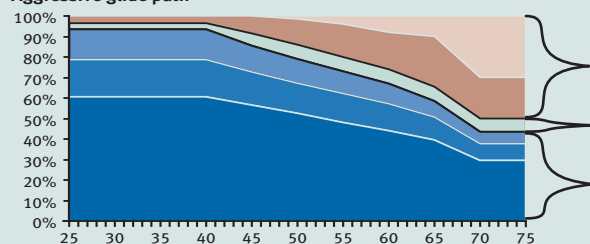
Extended and alternative assets

- High yield
- Emerging market debt
- Direct real estate
- REITs

Equity

- Emerging equity
- EAFE
- U.S. small cap
- U.S. large cap

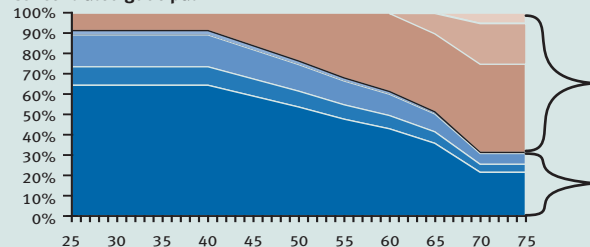
Aggressive glide path



Asset mix at ages:

	25 years	45 years	65 years
Cash and bonds	3%	9%	35%
Extended and alternative assets	3%	6%	7%
Equity	94%	86%	59%

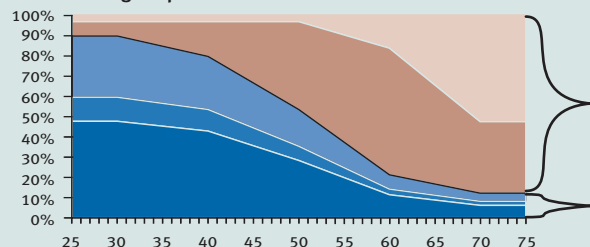
Concentrated glide path



Asset mix at ages:

	25 years	45 years	65 years
Cash and bonds	10%	18%	50%
Equity	90%	82%	50%

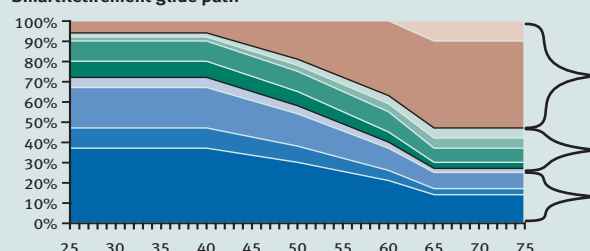
Conservative glide path



Asset mix at ages:

	25 years	45 years	65 years
Cash and bonds	11%	34%	84%
Equity	89%	66%	17%

SmartRetirement glide path



Asset mix at ages:

	25 years	45 years	65 years
Cash and bonds	6%	13%	53%
Extended and alternative assets	22%	22%	20%
Equity	72%	65%	27%

Sources: JPMorgan Asset Management, and industry prospectuses.
Some asset mix numbers may not add to 100% due to rounding.

Exhibit 9 – Cumulative behaviors in the Financials industry

	Simplified assumptions	JPMorgan All Industries	JPMorgan Financials industry
Contributions	Rates start at 6%, increase year-by-year, reaching 10% of salary by age 35	Contribution rates start at 6% and increase slowly, reaching 8% of salary by age 40, and 10% not until age 55	Contribution rates start near 6% and increase slowly, reaching 8% of salary by age 40 and 10% not until age 57
Salary raises	Participants get a raise every year	On average, participants get raises every 2 out of 3 years	On average, participants get larger-than-average raises every other year
Loans	Participants don't borrow	20% of participants borrow, on average, 15% of account balance; 35% repeated	20% of participants borrow, on average, 20% of account balance; 60% repeated
Pre-retirement distributions	Premature distributions don't happen	15% of participants over the age of 59½ withdraw, on average, 25% of assets	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% at or soon after retirement	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; JPMorgan Retirement Plan Services participant database, 2003–2006

In our simulations, broadly diversified strategies, such as SmartRetirement, resulted in the greatest number of industry participants reaching their target income replacement goal and the highest minimum and median portfolio balances at retirement — similar to results for the JPMorgan All Industries aggregate. These results emphasize the advantage of broadly diversified strategies in helping the greatest number of participants reach their income replacement goals. As we will see, a similar advantage appears to exist for those in the Financials industry.

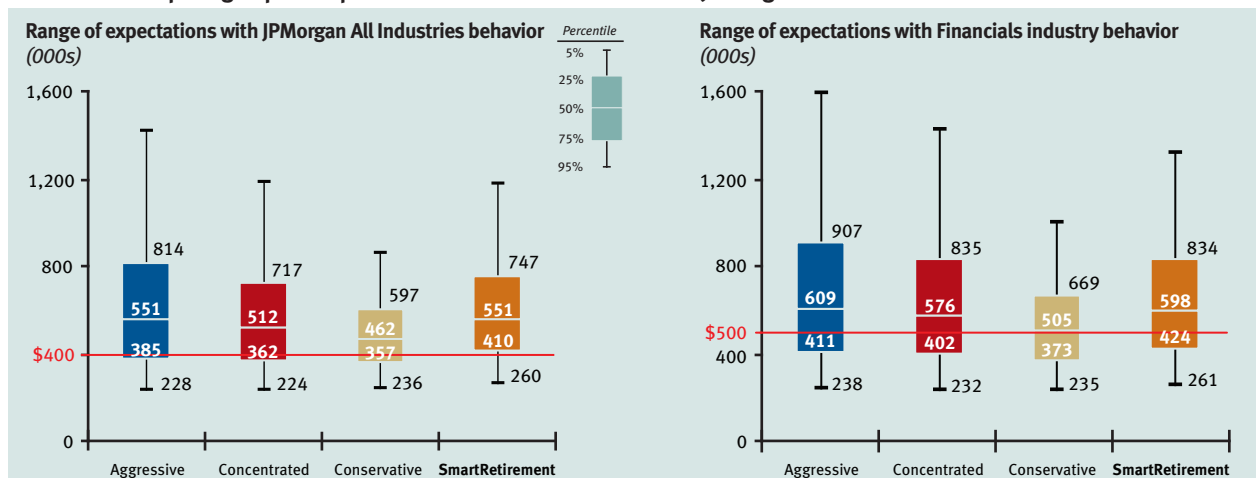
In contrast to the unique savings behavior observed in the Consumer Staples industry, the Financials industry is very similar to the general average. Participants in the Financials industry, however, have a significantly higher frequency of multiple loans (Exhibit 9), which interacts with contributions to create a mild impact on cash-flow volatility.

The impact of these behaviors on potential outcomes can be seen in Exhibit 10. The red line on the Financials industry graph represents the increased target for income replacement due primarily to higher-than-average (although less frequent) salary increases. The higher-than-average salary at retirement in Financials — on average \$72,000 in today's dollars — results in a higher-than-average annuity target of \$500,000 for those participants.

For participants in this industry, above-average salary growth also leads to slightly higher 401(k) balances at retirement, on average. However, because of only moderate savings, combined with multiple loan activity, the increase in expected outcomes is insufficient to match the higher target annuity level.

The probability of falling below the target increases across all four target date strategies for Financials versus the JPMorgan All Industries population. This

Exhibit 10: Comparing expected portfolio balances at retirement — JPMorgan All Industries versus Financials



Results are based on JPMorgan Asset Management Long-Term Capital Market Return Assumptions, 2006, JPMorgan Asset Management and industry prospectuses. See Exhibit 9 for participant behavior assumptions. All dollar values are inflation-adjusted.

Across industries, broadly diversified target date designs can help the most participants achieve retirement success

increased probability of shortfall, again, highlights the need for downside protection, which is best achieved through diversification.

It is important to note that the Aggressive and Concentrated strategy designs, with their higher concentration of return-generating but volatile equity assets, may be able to improve expected portfolio outcomes for the more fortunate participants who are expected to achieve “income replacement *plus*.” However, for those in the bottom half of the distribution, for whom some combination of loan-taking, inadequate savings, and adverse market conditions threatens retirement security, the broadly diversified SmartRetirement design can provide a higher degree of downside protection. As seen in Exhibit 10, with its greater allocation to extended and alternative investments, the SmartRetirement design is expected to get more participants over the income replacement hurdle — and to provide a higher floor for those who fail to reach this goal.

Although the behavior of the Financials industry appears to be “average,” even average behavior in an average industry can hide behavioral variations. After examining one financial company more closely, we made some interesting observations.

Once again, there was a potentially wide dispersion in behavior among different subsets of Financials industry participants. We separated the participants into two salary groups: those above and those below a current salary level of \$40,000. First, we found significant disparity in asset ownership. A minority of participants (36%) earned more than \$40,000, but they owned the majority of assets (69%). On the other hand, a larger

group of participants (64%) made less than \$40,000 and owned a smaller share of plan assets (31%).

And once the participants are separated by salary level, the behavior characteristics observed are significantly different (Exhibit 11).

The simulated portfolio outcomes for these two salary groups are shown in Exhibit 12. One can see that the target income replacement levels (the red lines) change dramatically.

For the “high salary” participants, higher salary growth leads to a target annual retirement income of roughly \$120,000 in today’s dollars and thus a higher-than-average annuity target of \$800,000. Above-average salary growth also leads to an increase in the range of expected portfolio outcomes for participants in this industry. However, a target replacement level of this size is very difficult to reach with only moderate savings rates. Therefore the expected range of outcomes falls significantly for this salary group versus its target — for all four target date strategies. It is notable that while both the Aggressive and SmartRetirement designs get approximately half of these participants to their goal, the SmartRetirement design provides somewhat greater downside protection for those who fall below the target annuity level (i.e., a higher expected portfolio balance).

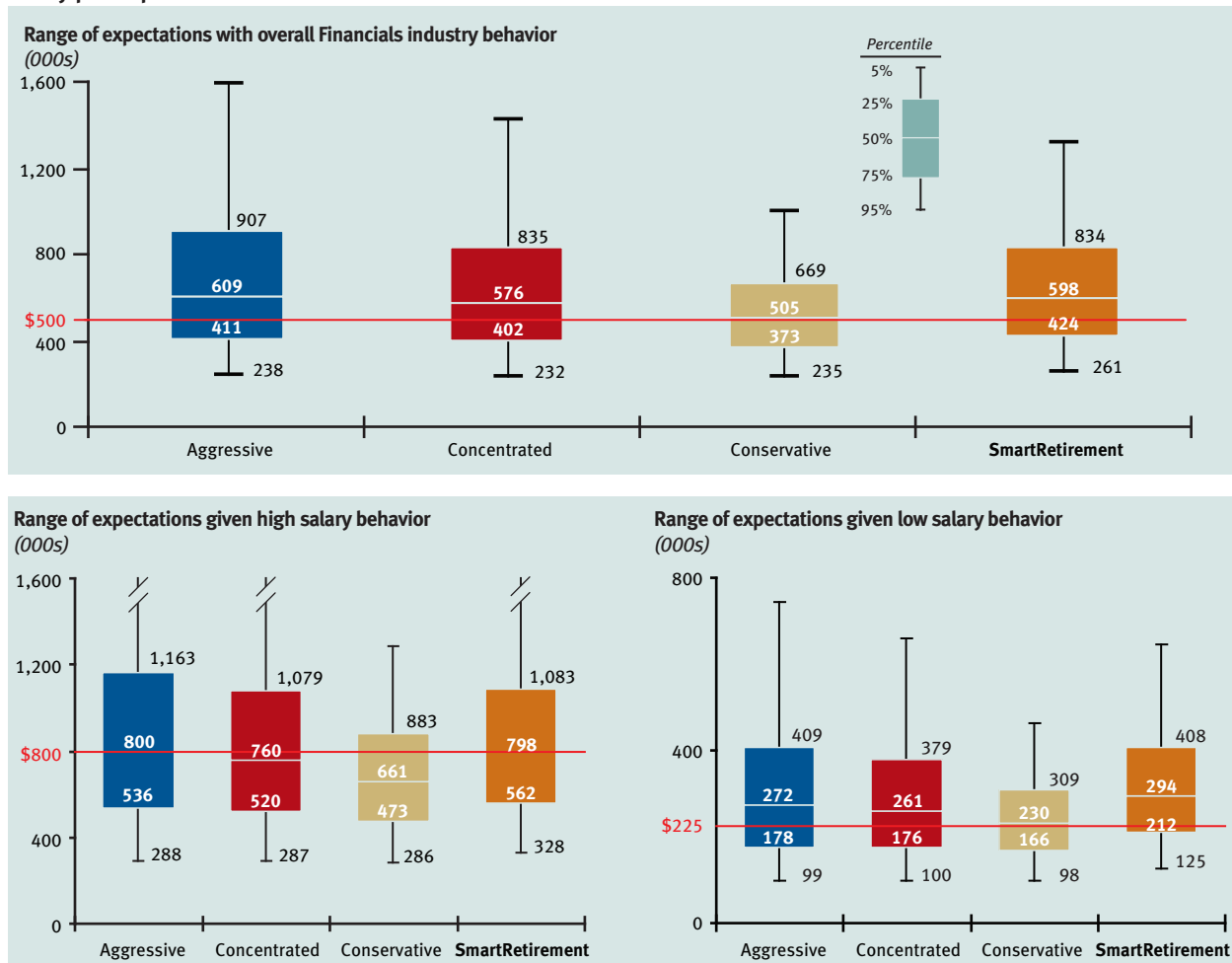
For “low” salary participants, we see two contrasting movements. Lower starting salaries combined with moderate salary growth lead to a target annual retirement income of only \$40,000 in today’s dollars, and a much lower annuity target of only \$225,000. At the

Exhibit 11: Financials industry — Salary and behavior analysis

	JPMorgan Financials industry	High salary participants	Low salary participants
Contributions	Contribution rates start near 6% and increase slowly, reaching 8% of salary by age 40, and 10% not until age 57	Contribution rates start at 6% and increase slowly, reaching 8% of salary by age 40, and 10% not until age 55	Contribution rates start near 6% and increase very slowly, reaching 8% of salary by age 55
Salary raises	On average, participants get larger-than-average raises every other year	On average, participants get larger-than-average raises every other year	On average, participants get larger-than-average raises every other year
Loans	20% of participants borrow, on average, 20% of account balance; 60% repeated	20% of participants borrow, on average, 20% of account balance; 55% repeated	20% of participants borrow, on average, 25% of account balance; 65% repeated
Pre-retirement distributions	15% of participants over the age of 59½ withdraw, on average, 25% of assets	15% of participants over the age of 59½ withdraw, on average, 15% of assets	15% of participants over the age of 59½ withdraw, on average, 30% of assets
In retirement distributions	The average participant withdraws over 20% at or soon after retirement	The average participant withdraws over 15% at or soon after retirement	The average participant withdraws over 25% at or soon after retirement

Source: JPMorgan Retirement Plan Services participant database, 2003–2006

Exhibit 12: Comparing Financials industry expected portfolio balances at retirement — “High” versus “Low” salary participants



Results are based on JPMorgan Asset Management Long-Term Capital Market Return Assumptions, 2006, JPMorgan Asset Management and industry prospectuses. See Exhibit 11 for participant behavior assumptions. All dollar values are inflation-adjusted.

same time, their lower savings and higher withdrawals dramatically lower their range of expected outcomes. What is the ultimate behavioral impact? When all these behaviors are combined, many participants end up well above the desired levels, thanks to their overall lower annuity target. But, again, there is no reason to believe that improving participants' low savings through automatic features (e.g., auto-enrollment and auto-escalation) will affect their withdrawal behavior — i.e., plan sponsors cannot be confident funds captured by forcing higher savings will actually stay invested in the plan.

We hypothesize that, relative to those with higher salaries, lower-salary participants may not only be more likely to default into a plan's QDIA³ but, when the

QDIA is a target date fund, may also benefit much more from a strong design focused on downside protection. In this Financial company example, highly diversified strategies increased the probability of lower-salary participants exceeding their retirement income targets — from 60% (for the Aggressive design) to more than 70% for the SmartRetirement design, while retaining upside capture for those with above-median outcomes.

(Note: While the savings shortfall for “high salary” employees is indisputable, their inadequate contribution rate may reflect something other than poor savings practices. Fixed-dollar contribution caps may be restraining their contribution rates as a percent of salary, thereby hampering their ability to reach adequate savings levels through their 401(k) plans, especially given their higher annuity targets.)

³ Qualified Default Investment Alternative (QDIA)

Conclusion

From industry to industry, there will always be variability around participants' cash flow behavior — Exhibit 13 shows the variability of ten industries compared to the JPMorgan All Industries average. There may even be variability within specific plans, particularly among different salary levels. Understanding these variations, and their impact on participants' success rates, is essential to both fund selection and plan design.

One thing does not change from plan to plan. Our research indicates that every plan is likely to vary to some extent from “simplified assumptions” about participant behavior. Consequently, every plan will face the issue of volatility in both contribution and withdrawal rates, emphasizing the importance of downside protection for all participants. Highly diversified target date strategies that include extended and alternative assets throughout the investment horizon and are designed to provide this downside protection may help the greatest number of participants reach their target account balances at retirement.

As a result, these types of strategies, regardless of the sponsor's industry, may be the most appropriate selection for a qualified default investment vehicle. Appendix A summarizes the range of expected portfolio outcomes for all ten of the industries we studied, taking into account specific contribution and withdrawal patterns for those industries. The broadly diversified approach appears to deliver superior results, better than those of less-diversified, more traditional strategies.

As discussed in our previous paper, target date strategies represent a quantum leap in defined contribution investments. They are designed to provide one package in which the individual's assets are allocated to the right markets, fully invested all the time and professionally managed. But our latest research shows that not all target date fund designs are equal: Greater portfolio diversity, providing greater downside protection, may improve outcomes for participants in all industries, especially taking into account cash-flow volatility and other behavioral challenges.

Exhibit 13 — Industry versus JPMorgan All Industries average*

	Salary raises	Contributions	Loans	Pre-retirement distributions	Industry values compared to JPMorgan All Industries average
Standard assumptions	Participants get a real raise every year	Rates start at 6%, increase year-by-year, reaching 10% of salary by age 35	Participants don't borrow	Premature distributions don't happen	▲ ▲ = Well above average ▲ = Above average A = Close to average ▼ = Below average ▼ ▼ = Well below average
Real-world JPMorgan All Industries average	On average, participants get raises every 2 out of 3 years	Contributions start at 6%, increase slowly to 8% by age 40 and don't reach 10% until age 55	15% of participants borrow, on average, 15% of account balance	20% of participants over the age of 59 ^{1/2} withdraw, on average, 25% of assets	■ = Potentially beneficial ■ = Potentially detrimental
Consumer Durables	▼ ▼	▼	A	▲ ▲	
Consumer Services	▼	▼	▼ ▼	A	
Consumer Staples	A	▼ ▼	A	▼	
Energy	A	A	A	▲	
Financials	▲ ▲	A	▲ ▲	A	
Healthcare	A	▼ ▼	▼ ▼	▼	
Industrials	A	▼	▼	▼	
Information Technology	▲ ▲	▲	▼ ▼	▲	
Materials	▲	▼	▲ ▲	▲	
Utilities	▲	▲	A	▼ ▼	

Sources: JPMorgan Asset Management, AllianceBernstein “Target-Date Retirement Funds — A Blueprint for Effective Portfolio Construction,” October 2005; JPMorgan Retirement Plan Services participant database, 2003–2006.

* For further details, see our supplemental industry summary sheets — available at jpmorgan.com/insight or through your JPMorgan representative, if not provided with this report.

Choosing a target date design may be among plan sponsors' most critical decisions

These target date strategies can be so effective, in part, because they have been designed specifically to address behaviors seen in real-world observation. Moreover, short of radically changing plan design features governing savings, loans and withdrawals, choosing the right target date strategy is one step that plan sponsors can take to reliably improve participant outcomes — helping the greatest number of participants achieve their retirement funding objectives.

With regard to behavior modification, we fear that many approaches currently being contemplated or used (e.g., auto-enrollment, auto-escalation) may not be sufficient to maximize overall success rates. Plan sponsors may have to rethink some features that have become commonplace, such as loans and early withdrawals.

These features were adopted for sound reasons, but they may be having unintended and potentially serious consequences for participants' portfolio outcomes. And we question whether the latest changes to such features — e.g., those in the current version of the Pension Protection Act — will produce the necessary behavioral results. Based on observations to date, we hypothesize that:

- Auto-enrollment may improve participation rates, but it is not clear to us that participants who choose not to act, and have to be enrolled by default, will actively manage their contribution rates and investment choices. They will likely save only to the amount defaulted.
- Likewise, auto-escalation may force inactive participants to increase their contribution rates and help them save more, but most auto-escalation features start with contribution rates of only 3% and increase up to only 6%, which our research indicates is an inadequate savings level for retirement.⁴
- In addition, auto-enrollment and auto-escalation may negatively impact participants' withdrawal and loan behavior. We observed that, even while certain plans and industries (e.g., Info Tech) tended to have

stronger savings, they also had larger average withdrawals prior to retirement, which can potentially diminish any advantage acquired from higher savings rates. In our original whitepaper (*Ready! Fire! Aim?* page 22), the impact of large withdrawals, even in the presence of strong savings, was shown to have a dramatic impact on retirement account balances.

We would go even further to suggest that participants who lack a commitment to saving and investing — i.e., those who must be auto-enrolled and auto-escalated — may exhibit a wider range of problematic savings behaviors. In addition, these less-engaged participants are likely to remain in the default vehicle, and they will represent a high percentage of target date investors in plans where the default vehicle is a target date fund.

So if participant behavior is resistant to change, and those most at risk for missing their retirement funding targets are also likely to rely on the default vehicle, plan sponsors would then do well to choose a target date strategy that can address both issues. According to our research, target date strategies that are well-diversified throughout the investment horizon are most effective in overcoming negative behavioral influences and delivering downside protection to those who need it most.

In future research, we hope to provide a clearer picture of the behavioral profile of the typical target date investor, which may help plan sponsors further refine their fund selection and plan features. In the meantime, we can say with confidence that, regardless of industry, highly diversified target date strategies help the greatest number of participants achieve income replacement security, and hopefully a comfortable retirement — and this, after all, is the highest fiduciary role and objective of plan sponsors.

*For further details, see our supplemental industry summary sheets and our previous research report **Ready! Fire! Aim?** — available at jpmorgan.com/insight or through your JPMorgan representative.*

⁴ These numbers do not include an employer contribution, which we assume for modeling purposes in our research, to be 3%.

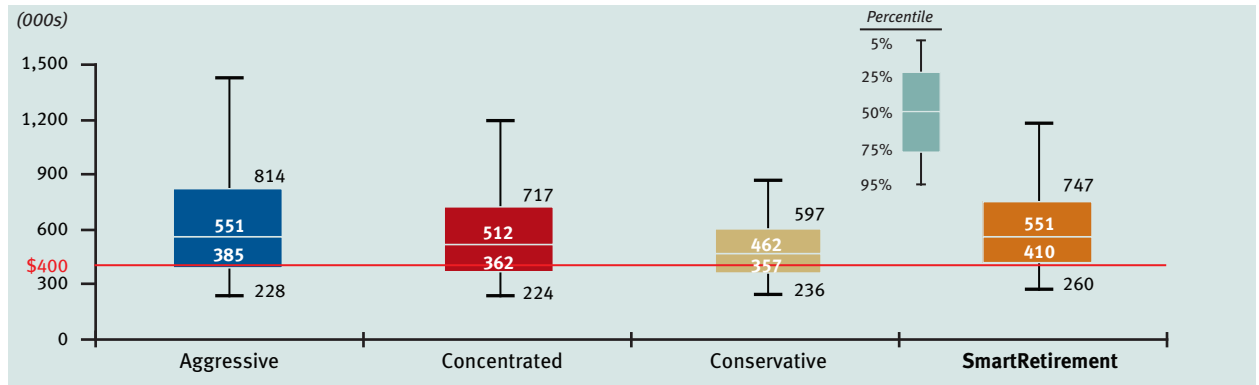
Appendices

Appendix A — Potential portfolio outcomes based on industry-specific behavior patterns*

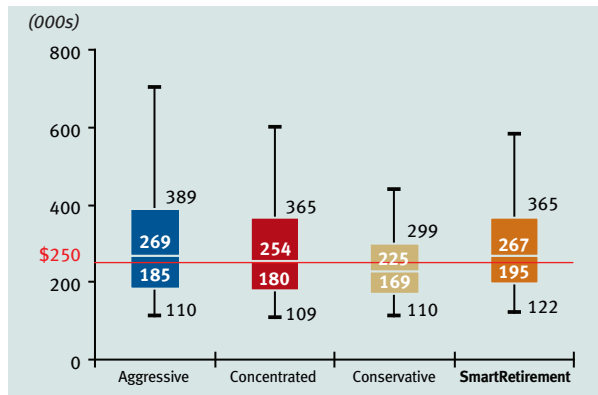
There are two key observations about these industry-specific charts. First, while the expected (i.e., mean or 50th percentile) return profiles of the Aggressive and highly diversified SmartRetirement portfolios are

comparable, the SmartRetirement portfolio delivers a tighter range of outcomes, suggesting a more efficient use of risk. Second, the highly diversified portfolio helps the greatest number of participants reach their annuity targets for all industries included in this study.

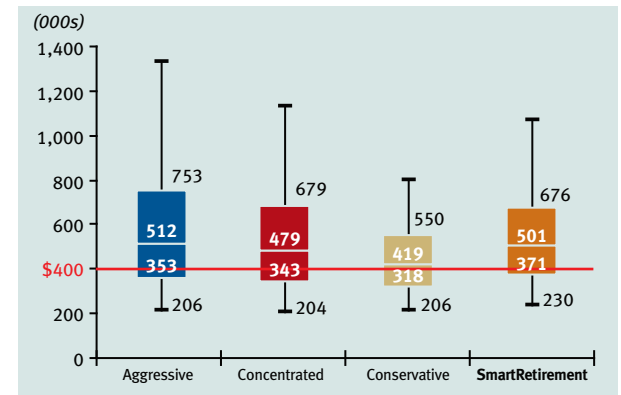
Range of expected balances with JPMorgan All Industries behavior assumptions



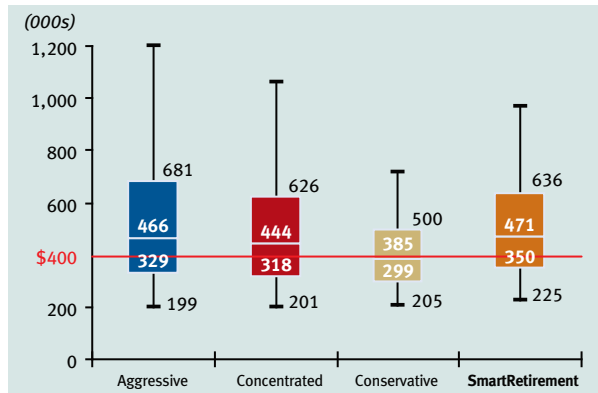
Range of expected balances with Consumer Durables industry behavior



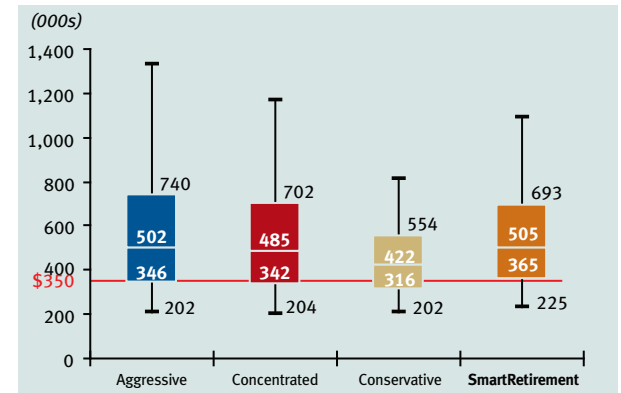
Range of expected balances with Consumer Services industry behavior



Range of expected balances with Consumer Staples industry behavior



Range of expected balances with Energy industry behavior



* For further details, see our supplemental industry summary sheets — available at jpmorgan.com/insight or through your JPMorgan representative, if not provided with this report.

Interpreting exhibited results:

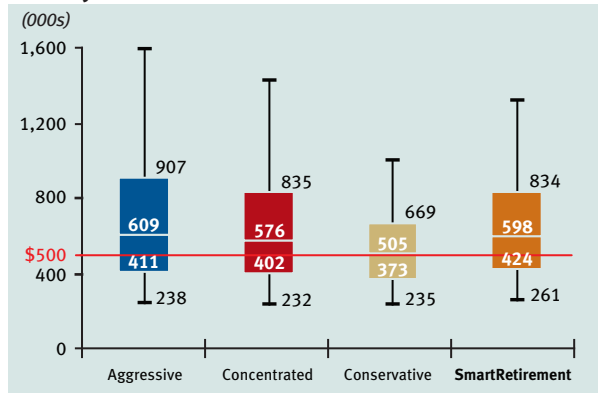
These charts show the range of outcomes (i.e., expected account balances at retirement) from scenario testing of four target date fund designs, based on JPMorgan’s industry behavior and capital market assumptions.

The colored box for each fund design marks the 25th, 50th and 75th percentile outcomes, from top (best) to bottom (worst). The vertical black lines reaching out from the top and bottom of the box show the range of outcomes up to the 5th and down to the 95th percentile.

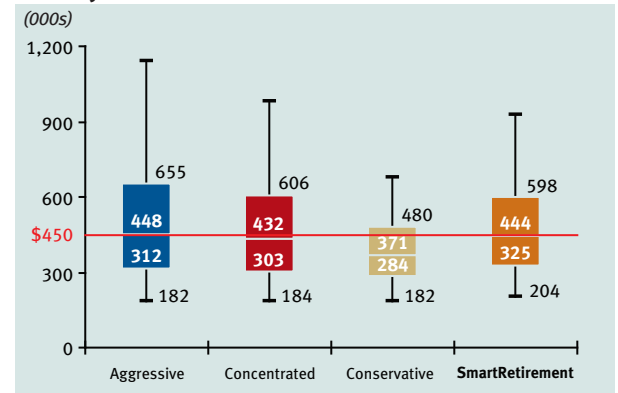
For each industry, the horizontal red line marks the target account balance needed to achieve income replacement.

(See Appendices B and C for JPMorgan Asset Management Capital Market Assumptions – 2006 and the calculation of income replacement targets.)

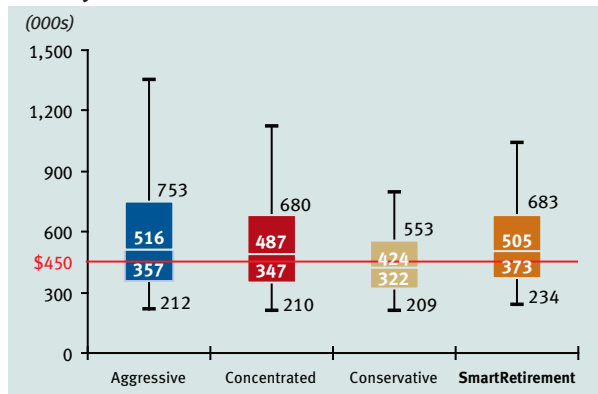
Range of expected balances with Financials industry behavior



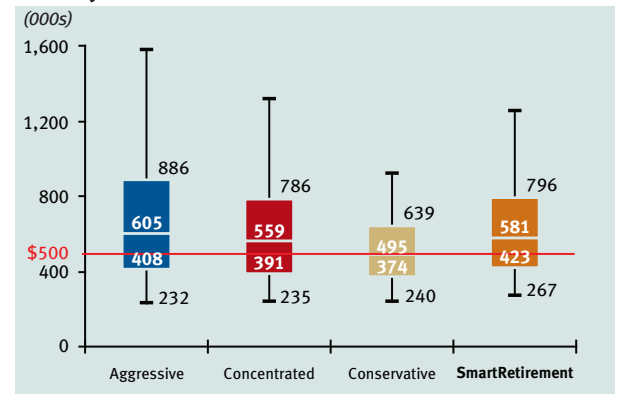
Range of expected balances with Healthcare industry behavior



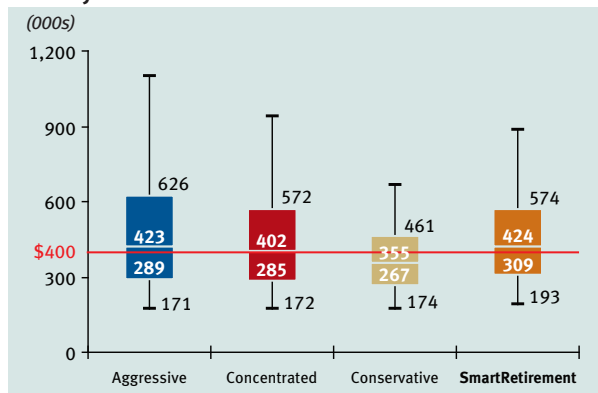
Range of expected balances with Industrials industry behavior



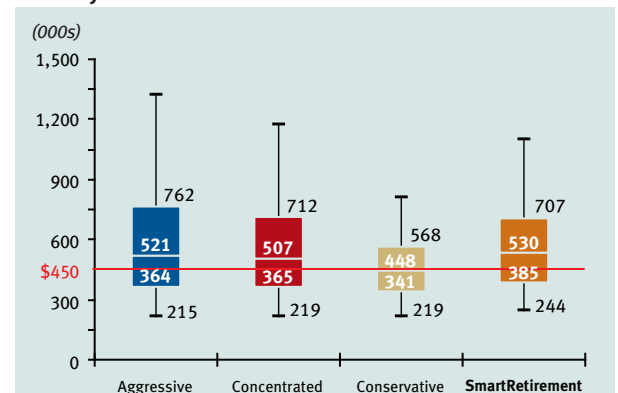
Range of expected balances with Information Technology industry behavior



Range of expected balances with Materials industry behavior



Range of expected balances with Utilities industry behavior



For all charts in Appendix A, results are based on JPMorgan Asset Management Long-Term Capital Market Return Assumptions, 2006, JPMorgan Asset Management and industry prospectuses. All dollar values are inflation-adjusted.

Appendix B: JPMorgan Asset Management long-term capital market return assumptions*

	Expected 10–15 year annualized compound USD returns	Rationale
U.S. Inflation	2.50%	Inflation to remain generally well-contained, but risks are to the upside given tight supply-demand balance in energy.
U.S. Real GDP	3.25%	Productivity growth expected to remain strong, but below the exceptional gains of recent years.
U.S. Cash	4.25%	Higher real short-term rates than in recent years, as Fed needs to work hard to contain inflation.
U.S. Treasuries (10-yr) TR	4.75%	10-yr yields to rise toward equilibrium level of 5.25%, but decline in bond prices to hurt returns as yields rise.
U.S. Aggregate TR	5.25%	Spreads near equilibrium, but rise in Treasury yields to hurt returns until adjustment is complete.
U.S. Long Duration Govt/Corp	5.25%	Bond yields expected to rise, but search for yield expected to put cap on longer term rates.
U.S. TIPS TR (nominal)	4.75%	Real yields expected to rise, hurting returns in early years.
U.S. High Yield TR	7.25%	Spreads assumed to widen from current historically low levels. Some haircut to returns from expected defaults.
Non-U.S. World Govt. Bond Index TR (local currency)	3.00%	Bond yields expected to rise, hurting returns in early years.
Non-U.S. World Govt. Bond Index TR (USD)	4.75%	Decline in the dollar (particularly against Japan, whose weight in WGBI is large) to provide an average 175bp per annum boost to returns.
Emerging Market Debt TR	7.50%	Spreads assumed to widen, but by less than High Yield; assumes secularly improving credit quality of EM universe.
U.S. Municipal TR	4.00%	Bond yields expected to rise, hurting returns in early years.
U.S. Large Cap TR	7.25%	Sum of below building blocks (EPS Growth + Dividend Yield + Impact of Changes in P/E Multiples).
U.S. Large Cap EPS Growth	5.50%	Boost from productivity acceleration is waning. EPS growth expected to be slightly below nominal GDP growth.
U.S. Large Cap Dividend Yield	2.25%	Dividend payout ratios expected to rise.
U.S. Large Cap P/E Impact on Return	-0.50%	Expect minor amount of multiple contraction, taking multiples back toward averages of past low inflation periods.
U.S. Mid Cap TR	7.50%	25 bps premium over Large-Cap. Small-Caps have become comparatively expensive and no longer appear to warrant a return premium relative to Mid-Caps.
U.S. Small Cap TR	7.50%	
U.S. Large Cap Growth TR	7.00%	Value expected to outperform growth over long time periods.
U.S. Large Cap Value TR	7.50%	
EAFE TR (local currency)	7.75%	Non-U.S. economic and (especially) profit performance expected to improve, fueling a small rise in P/E multiples.
EAFE TR (USD)	8.75%	Decline in the dollar (particularly against Japan) to provide an average 100bp per annum boost to USD EAFE returns.
Emerging Market Equity TR (USD)	8.75%	Improved economic and profit performance by EM economies. Currencies likely to rise over time vs. USD.
Private Equity TR (Industry median)	8.50%	Forecast is modestly above those on higher-risk categories of public equity. Only top quartile managers can be expected to substantially beat public market returns. (See note below.)
U.S. Direct Real Estate (unlevered)	6.75%	Less than equity return, more than fixed income. Reflects strong operating income yields.
REITs	7.00%	A bit higher than return on direct real estate due to leverage. Premium constrained due to comparatively expensive REIT valuations.
Hedge Fund (non-directional) TR	5.75%	Hedge Funds to deliver only moderate returns but with comparatively low risk. Top managers expected to beat these returns. (See note below.)
Hedge Fund (directional) TR	7.00%	

As of November 30, 2005*

Note: Private Equity and Hedge Funds are unlike other asset classes shown above, in that there is no underlying investible index. The return estimates shown above for these assets are our estimates of industry medians; the dispersion of returns among different managers in these asset classes is typically far wider than in traditional assets. Given the complex risk-reward tradeoff in these assets, we counsel clients to rely on judgment rather than quantitative optimization approaches in setting strategic allocations to these asset classes. Please note all information shown is based on assumptions; therefore, exclusive reliance on these assumptions is incomplete and not advised. The assumptions should not be relied upon as a recommendation to invest in any particular asset class. The individual asset class assumptions are not a promise of future performance. Note that these asset class assumptions are passive-only; they do not consider the impact of active management. Return estimates are on a compound or internal rate of return (IRR) basis. Equivalent arithmetic averages, as well as additional notes, are shown on the next page.

* JPMorgan Asset Management's long-term capital market return assumptions as of November 30, 2005 were used in this and our earlier research report on target date funds. For our latest assumptions, as of November 30, 2007, please visit our website at jpmorgan.com/insight or contact your JPMorgan representative.

Appendix C — Income Replacement Summary

Although salary levels over the course of a participant's career determine the dollar amounts he or she is contributing every year into a 401(k), the salary level obtained by the date of retirement determines the lifestyle to which he or she has become accustomed and the amount of wealth on which he or she will need to live.

Research on retirement has concluded that the living expenses required to maintain a working year's lifestyle in retirement decrease significantly. There are many factors that lead to the decline in required gross income, such as a decline in income taxes, the start of social security benefits, the elimination of many working expenses and the culmination of many savings goals (such as retirement). On average, an individual will need to replace around 80% (or need an 80% replacement ratio) of their working income in retirement to maintain his or her former standard of living.¹

However, many of the factors that help determine the amount of income replacement needed depend on an individual's circumstances. One major factor that will alter the required level of income replacement is the individual's salary that is to be partially replaced. At lower levels of income, a small replacement ratio is required, due to lower income tax rates in retirement and proportionally greater Social Security benefits. For working incomes of around \$65,000, the total replacement ratio is only 75% and Social Security replaces around 40%, so the remaining replacement rate declines to about 35%. However, for higher working incomes of around \$80,000, the total replacement ratio


increases to 77%, but Social Security benefits currently replace only 35% of income. This leaves 42% of working income to be replaced by alternate savings, such as an individual's 401(k) plan.

Income replacement can also be expressed as a target portfolio level — the minimum amount needed, hypothetically, to purchase an annuity that would provide the required level of income replacement for life. Estimates of the lump sums can differ, depending on the return embedded in the annuity and whether the income stream adjusts with inflation. Although there are a number of methods for measuring the value of a portfolio at retirement, we use the price of an annuity to derive an equal measure for the 401(k) balance needed to provide a minimum income replacement level.

In our analyses, we observed sub-populations of retirees earning a wide range of final salaries. The average across the population was approximately \$65,000, but ranged from \$50,000 to over \$80,000 across industry groups. Market prices of annuities replacing 35% of the average \$65,000 income were about \$400,000 in late 2006. Alternatively, final salaries of \$80,000 would require around \$550,000 to replace around 42% of that income.² Of course, there are many additional factors that can alter an individual's required income replacement, such as medical expenses, additional savings, or continued employment. We take the view that structuring target date strategies to accommodate such highly unpredictable and diverse post-retirement cash flows could lead to poor target date fund design. We believe a more prudent approach is to help as many participants as possible meet the basic income replacement goal defined in this paper.

¹ The Aon Consulting/Georgia State University 2004 Retirement Income Replacement Ratio Study, Aon Consulting.

² Our analysis assumes a 5% return and a 2.5% inflation rate. Academic research and industry pricing center around these numbers but can vary dramatically. Annuity amounts are inflation-adjusted to represent today's dollars.



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