

Managed Advice: The Value Add of Personalized Solutions over Target Date Funds

Executive Summary

NextCapital Advisers has created a framework that quantifies the benefits of personalized managed advice compared to target date funds. The benefits can be quantified and expressed across multiple features of the managed advice solution adding up to a substantial advice value add for end investors. In this paper, NextCapital Advisers provides an analysis focused only on the personalized investment advice feature and how it can provide value relative to an age-based target date fund strategy.

We further highlight that the advice value add is not constant, as investor demographics and advisory inputs vary over time, which is contrary to the common line of thought that attributes a fixed value in terms of basis points. Additional investor data further increases the validity of our advice and enables us to pinpoint the advice value add more precisely.

NextCapital Advisers believes this analysis provides a framework that is repeatable and broadly applicable across different plans and target date funds.

Comparative Framework and Methodology

Our comparative framework quantifies the advice value add vs. the age-based target date fund strategy from two perspectives; an increased return perspective, and an increased retirement income stream perspective. The increased return perspective is quantified at a single point in time using the investor's projected wealth at retirement, while the retirement income stream perspective is quantified over the investor's personalized decumulation period using the estimated annual retirement income.

The analysis is conducted over a wide spectrum of workplace plan scenarios in the following way:

1. We categorize investors into either Return Enhancement or Risk Control cohorts as follows from their implied and dynamically calculated risk appropriateness score determined by the personalization methodology:
 - a. Return Enhancement investors possess personalized glide path strategies with a focus on capital growth.
 - b. Risk Control investors possess personalized glide path strategies with a focus on capital preservation.
2. We compute aforementioned return and income statistics that follow from the personalized glide path strategy across stochastically simulated market return scenarios.
3. We quantify the advice value add of personalization by evaluating the projected additional return and income potential following the personalized glide path relative to the baseline glide path asset allocation.
 - a. Return Enhancement investors' advice value add is anchored to the median market expectations (confidence level), broadly aligned with their investment objective.
 - b. Risk Control investors' advice value add is anchored to pessimistic market expectations (confidence levels), broadly aligned with their investment objective.

Broadly Applicable Results

We show that the average per-plan advice value add ranges from:

- 7bps to 53bps of additional return p.a. on average, measured by the projected wealth at retirement at the applicable confidence levels, and
- 20bps to 1,100bps additional income p.a. on average, measured by the projected fundable retirement income at risk stream (i.e., income attributable to withdrawals from the participant's accounts, which excludes guaranteed income sources, like Social Security) at the applicable confidence levels.

Note that results per plan vary due to underlying plan demographics and the investor profiles of plan participants.

Concrete Sample Plan Results and Setting Considerations for Varying Levels of Engagement

In order to demonstrate the applicability of the framework in practice, we quantify the advice value add for a concrete sample plan and compare the results for unengaged and engaged users, i.e., investors who provide auxiliary information in addition to the data available from the recordkeeper. As the level of engagement increases, we are able to write more personalized financial plans with resulting advice profiles being more precise with regards to the investor's unique characteristics and circumstances.

The advice value add at the plan level depends on the distribution of the additional information provided. All else equal, a richer information set per individual investor leads to greater confidence in the portfolio advice assignment, and thus, by extension, we are able to articulate the advice value add at a higher level of precision. For a hypothetical thought experiment consider the following example: While derived advice value for a given investor might be 30bps with an (unobservable) standard error of +/-20bps, the advice value add after engagement might be higher or lower (40bps or 20bps), but the (unobservable) standard error shall be by an order of magnitude smaller, e.g., +/- 5bps, given the larger information set. Note that we do not actually calculate standard errors as part of this methodology here.

Overall, we show that personalization with increased levels of engagement translates into higher average advice value add for Return Enhancement investors, which is largely attributable to the algorithm's design of increasing equity levels when this is sufficiently backed by additional information provided. We may not expect the advice value add for the Risk Control investors to increase as much as it does for Return Enhancement investors due to the conservative nature of the algorithm, however, the derived advice value add can be stated at higher confidence due to the aforementioned reason. For the sample plan, for unengaged users (engaged user statistics in parentheses), we show:

- 11bps to 21bps (11bps to 31bps) additional return p.a. for the sample plan in terms of wealth at retirement at respectively applicable confidence levels, and
- 96bps to 432bps (124bps to 817bps) additional income p.a. for the sample plan in terms of fundable retirement income at risk stream at respectively applicable confidence levels.

Advice Value Add under Contribution Recommendations

The Managed Advice Solutions Suite also offers a contribution recommendation logic geared towards the algorithms' intrinsically defined, adaptive target goal that is recalculated along with the investor's profile over time.

The primary objective of the Solutions Suite is to help participants achieve their retirement goals given their unique circumstances, constraints and preferences. Any portfolio advice service reaches certain limitations towards, e.g., increasing funding status. Therefore, the primary and most effective mechanism is to promote contribution increases as these yield the highest benefits from an income

certainty level perspective, but may compromise the investor's current lifecycle. Note that the advice value add of doing so, i.e., nudging investors to save beyond what they would have saved in the absence of a methodological consistent goal readiness assessment, is not part of the analysis conducted here.

Engaged users who follow the contribution recommendation, which is a desired outcome, are more likely to shift from the Return Enhancement to the Risk Control cohort. Furthermore, as they approach a more neutrally funded status, their personalization shifts are anticipated to be smaller in magnitude. Note that even in this case, the algorithm continues to evaluate the investor's profile over time with any input changes for an investor prompting the algorithm to re-evaluate the investor's risk appropriateness score which may lead to larger personalized adjustments relative to the baseline implied glide path strategy.

Comparative Framework and Results

Background on Glide Path Theory

TDFs are a one-size-fits-all approach created for hypothetical representative economic agents. Indeed, a baseline glide path asset allocation strategy, projected using a set of capital market assumptions (CMAs), implies an almost unique investor base under a given methodological framework within its underlying assumptions. Our research suggests that the majority of plan participants deviate away from these baseline implied investor profiles including their derived, implied goals, and thus, by extension, follow an inappropriate asset allocation strategy when investing in a target date fund.

While TDFs de-risk their asset allocation over time on a glide to- or glide through-retirement basis, these are not goal based solutions in that these do not define and subsequently measure a personalized goal in terms of a planning horizon and retirement income target amount, leaving the investor in the dark.

The Solution: A Heuristics-based Personalization Engine at Runtime

Our *Heuristics-based Personalization Engine at Runtime* approach, advocated here, builds upon and extends the baseline glide path asset allocation strategy that has been constructed using any method. The personalization takes place through forecasting and then dynamically scoring the investor's evolving profile and, even with minimum required data, such as salary, account balance and contribution etc., we arrive at a superior risk score compared to a one-size-fits-all solution.

NextCapital generates personalized portfolio advice based on the investor's unique characteristics and circumstances (i.e., data and inputs which describe the investor's personal information, lifestyle, financial status, etc.) all of which are tied to and inform the investor's (or household's, where applicable) risk appropriateness score; for further information refer to section [Background on the Personalization Algorithm](#) in the Appendix. Ultimately, the algorithm makes adjustments with an overall focus on either Return Enhancement or Risk Control as detailed below.

Return Enhancement

Investors in this cohort are characterized by an overall higher risk/return capacity (in conjunction with a moderate to high implied risk tolerance) and receive personalized glide paths that are more focused on capital growth than the baseline glide path strategy. The following are examples of Return Enhancement investors, under the assumption that each investor's other characteristics and circumstances are the same as the baseline investor's:

- Married investor with a longer life expectancy than the average investor.
- Investor who has a higher guaranteed portion of projected fundable retirement income relative to their peers (i.e., guaranteed income from Social Security or a pension).
- Investor who is underfunded relative to their target.

Risk Control

Investors in this category have an overall lower risk/return capacity (along with a moderate to low implied risk tolerance) and receive personalized glide paths that are more focused on capital preservation than the baseline glide path strategy. The following are examples of Risk Control investors, under the assumption that each investor's other characteristics and circumstances are the same as the baseline investor's:

- Male investor with poor health who has a shorter life expectancy than the average investor.
- Investor who has a lower guaranteed portion of projected fundable retirement income relative to their peers.
- Investor who is overfunded relative to their target.

Comparative Analysis Framework

Outcome Metrics for Evaluation

In order to quantify the advice value add of the NextCapital-powered personalization solution, we start by calculating the following outcome metrics:

- projected wealth at retirement
- fundable retirement income at risk (i.e., income attributable to withdrawals from the participant's accounts which excludes income from guaranteed sources, like Social Security) along the entire decumulation phase

for large sets of representative Return Enhancement and Risk Control real-world investors following the NextCapital-powered personalized portfolio advice and baseline glide path asset allocation strategies.

We use the baseline glide path asset allocation strategy as a benchmark to evaluate the efficacy of the NextCapital-powered personalized portfolio advice. Note that the forecasts for the baseline glide path strategy leverage the same functionality as the personalized forecasts, and thus, incorporate many benefits such as a dynamic planning horizon projection, personalized taxation, and tax-aware withdrawal strategies, etc.

We produce the two aforementioned outcome metrics for each investor across a set of confidence levels (5%, 50%, 70% and 95%) representing real world capital market scenarios to cover the distribution of possible outcomes in our analysis: To be clear, each confidence level refers to a simulated market return scenario that ranges from very pessimistic to very optimistic, with higher confidence levels corresponding to more pessimistic market returns (i.e., downside scenario). For example, the wealth at retirement corresponding to the 95% confidence level represents the accumulated wealth under a very pessimistic market return scenario; refer to section [Confidence Level Methodology](#) in the appendix for further information on how confidence levels apply for fundable retirement income at risk.

Assumptions

We use the current NextCapital Advisers Capital Market Assumptions and Model Portfolios and other primary advisory methodological inputs and required assumptions that are used for generating holistic financial plans and providing advice to real users.

Representative Investor Profiles

We determine the representative Return Enhancement and Risk Control investor profiles by sampling from a large pool of more than 12,000 real investors that represent the spectrum of plan participants. In our approach, we attempt to preserve the plan's marginal and joint distribution of age, salary, contribution rate, and plan balance while also ensuring that the aggregation of the investor's underlying characteristics leads to a clear categorization to either Return Enhancement or Risk Control. **Table 1** contains a subset of summary statistics of globally applied demographics underlying all representative Return Enhancement and Risk Control investor profiles.

Table 1: Dispersion of Investor Demographics with Characteristics

Dispersion points are related to the marginal distribution for each category across all representative investor profiles. This means that each row in the table is independent and should not be combined (e.g., an investor in the middle of the distribution is not 45 years old with a salary of \$122k, a 7% contribution rate, and a plan account balance that is \$114k). Source: NextCapital Advisers, Inc. © NextCapital Advisers, Inc. 2020. All rights reserved.

	Dispersion Points				
	Towards lower tail (10th Percentile)	~30th Percentile	Midpoint	~70th Percentile	Towards upper tail (~90th Percentile)
Age	30	35	45	55	60
Salary (\$)	29,000	55,000	122,000	156,000	232,000
Contribution Rate (%)	0	3	7	15	18
Total Plan Balance (\$)	7,000	37,000	114,000	281,000	603,000

Categorization

We then categorize the set of representative investors into either Return Enhancement or Risk Control buckets based on a comparison of the fundable retirement income at risk output metric at each confidence level following from the personalized and the benchmark asset allocation strategies.

Return Enhancement

Investors are categorized into Return Enhancement if the change in the fundable retirement income at risk output metric (personalized vs benchmark) is maximized at the 50% or the 5% confidence levels (i.e., the confidence levels pertaining to less conservative market returns). Refer to section [Return Enhancement Example](#) in Appendix for a generic example of Return Enhancement categorization for a hypothetical investor.

Risk Control

Investors are categorized into Risk Control if the change in the fundable retirement income at risk output metric is maximized at the 70% or the 95% confidence levels. Refer to section [Risk Control Example](#) in Appendix for a generic example of Risk Control categorization for a hypothetical investor.

Methodology

Now, we quantify the advice value add provided by the NextCapital-powered personalization algorithm. Refer to section [Return and Income metrics](#) in the appendix for more information.

- First, we calculate the difference in the money-weighted return up to retirement (using the wealth at retirement outcome metrics) to assess the advice value add of personalization over just the accumulation period.

- Second, we calculate the percentage change in fundable retirement income at risk to determine the advice value add that is realized for each investor in the sample across the entire retirement goal planning horizon (accumulation and decumulation). Refer to section [Improvement in Income at Risk Example](#) in Appendix.

Assessment

For Return Enhancement, we quantify the advice value add using the output at the 50% confidence level (median) as the algorithm is focused on capital growth. For Risk Control, we use the larger of the 70% and 95% confidence levels. We use higher confidence levels for Risk Control investors because the algorithm is focused on capital preservation during market downturns and the degree of downside risk protection varies based on the risk appropriateness score.

Broadly Applicable Advice Value Add Results

We demonstrate the advice value add in the most general case, allowing for the fact that the value add may vary considerably by plan since the plan's demographic composition informs the distribution of investors both across and within Return Enhancement and Risk Control categories. Further, we note that the results are impacted by the primary advisory methodology inputs such as the capital market assumptions, model portfolios, baseline glide path and other applicable assumptions, which, for brevity of exposition, we keep constant.

In **Table 2** below, we summarize the advice value add in terms of the ranges of Average Return and Income Improvements for varying representative sets of Return Enhancement and Risk Control investors – having established that the range concept seeks to address the variation in the distribution of the underlying plan demographics. This is achieved by varying the weights attached to the fixed set of representative investors associated within the Return Enhancement and Risk Control categories in order to keep the analysis tractable.

Table 2: Average Return and Income at Risk Improvements Across Plans

Single asterisk (*) indicates that the money-weighted return is calculated based on starting wealth, contributions, and projected wealth upon retirement. Two asterisks (**) indicate that the actual range is highly dependent on the underlying plan composition. All values subject to primary advisory methodology inputs. Source: NextCapital Advisers, Inc. © NextCapital Advisers, Inc. 2020. All rights reserved.

Category	Avg. Improvements in Money-weighted Return p.a. across Investors		Avg. Improvements in Fundable Retirement Income at Risk p.a. across Investors	
	Global Average Improvement across Plans	Range of Avg. Improvements across Plans**	Global Average Improvement across Plans	Range of Avg. Improvements across Plans**
Return Enhancement	0.39%	0.09% ~ 0.53%	8.1%	2.8% ~ 11.0%
Risk Control	0.13%	0.07% ~ 0.25%	0.8%	0.2% ~ 2.6%

Analysis

We note that plans with a larger proportion of Return Enhancement investors may expect a larger average advice value add under the given set of assumptions and configuration. For example, a plan with 75% Return Enhancement investors (and 25% Risk Control investors) is estimated to have an average improvement in money-weighted return per annum of 33bps, based on the global average values. In the unlikely scenario that a plan is comprised almost entirely of Risk Control investors, e.g., 90/10, we still expect the plan to realize at least 16bps (7bps) average improvement in money-weighted return per year and 152bps (45bps) average improvement in fundable retirement income at risk per year based on the global average (assuming plan demographics that are more closely aligned

with the baseline implied investor). All values subject to the primary advisory methodology inputs described earlier. Refer to section [Key Concepts and Results](#) in the Appendix for more discussion on how to interpret these results.

In the remainder of this paper, we walk through the exercise of quantifying the advice value add of the personalization algorithm for a real sample plan.

Empirical Sample Plan Analysis and Results

Real Sample Participants Demographics and Engaged User Simulation

We now apply the same advice value add methodology discussed above to an existing sample plan of more than 1,000 participants. We assume approximately half of the plan users engage with the NextCapital application and provide information in addition to the minimum available data (i.e., data that can be provided by the recordkeeper). In a controlled setting, we randomly generate engaged user inputs with minor constraints in place to ensure simulated inputs are reasonable, i.e., leaving salary information and contributions unchanged (which would add an additional layer of participation and complexity). **Table 3** contains a summary of the plan demographics.

Table 3: Dispersion of Investor Demographics with Characteristics for Sample Plan

Dispersion values are calculated based on the marginal distribution for each category across all sample plan investors. This means that each row in the table is independent and should not be combined. Source: NextCapital Advisers, Inc. © NextCapital Advisers, Inc. 2020. All rights reserved.

	Dispersion Points				
	Towards lower tail (10th Percentile)	~30th Percentile	Midpoint	~70th Percentile	Towards upper tail (~90th Percentile)
Age	30	40	48	55	63
Salary (\$)	29,000	44,000	61,000	117,000	147,000
Contribution Rate (%)	3	5	6	10	13
Total Plan Balance (\$)	4,000	18,000	59,000	142,000	373,000

Commentary on Real Sample Plan Demographics

We note that the majority of investors in our sample plan are relatively closely aligned with the baseline implied profile. Thus, the Average Return and Income Improvements for this sample plan (presented and discussed below) are a fairly conservative representation of the advice value add that can be realized following the NextCapital-powered personalization solution.

Advice Value Add for Unengaged Investors

Average Return and Income Improvements for Unengaged Sample Plan Investors

In **Table 4** below, we summarize the Average Return and Income Improvements for the unengaged investors.

Table 4: Average Return and Income Improvements for Unengaged Sample Plan Investors

Single asterisk (*) indicates that the money-weighted return is calculated based on starting wealth, contributions, and projected wealth upon retirement. Source: NextCapital Advisers, Inc. © NextCapital Advisers, Inc. 2020. All rights reserved.

Categorization	Avg. Improvement in Money-weighted Return p.a.*	Avg. Improvement in Fundable Retirement Income at Risk p.a.	Percentage of Population
Return Enhancement	0.21%	4.32%	88%
Risk Control	0.11%	0.96%	12%
Overall	0.20%	3.91%	100%

Dominant Characteristic when Categorizing Unengaged Investors

Recall that an investor categorized into the Return Enhancement (Risk Control) bucket is not necessarily underfunded (overfunded). Our classification framework also considers other factors that influence an investor's risk/return capacity.

Table 5 contains a breakout of which investor characteristic is most influential when categorizing unengaged investors into the Return Enhancement or Risk Control buckets. While approximately 54% of investors are categorized into the Return Enhancement bucket due to being underfunded, note that this number shall be lower if the investors engage with the NextCapital application, which we discuss in the subsequent section [Dominant Characteristic when Categorizing Engaged Investors](#). In addition, note that the NextCapital-powered personalization algorithm employs overall equity level guardrails which ensures that all personalized glide paths, including those for underfunded unengaged investors, remain within a reasonable age-based risk-return spectrum.

Table 5: Dominant Characteristic when Categorizing Unengaged Investors

Each characteristic corresponds to a NextCapital advice factor; refer to [Appendix](#) for further detail. Single asterisk (*) indicates that we calculate an investor's funding status as the ratio of projected retirement income to target. Source: NextCapital Advisers, Inc. © NextCapital Advisers, Inc. 2020. All rights reserved.

Return Enhancement		Risk Control	
Dominant Characteristic	Percentage	Dominant Characteristic	Percentage
Higher Life Expectancy than Average	9%	Shorter Life Expectancy than Average	23%
Gender-neutral Investor due to being Female or Married		Gender-neutral Investor due to being Male	
Higher Guaranteed Income to Peer Average	37%	Lower Guaranteed Income to Peer Average	46%
Underfunded*	54%	Overfunded*	31%
Total	100%	Total	100%

Advice Value Add for Engaged Investors

Average Return and Income Improvements for Engaged Sample Plan Investors

We now turn our attention to engaged investors. In **Table 6** below, we summarize the Average Return and Income Improvements for the engaged sample plan investors. We note that a slightly larger percentage of the population is categorized into Risk Control than for the unengaged investors. However, if the engaged investors employ the algorithm's savings rate recommendation, the percentage of the

population categorized into Risk Control shall increase by a larger magnitude which we demonstrate in subsequent section [Categorization for Engaged Investors who use the Saving Rate Recommendation](#).

We also observe that while the overall improvement in money-weighted return is higher, the improvement for the Risk Control investors only is unchanged at 11bps. This result is attributable to the underlying distribution of engaged user inputs -- i.e., the minimum required data plus additional engaged user data points -- which impacts each investor's personalized portfolio advice differently.

Table 6: Average Return and Income Improvements for Engaged Sample Plan Investors

Single asterisk (*) indicates that the money-weighted return is calculated based on starting wealth, contributions, and projected wealth upon retirement. Source: NextCapital Advisers, Inc. © NextCapital Advisers, Inc. 2020. All rights reserved.

Categorization	Improvement in Money-weighted Return p.a.*	Improvement in Fundable Retirement Income at Risk p.a.	Percentage of Plan Population
Return Enhancement	0.31%	8.17%	85%
Risk Control	0.11%	1.24%	15%
Overall	0.27%	7.16%	100%

Note on Average Return and Income Improvements for Engaged Users Compared to Unengaged Users

For clarity of exposition, note that engaged user inputs impact the investor's overall risk appropriateness score (e.g, addition of an outside account leads to a higher funding status or adding spousal information results in a longer planning horizon) which may lead to the algorithm justifiably focusing more or less on Return Enhancement or Risk Control. Therefore, engaged users may realize larger or smaller (or even the same) average improvements in return and income at risk compared to unengaged investors with the result being dependent on how the engaged user inputs impact the risk appropriateness scores.

For example, the algorithm may deem an unengaged investor as very overfunded, and thus, focus on Risk Control. If this same investor engages with the NextCapital application and changes their health status to "Excellent" in isolation, the investor's funding status would be relatively lower because of a longer projected decumulation period. This could lead the algorithm to place less emphasis on Risk Control which could translate to a smaller improvement in money-weighted return than in the unengaged case.

Dominant Characteristic when Categorizing Engaged Investors

Table 7 contains a breakout of what investor characteristic is most influential when categorizing engaged investors into either Risk Control or Return Enhancement. Note that a much lower proportion of the engaged investors are categorized into the Return Enhancement bucket (24%) due to being underfunded compared to the unengaged investors (54%, from **Table 5** in section [Dominant Characteristic when Categorizing Unengaged Investors](#)).

Table 7: Dominant Characteristic when Categorizing Engaged Investors

Each characteristic corresponds to a NextCapital advice factor; refer to [Appendix](#) for further detail. Single asterisk (*) indicates that we calculate an investor's funding status as the ratio of projected retirement income to target. Source: NextCapital Advisers, Inc. © NextCapital Advisers, Inc. 2020. All rights reserved.

Return Enhancement		Risk Control	
Dominant Characteristic	Percentage	Dominant Characteristic	Percentage
Higher Life Expectancy than Average Gender-neutral Investor due to being Female or Married	17%	Shorter Life Expectancy than Average Gender-neutral Investor due to being Male	18%
Higher Life Expectancy than Average due to Better-than-average Health	3%	Shorter Life Expectancy due to Worse-than-average Health	3%
Longer Accumulation Period due to Late Retirement Age	14%	Shorter Accumulation Period due to Early Retirement Age	20%
Decreased Probability of Unexpected Early Withdrawals (Stable Salary)	7%	Increased Probability of Unexpected Early Withdrawals (Risky Salary)	8%
Higher Guaranteed Income to Peer Average	35%	Lower Guaranteed Income to Peer Average	13%
Underfunded*	24%	Overfunded*	38%
Total	100%	Total	100%

Categorization for Engaged Investors who use the Saving Rate Recommendation

Now we assume that the engaged investor population uses the personalization algorithm's savings rate recommendation (which recommends a savings rate that allows the investor to achieve their goal). Then we classify the engaged investors into the Return Enhancement or Risk Control buckets. We note that a much higher proportion are categorized into Risk Control; refer to **Table 8**.

Table 8: Categorization for Engaged Investors Before and After Savings Rate Recommendation

Source: NextCapital Advisers, Inc. © NextCapital Advisers, Inc. 2020. All rights reserved.

Categorization	Before Savings Rate Recommendation Percentage of Population	After Savings Rate Recommendation Percentage of Population
Return Enhancement	85%	68%
Risk Control	15%	32%
Overall	100%	100%

Advice Value Add for Overall Sample Plan

Finally, we now review the advice value add provided by the NextCapital personalization algorithm for the overall sample plan (i.e., both the unengaged and engaged investors without the saving rate recommendation); refer to **Table 9**.

Table 9: Average Return and Income Improvements for Full Sample Plan Investors without Savings Rate Recommendation for Engaged Investors

Single asterisk (*) indicates that the money-weighted return is calculated based on starting wealth, contributions, and projected wealth upon retirement.
 Source: NextCapital Advisers, Inc. © NextCapital Advisers, Inc. 2020. All rights reserved.

Categorization	Avg. Improvement in Money-weighted Return p.a.*	Avg. Improvement in Fundable Retirement Income at Risk p.a.	Percentage of Population
Return Enhancement	0.26%	6.23%	87%
Risk Control	0.11%	1.12%	13%
Overall	0.24%	5.55%	100%

Appendix A

Appendix A-1 Key Concepts and Interpretation of Results

A-1.1: Interpretation of Broadly Applicable Results

The advice value add shown in [Table 2: Average Return and Income Improvements across Plans](#) represent global averages across the spectrum of plans. To be clear, we are referring to the many possibly encountered, hypothetical plans each with different investor demographics where the global averages are the sample means across all modeled plans. This is achieved by running modeled sample plan participants through the advice value add framework and then varying weights to those representative sample plan participants in a controlled setting in order to approximate how the advice value add may vary per plan.

The lower bound of the range represents the average advice value add achieved by placing higher weights on investors that have characteristics which result in smaller shifts (and, thus, a smaller advice value add) and vice versa for the higher bound of the range. The middle value of the range (referred to in Table 2 as Global Average Improvement across Plans) is derived by placing equal weights across the modeled sample plan participants. We believe that our range is a good representation of a typical +/-2 standard deviation range for the global averages presented; in the absence of the true population data set.

Motivation for the Range Concept

We use the range concept in recognition that the advice value add on a per plan basis may vary considerably depending on the underlying plan and methodological inputs and assumptions (i.e., capital market assumptions, glide path, model portfolios, etc.), and it generally varies also across time. The ranges are not intended to be precise. Rather, they are intended to be broad, high level long run estimates. While we cannot guarantee that all encountered plans will fall within these ranges (as we do not know the true population demographics in advance and across time), we are confident that the ranges provided in the paper are reasonable to be used as rule of thumb estimates.

A-1.2: Interpretation and Comparison of Avg. Improvements in Money-weighted Return p.a. and Avg. Improvement in Fundable Retirement Income at Risk p.a.

Relationship between Income and Return Metrics

The income and return metrics are interrelated. The improvement in return metric is an assessment over the investor's accumulation period only and is calculated based on the investor's starting account balance, contributions, and keyed off the investor's wealth at retirement only. The fundable retirement income at risk metric is an assessment over the investor's full planning horizon (accumulation and decumulation period). It subsumes the investor's wealth to and through retirement, in addition to a variety of factors; refer to section [Fundable Retirement Income at Risk](#) for further information.

Note on Comparing Income and Return Metrics

The return and income metrics should be considered separately. The fundable retirement income metric is on an after-tax basis while the improvement in returns is on a pre-tax basis. This muddies the comparison as the growth in pre-tax wealth does not directly translate to a comparable increase in income but needs to be reduced to reflect the impact of taxes.

A-1.3: Translating Avg. Improvements

a) in Money-weighted Return p.a to an Increase in Wealth at Retirement

The average improvement in money-weighted return p.a. can be translated into a hypothetical increase in wealth at retirement. For example, assuming the plan has an average accumulation period of 25 years, the Personalization Algorithm may increase the real wealth for Return Enhancement investors (with a corresponding improvement in return of 0.39%, refer to [Table 2](#)) by $((1 + 0.39\%)^{25}) - 1 = 10\%$ at retirement. As pointed out previously in this paper, the actual impact of the Personalization Algorithm on a plan will vary according to the plan's demographic composition in addition to the primary advisory methodology inputs used in the analysis.

b) in Fundable Retirement Income at Risk p.a to an Increase in Lifetime Income

Note that the avg. improvement in fundable retirement income at risk p.a. metric is already a representation of a lifetime benefit as the metric is based on both the accumulation and decumulation period. To be clear, the Personalization Algorithm may increase the real lifetime income at risk (attributable to withdrawals from accounts) for Return Enhancement investors by 8.1% (refer to [Table 2](#)).

Consideration

Note that the global averages are derived from various investors across the entire sample plan with differing accumulation horizons (e.g., 40 or 5 years) and decumulation periods (e.g., 20 or 25 years). Therefore, extrapolating these average results to individual users may be less meaningful.

Appendix A-2 Q&A

A-2.1: What is the cutoff between Return Enhancement and Risk Control bucket participants?

For each modeled investor persona, we evaluate the change in fundable retirement income at risk metric across a range of confidence levels. We categorize those investor personas whose largest gain occurs at either the 95% or 70% confidence level as Risk Control. The other investor personas' risk profiles are more aligned with a higher risk/return capacity in conjunction with a moderate to high implied risk tolerance, and these are therefore classified as Return Enhancement. Refer to [Categorization](#) at the bottom of page 6 and A-2.2 below for further information.

A-2.2: What is the intuition behind anchoring the advice value add to pessimistic (median) market expectations for Risk Control (Return Enhancement) investors?

The advice value add for Risk Control investors is quantified at pessimistic market conditions (i.e., the 95% or 70% confidence level) because the personalization algorithm targets a lower risk/return capacity with a strong focus on risk tolerance and thus has advised a personalized glide path which is lower than the benchmark (i.e., the personalized glide path is more conservative than the benchmark). We use higher confidence levels for Risk Control investors because the algorithm is focused on capital preservation during market downturns and the degree of downside risk protection varies based on the algorithm's risk appropriateness score.

On the other hand, for Return Enhancement investors, we quantify the advice value add at the median market expectations (i.e., the 50% confidence level) because the personalization algorithm targets a higher risk/return capacity with an advised personalized glide path which is higher than the benchmark. We use the 50% confidence level because the algorithm is focused on capital growth.

A-2.3: What plan assumptions are used for “Broadly applicable results” vs. “Concrete Sample Plan Results”? Is the former an aggregation of many plans and the latter is one plan?

Broadly applicable results are a representation of the advice value add across the spectrum of possible plans; refer to section [A-1.1](#).

Regarding the Concrete Sample Plan Results, we calculate the advice value add for each plan participant in a sample plan of more than 1,000 plan participants, and then average the results.

Appendix B

Appendix B-1 Return and Income Metric Definitions

Money-weighted Return

The money-weighted return metric is calculated as the internal rate of return based on the investor's starting wealth, contributions, and projected wealth at retirement.

Fundable Retirement Income at Risk

The fundable retirement income at risk outcome metric is an estimate of the amount of income that an investor can sustain throughout retirement, attributable specifically to withdrawals from the participant's accounts. This metric excludes income from guaranteed sources, like Social Security, pensions, or annuities.

The metric is not only keyed off the investor's wealth at retirement, but is also impacted by various other components such as:

- the investor's personalized tax-aware forecasting and
- the glide path strategy in decumulation (higher equity level in retirement, i.e., decumulation should in most cases translate into higher retirement income whenever the decumulation period is long).

Confidence Level Methodology

The metric at a high confidence level (e.g., the 95% confidence level) represents the amount of income that an investor can fund along their entire decumulation period over a pessimistic market return scenario and vice versa for a low confidence level.

Appendix B-2 Categorization Examples

Return Enhancement Example

As the maximum change in fundable retirement income at risk occurs at the 5% confidence level, the investor is categorized into the Return Enhancement cohort. Note that even though the 5% confidence level is used for classification purposes, the 50% confidence level is still used to quantify the advice value add.

Table B-2.1: Return Enhancement Categorization Example for Hypothetical Investor

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Confidence Level	Change in Fundable Retirement Income at Risk
95%	-0.86%
70%	1.48%
50%	3.98%
5%	7.58%

Risk Control Example

As the maximum change in fundable retirement income at risk occurs at the 95% confidence level, the investor is categorized into the Risk Control cohort.

Table B-2.2: Risk Control Categorization Example for Hypothetical Investor

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Confidence Level	Change in Fundable Retirement Income at Risk
95%	2.58%
70%	0.79%
50%	-0.02%
5%	-0.64%

Appendix B-3 Improvement in Income at Risk Example

Improvement in Income at Risk Hypothetical Example

To illustrate how the improvement in fundable income at risk is calculated, we have prepared the following, hypothetical example.

Suppose that a participant's total fundable income (i.e., including guaranteed income sources) following the personalized glide path strategy is \$35,500, while their total fundable income following the benchmark glide path strategy is \$34,500. Furthermore, assume that the participant's fundable income is comprised of \$25,000 of Social Security benefits. Under these assumptions,

- the income at risk for the personalized glide path strategy is equal to (\$35,500 - \$25,000) or \$10,500,
- the income at risk for the benchmark glide path strategy is equal to (\$34,500 - \$25,000) or \$9,500,
- and the improvement in income at risk is equal to (($\$10,500 / \$9,500$) - 1) or 10.5%.

By using this methodology, we better isolate the impact of the Personalization Algorithm on the participant's retirement income. In other words, we exclude guaranteed income sources in the calculation of improvement in income because including them would downward bias the true impact of the managed account advice value add.

Appendix B-4 Background on the Personalization Algorithm

Risk appropriateness is based on an aggregation technique assessed at each glide point (now and in the future) with e.g., future projection metrics such as funding status informing each glide path operation. Addressed concepts covered include the investor's risk/return capacity in conjunction with their implied risk tolerance.

The NextCapital personalization engine incorporates these concepts when generating advice through the Gender/Marital, Health Risk, Retirement Age, Salary Risk, Guaranteed Income, and Funding Gap advice factors, next to other planning methodology components which may indirectly affect advice. See **Table B-4**.

Table B-4: Personalization Algorithm Default Risk Capacity and Risk Tolerance Assumptions

Single asterisk (*) indicates that the default risk tolerance specification per advice factor is implied by the personalization algorithm, all else equal; risk tolerance, here, refers to the investor's emotional comfort with financial risk taking. Source: NextCapital Advisers, Inc. © NextCapital Advisers, Inc. 2020. All rights reserved.

Advice Factor	Scenario	Risk / Return Capacity	Implied Risk Tolerance*	Explanation
Gender and Marital Status & Health Risk	Female or Married or Healthy	High	Moderate	Due to a longer planning horizon (both longer decumulation and potentially longer accumulation period), a higher expected return with associated increase in risk taking is warranted, all else equal.
	Male or Poor Health	Low	Moderate	Due to shorter planning horizon (both shorter decumulation and potentially shorter accumulation period), a lower expected return with an associated decrease in risk taking is warranted, all else equal.
Salary Risk	Stable Salary	High	Moderate	Due to a more stable cash inflow stream (contributions and income) and decreased likelihood of unexpected early withdrawal, a higher expected return with an associated increase in risk taking is warranted, all else equal.

	Risky Salary	Low	Moderate	Due to a less predictable cash inflow stream and increased likelihood of unexpected early withdrawal, a lower expected return with an associated decrease in risk taking is warranted, all else equal.
Retirement Age	Retire Late	High	Moderate	Due to a longer accumulation period, a higher expected return with associated increase in risk taking is warranted, all else equal.
	Retire Early	Low	Moderate to Low	Due to a shorter accumulation period, a lower expected return with associated decrease in risk taking is warranted, subject to the investor's tolerance for risk: <ul style="list-style-type: none"> • Low for investors who retire well before the default retirement age.
Guaranteed Income	High Guaranteed Income Ratio	High	Moderate to High	Due to a more stable retirement cash inflow stream (income from guaranteed sources), a higher expected return with an associated increase in risk taking is warranted, subject to the investor's tolerance for risk: <ul style="list-style-type: none"> • Moderate for investors with a higher guaranteed income ratio and who achieve their goal (funded). • High for investors with a higher guaranteed income ratio and who do not achieve their goal (underfunded).
	Low Guaranteed Income Ratio	Low	Moderate to Low	Due to a less predictable retirement cash inflow stream in retirement (income from guaranteed sources), a lower expected return with an associated decrease in risk taking is warranted, subject to the investor's tolerance for risk: <ul style="list-style-type: none"> • Moderate for investors with a lower guaranteed income ratio and who do not achieve their goal (underfunded). • Low for investors with a lower guaranteed income ratio and who do achieve their goal (funded).
Funding Gap	Underfunded	High	High	Due to a projected funding gap, a higher expected return with associated increase in risk taking is warranted, subject to the investor's tolerance for risk: <ul style="list-style-type: none"> • High for investors who do not achieve their goal (underfunded).
	Overfunded	Low	Low	Due to a projected funding surplus, a lower expected return with an associated decrease in risk taking is warranted, subject to the investor's tolerance for risk: <ul style="list-style-type: none"> • Low for investors who do achieve their goal (overfunded).

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