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June 5, 2009

To: Office of Regulations and Interpretations
Employee Benefits Security Administration
Attn: Target Date Fund Joint Hearing, Room N-5655
U.S. Department of Labor
200 Constitution Avenue NW
Washington, DC 20210

From: Josh Cohen, Institutional Advisory Service - Consulting Services
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RE: Request to testify at the Target Date Fund Joint Hearing
Thursday, June 18, 2009, 9:00 a.m. EST

Russell Investments, a Tacoma, Washington based asset management firm, would welcome the opportunity to testify at the Target Date Funds and Similar Investment Options Joint Hearing of the Department of Labor and the Securities and Exchange Commission, Thursday, June 18, 2009 at the U.S. Department of Labor in Washington, D.C.

Russell Investments provides strategic advice, state-of-the-art performance benchmarks and a range of institutional-quality investment products to U.S. and international clients including individual, institutional and advisor clients in more than 40 countries. Russell has more than \$150 billion in assets under management as of Dec. 31, 2008; Russell Indexes have \$4.3 trillion in assets benchmarked to them as of June 30, 2008.

This business portfolio and reach provides Russell with direct knowledge, understanding and insight that we believe would be relevant and beneficial to benefit the Department of Labor and the Securities and Exchange Commission as the agencies seek to determine whether additional guidance on Target Date Funds (TDFs) by either agency would be helpful.

Russell's asset allocation knowledge, our research on money managers and our history of innovation gives us a broad perspective on target date fund construction. Currently we advise plan sponsors on the selection of TDFs and we implement TDF solutions through either customized approaches or TDF commingled and mutual funds.

We understand the imperative for these funds to be designed based on prudent investor standards. As part of a retirement program, TDFs need to be structured to help participants meet their retirement income goals at an appropriate risk level. The attached article, "Twelve Observations on Target Date Funds," which we wrote last year, provides more detailed information regarding the design of these funds.

Key to Russell's disciplined approach is our belief that risk must be managed appropriately – particularly as the target retirement date approaches. Russell's standard glide path has 32 percent in equities at retirement, and it remains flat thereafter.

Our testimony would include the following key points:

1. Glide Path Construction (6 Minutes)

- a. Discuss how our methodology has led us to the conclusion that TDFs need to have a relatively lower equity allocation at retirement. Key considerations:
 - i. Glide paths should be built with the objective of helping participants meet their retirement income goals.
 - ii. Risk is defined by not meeting those goals. The further the participant is from those goals, the higher the risk penalty.
 - iii. As participants near retirement, they have fewer future contributions (i.e. human capital) to make up for losses from market returns.
 - iv. The concept of sequential risk is critical to understand in defined contribution (DC) plans. It refers to the impact on savings of the sequence of returns that a participant experiences. Sequential risk is highest at retirement (see attached paper.)

2. Manager Selection (2 minutes)

- a. Russell believes that it is difficult for a single investment manager to be able to provide best-of-breed investment options in all asset classes.
 - i. Therefore, we include managers in TDFs from multiple fund families.

3. Performance Measurement (2 minutes)

- a. TDF benchmarking and measurement is not simple. We believe performance measurement should have the following features:
 - i. Evaluates a TDF family as a whole instead of evaluating each individual fund in the series.
 - ii. Measures how well the family does in building wealth over time relative to other options.
 - iii. Russell is developing and refining a methodology to conduct this evaluation.

Sincerely,

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Twelve observations on target date funds

APRIL 2008

By:

Josh Cohen,
Senior Consultant

A participant in a target date fund is entrusting the plan sponsor to determine what is the best investment solution on their behalf. This is a serious responsibility...

There seems to be growing consensus in the retirement industry that target date funds are going to be a critical component of most defined contribution plans. Plan sponsors, participants, money managers, consultants and even the U.S. government have acknowledged the power of target date funds to provide an effective solution to the asset allocation decisions participants have historically had to make on their own.

Plan sponsors have a great deal of choice available, but target date funds require a different type of analysis than they are used to. As someone who has worked with plan sponsors to help select and implement target date fund solutions, I've come to appreciate the differences between approaches – and there truly are differences between approaches. I share below 12 observations based on my experience to date:

Observation #1: Target date funds should be designed with specific objectives in mind.

Target date funds should be seen as a component of an overall retirement program. You'll note I didn't say savings program. Greater certainty in retirement income replacement should be the goal of a target date fund – and asset accumulation is only one part of that. A target date fund series is not merely a set of portfolios designed for different points in someone's life. Rather, it should be seen holistically as a continuous retirement program designed to meet specific objectives.

Observation #2: Glide paths (equity to fixed income allocation) slope down because of contributions, not because of time horizon.

You may hear statements like: "you can be more aggressive when you have a longer time horizon because you have more time to make up for losses." This line of thinking is flawed¹. The real reason a glide path should slope down is because early in someone's career, their retirement income expectation is based on a small amount of accumulated savings and a whole lot of human capital, in the form of future contributions. So a young saver can invest more of their savings in risky asset classes (like equities) because their human capital acts more like a bond. As accumulated savings grow and expected future contributions get smaller, the savings are increasingly invested in less risky asset classes.

Why is this esoteric distinction important? As I will discuss in other observations, I have found that a glide path manager's understanding of this difference drives the design of different target date funds in important ways. A target date fund should be built from sound principles.

¹ For a brief description of why this is so, see Smith, Matt and Bob Collie. "Sequential Risk: When it comes to investment returns in defined contribution (DC) plans, 'when' can be almost as important as 'how much.'" Russell Investments. February 2008. For a fuller analysis, see Gardner, Grant and Yuan-An Fan, "Russell's Approach to Target Date Funds - Building a Simple and Powerful Solution to Retirement Saving." Russell Investments. January 2008.

Observation #3: Risk should be measured in terms of not meeting retirement objectives.

Conventionally, investment risk is measured by some volatility calculation, like standard deviation of returns. But that point-in-time measurement of asset return volatility is meaningless in a 40-year savings program. The more important risk is falling short of your goals of meeting certain levels of income replacement at retirement.

Also, it's important not to think of this risk measurement as an "all-or-nothing" proposition. I have found that some target date funds that define risk simply as running out of money in retirement (without recognizing that there is a big difference between not meeting a goal by \$1 and not meeting it by \$1 million) tend to be much more aggressive. That's because they've defined their goal as either you met it or you didn't.

Observation #4: It's okay to have high equity allocations at the beginning of the glide path. In fact, you should.

Remember my human capital discussion in observation #2. For example, a young saver just starting to put money away will have a relatively small account compared to what it is projected to be in the future. Much of the growth of a young saver's account early on is going to be driven by plan contributions. So, one can typically afford to have a high equity allocation without worrying that a large negative return will have a meaningful impact on final expected wealth.

As explained in our recent note on sequential risk², the timing of investment returns is critical in a DC plan. Sequential (or timing) risk is lowest in the early years of saving. That means that, in the context of the overall program, this may be the best time to take maximum risk on accumulated savings.

Observation #5: It's not okay to have high equity allocations at the retirement end of the glide path.

This is the corollary to the sequential risk discussion above. By retirement, there are no more future contributions to offset the risk in the investment portfolio. A negative return near to retirement has significant impact on the amount of income that the plan will provide.

Those glide path managers who have more aggressive allocations at the retirement date will look like winners if the risk is rewarded and returns are good – but this approach is at odds with the holistic retirement program that a target date fund should represent. I'm not sure "swinging for the fences" is the right solution here. Think of the person who retired in March 2000 and experienced sharply declining markets for three years after that: it's hard to recover from such losses when money is already coming out of the account. There is significant timing risk when taking too high an equity allocation at retirement.

Observation #6: There is no clear investment rationale for the glide path to continue to slope down after retirement.

You are at your maximum risk exposure at retirement because you have the longest time to fund retirement income. Your asset allocation in retirement should be more a function of how you react to experience than to time. However, since we can't know everyone's experience, a flat glide path is a reasonable place to start.

Some glide paths are more aggressive at the target retirement date and continue to slope down for many years into retirement. However, this becomes the sequential risk

² Smith Matt and Bob Collie. February 2008. Op. cit.

argument in reverse. Now you are most vulnerable to a negative return at the beginning of your disbursement of assets.

Observation #7: Target date solutions should provide diversified sources of return.

Doesn't every investor seek to push out the efficient frontier by diversifying into uncorrelated asset classes? Yet, many say we shouldn't expose "naïve" defined contribution investors to more volatile asset classes like REITs or emerging markets. I could agree with that if you are talking about offering these as standalone options. However, as a part of a broader portfolio where it is the volatility of all of the assets together that counts (not that of each asset in isolation), it may make sense to provide these types of exposures wherever possible. In fact, a good fiduciary who wants to meet prudent investor standards should consider this.

Observation #8: Passive should not be considered the safe choice.

An example of a prudent investor is someone who makes decisions that they believe are in the best interests of the participants. They are not necessarily taking into account fee minimization, convenience or the tracking of market index performance. There is a notion floating around that because these are default options, a fiduciary is in a safer position by offering low cost, low tracking error options. However, to me this seems like a solution more driven by the fiduciary's own interests than the participants'.

I'm not arguing that passive investing is bad and isn't the right solution for some³. But, I'm concerned how some are coming to that conclusion. Indeed, we find that most large investment programs, whether defined benefit, endowment or the individual options in a defined contribution plan, use a combination of active and passive management. If an active/passive mix is a prudent decision for those plans, it may be prudent for a target date fund as well. How can a plan sponsor explain to participants that it's important for their DB plan to pay for the best investments, but the DC plan just gets whatever investments are cheapest? And if a plan sponsor doesn't consider low risk, all passive investing the most prudent choice for an organization's DB plan, why is it considered appropriate for its DC plan?

Observation #9: Proprietary managers face headwinds.

Many target date solutions are offered by investment companies that use their own proprietary strategies within the funds. Such providers are challenged to argue that they can provide best-of-breed approaches across all asset classes. In addition, there are issues surrounding the independence and objectivity of those making the decision of which underlying strategies to use. Further, plan sponsors should evaluate the commonality of holdings and themes across underlying strategies from a certain provider, as well as the ability to gain access to capacity-constrained strategies in the target date fund.

Observation #10: Building your own target date fund is harder than it sounds.

Some larger plan sponsors like the idea of creating a customized target date fund built from, for example, the asset class funds that are already being offered in the plan. This can make sense, but while it can appear straightforward on the surface, I think it's a challenge to implement effectively and for the long term.

Plans thinking of going down this route should make sure they have the dedicated staff resources, an appropriate amount of assets to make it cost efficient, and the right

³ More detail of Russell's position on this question can be found in Collie, Bob. "The Risks and Benefits of Active Management in Target Date Funds. It Doesn't Have to Be Either/Or." Russell Investments. July 2007.

partner to do this. Weak implementation can wipe out any potential benefits. And, while you may feel comfortable that you can set this up today, investment programs are never static: the structure has to be maintained over the long term, when those who created the options may have moved on to do something else.

Observation #11: Take care with performance comparisons.

Everyone wants to compare performance of funds versus other funds to make a value judgment of which is better. I can tell you that a simple comparison of returns of different providers is a dangerous activity. For one thing, there isn't much history for most target date funds. Even more important, a comparison of returns by target date years will be driven by asset allocation – if equities perform well, the provider with the highest allocation to equities will tend to be top of the pile (and vice versa when equities perform poorly). That doesn't tell you who was "right" or "wrong." What about a measure of risk?

This is not to say that the industry doesn't need better ways to measure performance and I think we will see innovation in this area. While this is still work-in-progress, it is clear that such performance measurements need to look at target date funds as a family, not as individual funds. It is also clear that performance should be based on how well the family does in building retirement wealth, not simply raw return numbers. Expect to hear more from the industry on this topic in the coming months.

Observation #12: Target date funds can't solve all your problems.

I hear some providers say that participants act badly and thus we need to design target date funds with that in mind. For example, participants don't save enough, they take out too many loans, and they spend too much in retirement. Target date providers who make this argument usually adopt more aggressive allocations to compensate for this bad behavior – again, swinging for the fences.

However, I'm not sure we want to design target date funds in this way. It's important to understand typical participant behavior, but I think one should design funds for a realistic but appropriate saver. A target date fund does help solve the one issue that has given participants the most difficulty – building an appropriate asset allocation. But to expect it to make up for shortcomings in savings rates is unrealistic.

Conclusion

A participant in a target date fund, whether through a default or by their own choice, is entrusting the plan sponsor to determine what is the best investment solution on their behalf. This is a serious responsibility; most plan sponsors are still coming to terms with what that means, and best practices are still in the process of being defined. My intention in writing this note has been to help that process, on which the retirement security of so many is likely to depend.

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Contact your Russell representative or visit www.russell.com/dcinsights.

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Diversification and strategic asset allocation do not assure profit or protect against loss in declining markets.

Please remember that all investments carry some level of risk, including the potential loss of principal invested. They do not typically grow at an even rate of return and may experience negative growth. As with any type of portfolio structuring, attempting to reduce risk and increase return could, at certain times, unintentionally reduce returns.

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Sequential Risk:

When it comes to investment returns in defined contribution (DC) plans, “when” can be almost as important as “how much.”

FEBRUARY 2008

By: Matt Smith,
Managing Director,
Retirement Services

Bob Collie,
Director, Investment
Strategy

Because DC savings are accumulated over a working lifetime, the impact of a period of negative investment returns is greater if it occurs close to retirement than if it occurs in the early stages of accumulation. In this paper, we introduce the concept of sequential risk, which can be viewed as the risk of experiencing poor investment performance at the wrong time. Sequential risk can be managed in part through asset allocation strategies that change over time, such as those built into target date funds.

In the recent paper “The 10/30/60 Rule¹” we used a simple base case simulation to analyze the growth and decumulation of an individual’s DC account. However, a simple base case simulation can only show one (typical) outcome and does not capture the uncertainty associated with retirement provision. One of the biggest sources of uncertainty is the unpredictability of investment returns. In this article, we will explore one aspect of this risk linked to the *timing* of investment returns, a risk that is of particular significance to a DC plan participant. We will refer to this timing risk as *sequential risk*.

Sequential risk is perhaps easiest to understand if it is thought of as the risk of experiencing bad investment performance at the wrong time (i.e. when poor returns do the greatest harm). For example, negative investment returns during the first year of DC saving, while unwelcome, have much less impact on the retirement income generated than the same returns would have if they occurred immediately prior to retirement.

It is possible to quantify this differential by varying the base case developed in the earlier paper. In that base case, distributions totaling \$1.162m were paid to the participant, based on a constant assumed investment return of 7.8% each year throughout the existence of the plan. If, however, we substitute an investment return of -20% into the first year of the plan (when the participant is 25 years old), then total distributions fall to \$1.156m, a drop of barely 0.5% compared to the base case. In contrast, if the same negative return were to be substituted into the base case in the year immediately prior to retirement, it would cause total distributions to fall to \$0.865m – a drop of more than 25%.

For ease of reference, we include a summary of the base case and the two variations described above, as an appendix to this paper.

Sequential risk is about timing, not about time horizon.

¹ Smith, Matt and Bob Collie . “The 10/30/60 Rule: Where Do Defined Contribution (DC) Pension Benefits Come From? It’s Not Where You Think.” Russell Investments. January 2008.

Sequential Risk Is About Timing, Not About Time Horizon

Sequential risk arises because contributions are spread over time. If a DC plan were to be funded by a single amount paid in at one time, then there would be no sequential risk. Investment risk would, of course, still affect the plan, but there would be no risk associated with whether the worst return happened to fall in the early or late years of accumulation: the timing of the investment returns prior to retirement would have no effect on the end outcome.

This concept is illustrated in the following example, which for simplicity covers only a 10 year period rather than the full pre- and post-retirement experience built into our base case, and uses a flat, rather than rising, contribution. We have assumed there are nine years of positive returns (sticking with our base case assumption of 7.8% each year) and one year of negative returns (again, -20%). If \$1,000 is invested at the start of each year, the accumulated value after 10 years could be as high as \$14,922, or as low as \$11,480, depending on whether the negative return occurs early or late in the 10 year period. If \$10,000 is invested at the start of the period (and no further contributions are made), the accumulated value at the end is \$15,727, irrespective of the year in which the negative return occurs.

Case 1: Annual Contributions, Negative Return In Year 1

Year	Account balance at start of year	Savings added to account	Investment rate of return	Investment return earned	Account balance at end of year
1	0	1,000	-20.00%	-200	800
2	800	1,000	7.80%	140	1,940
3	1,940	1,000	7.80%	229	3,170
4	3,170	1,000	7.80%	325	4,495
5	4,495	1,000	7.80%	429	5,924
6	5,924	1,000	7.80%	540	7,464
7	7,464	1,000	7.80%	660	9,124
8	9,124	1,000	7.80%	790	10,913
9	10,913	1,000	7.80%	929	12,843
10	12,843	1,000	7.80%	1,080	14,922

Case 2: Annual Contributions, Negative Return In Year 10

Year	Account balance at start of year	Savings added to account	Investment rate of return	Investment return earned	Account balance at end of year
1	0	1,000	7.80%	78	1,078
2	1,078	1,000	7.80%	162	2,240
3	2,240	1,000	7.80%	253	3,493
4	3,493	1,000	7.80%	350	4,843
5	4,843	1,000	7.80%	456	6,299
6	6,299	1,000	7.80%	569	7,868
7	7,868	1,000	7.80%	692	9,560
8	9,560	1,000	7.80%	824	11,384
9	11,384	1,000	7.80%	966	13,350
10	13,350	1,000	-20.00%	-2,870	11,480

Case 3: Single Contribution, Negative Return in Year 1

Year	Account balance at start of year	Savings added to account	Investment rate of return	Investment return earned	Account balance at end of year
1	0	10,000	-20.00%	-2,000	8,000
2	8,000	0	7.80%	624	8,624
3	8,624	0	7.80%	673	9,297
4	9,297	0	7.80%	725	10,022
5	10,022	0	7.80%	782	10,804
6	10,804	0	7.80%	843	11,646
7	11,646	0	7.80%	908	12,555
8	12,555	0	7.80%	979	13,534
9	13,534	0	7.80%	1,056	14,589
10	14,589	0	7.80%	1,138	15,727

Case 4: Single Contribution, Negative Return in Year 10

Year	Account balance at start of year	Savings added to account	Investment rate of return	Investment return earned	Account balance at end of year
1	0	10,000	7.80%	780	10,780
2	10,780	0	7.80%	841	11,621
3	11,621	0	7.80%	906	12,527
4	12,527	0	7.80%	977	13,504
5	13,504	0	7.80%	1,053	14,558
6	14,558	0	7.80%	1,136	15,693
7	15,693	0	7.80%	1,224	16,917
8	16,917	0	7.80%	1,320	18,237
9	18,237	0	7.80%	1,422	19,659
10	19,659	0	-20.00%	-3,932	15,727

We do not show the cases where the negative returns occurs between the years two and nine, but the results confirm the pattern we have described above.

The Implications of Sequential Risk for Asset Allocation Strategy

The interaction between timing, risk, reward and asset allocation over the life of a DC retirement account is far from simple. However, the dynamics we have described above have direct implications for asset allocation strategy, and point to a falling allocation to equity (as a percentage of accumulated assets) as retirement approaches and sequential risk increases. Thus, sequential risk lies behind the “target date” approach that is increasingly the default investment of choice for DC plans.²

Conclusion

As a DC account grows over a working lifetime and subsequently declines in retirement, investment returns have an enormous impact on the success of the plan. The impact of investment returns is not constant, however; it increases throughout the accumulation phase and reaches its peak around retirement.³

² For a fuller analysis of the theoretical basis for a target date fund’s asset allocation glide path, see Gardner, Grant and Yuan-An Fan “Russell’s Approach to Target Date Funds - Building a Simple and Powerful Solution to Retirement Saving.” Russell Research Report. August 2006.

³ This paper does not explore the nature of sequential risk after retirement. While many of the same principles apply, the interaction between investment returns and distributions is not a mirror image of the interaction between investment returns and savings, and the analysis is more complex for the post-retirement period.

Asset allocation strategy for a participant in a DC plan - whether implemented directly or via a target date fund - should seek to manage the potential impact of the sequential (or timing) risk that is associated with investment returns.

Appendix

The base case retirement savings scenario on which the numbers in this note are based is described in full in “The 10/30/60 Rule.” The key assumptions used in that model are:

- The participant is assumed to join the plan at age 25.
- Contributions in the first year are assumed to equal \$1,000, and to rise by 4.75% each subsequent year until retirement.
- Distributions are assumed to begin on retirement at age 65 and to rise by 3% each subsequent year until death at age 90. The level of initial distribution at retirement is set so as to leave the account balance at exactly 0 at the point of death.
- An investment return of 7.8% is assumed earned each year – the full 7.8% is earned on the account balance at the start of the year, while half of that rate (3.9%) is assumed to be earned on contributions and distributions. (This is approximately equivalent to assuming that contributions and distributions are made evenly throughout the year.)

In this baseline scenario, total contributions paid in to the plan over the participant’s working lifetime are \$113,678, the accumulated account value at retirement is \$469,163, and distributions paid out in retirement total \$1,162,505.

The pre-retirement accumulation in this base case is shown on the following page.

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Appendix - Continued

Age at start of year	Account balance at start of year	Savings added to account	Distributions from account	Investment rate of return	Investment return earned	Account balance at end of year
25	0	1,000	0	7.80%	39	1,039
26	1,039	1,048	0	7.80%	122	2,208
27	2,208	1,097	0	7.80%	215	3,521
28	3,521	1,149	0	7.80%	319	4,990
29	4,990	1,204	0	7.80%	436	6,630
30	6,630	1,261	0	7.80%	566	8,457
31	8,457	1,321	0	7.80%	711	10,489
32	10,489	1,384	0	7.80%	872	12,745
33	12,745	1,450	0	7.80%	1,051	15,245
34	15,245	1,518	0	7.80%	1,248	18,012
35	18,012	1,591	0	7.80%	1,467	21,070
36	21,070	1,666	0	7.80%	1,708	24,444
37	24,444	1,745	0	7.80%	1,975	28,164
38	28,164	1,828	0	7.80%	2,268	32,260
39	32,260	1,915	0	7.80%	2,591	36,766
40	36,766	2,006	0	7.80%	2,946	41,718
41	41,718	2,101	0	7.80%	3,336	47,155
42	47,155	2,201	0	7.80%	3,764	53,120
43	53,120	2,306	0	7.80%	4,233	59,659
44	59,659	2,415	0	7.80%	4,748	66,822
45	66,822	2,530	0	7.80%	5,311	74,662
46	74,662	2,650	0	7.80%	5,927	83,239
47	83,239	2,776	0	7.80%	6,601	92,616
48	92,616	2,908	0	7.80%	7,337	102,861
49	102,861	3,046	0	7.80%	8,142	114,049
50	114,049	3,190	0	7.80%	9,020	126,260
51	126,260	3,342	0	7.80%	9,979	139,580
52	139,580	3,501	0	7.80%	11,024	154,105
53	154,105	3,667	0	7.80%	12,163	169,935
54	169,935	3,841	0	7.80%	13,405	187,181
55	187,181	4,024	0	7.80%	14,757	205,961
56	205,961	4,215	0	7.80%	16,229	226,406
57	226,406	4,415	0	7.80%	17,832	248,652
58	248,652	4,625	0	7.80%	19,575	272,852
59	272,852	4,844	0	7.80%	21,471	299,168
60	299,168	5,074	0	7.80%	23,533	327,776
61	327,776	5,316	0	7.80%	25,774	358,865
62	358,865	5,568	0	7.80%	28,209	392,641
63	392,641	5,832	0	7.80%	30,854	429,327
64	429,327	6,110	0	7.80%	33,726	469,163

If a -20% investment return is substituted into the first year of this analysis⁴, then the effect is as follows on page 6.

⁴ Note that we apply only half of the investment rate of return to savings added during the year. As a result, the \$1,000 contribution in year 1 falls to \$900 in our model, not to \$800, in order to allow for the fact that savings are added throughout the year, not as a single lump sum on January 1.

Age at start of year	Account balance at start of year	Savings added to account	Distributions from account	Investment rate of return	Investment return earned	Account balance at end of year
25	0	1,000	0	-20.00%	-100	900
26	900	1,048	0	7.80%	111	2,059
27	2,059	1,097	0	7.80%	203	3,359
28	3,359	1,149	0	7.80%	307	4,815
29	4,815	1,204	0	7.80%	423	6,442
30	6,442	1,261	0	7.80%	552	8,255
31	8,255	1,321	0	7.80%	695	10,271
32	10,271	1,384	0	7.80%	855	12,510
33	12,510	1,450	0	7.80%	1,032	14,992
34	14,992	1,518	0	7.80%	1,229	17,739
35	17,739	1,591	0	7.80%	1,446	20,775
36	20,775	1,666	0	7.80%	1,685	24,127
37	24,127	1,745	0	7.80%	1,950	27,822
38	27,822	1,828	0	7.80%	2,241	31,891
39	31,891	1,915	0	7.80%	2,562	36,369
40	36,369	2,006	0	7.80%	2,915	41,289
41	41,289	2,101	0	7.80%	3,303	46,693
42	46,693	2,201	0	7.80%	3,728	52,622
43	52,622	2,306	0	7.80%	4,194	59,122
44	59,122	2,415	0	7.80%	4,706	66,243
45	66,243	2,530	0	7.80%	5,266	74,038
46	74,038	2,650	0	7.80%	5,878	82,566
47	82,566	2,776	0	7.80%	6,548	91,891
48	91,891	2,908	0	7.80%	7,281	102,079
49	102,079	3,046	0	7.80%	8,081	113,206
50	113,206	3,190	0	7.80%	8,954	125,351
51	125,351	3,342	0	7.80%	9,908	138,600
52	138,600	3,501	0	7.80%	10,947	153,048
53	153,048	3,667	0	7.80%	12,081	168,796
54	168,796	3,841	0	7.80%	13,316	185,953
55	185,953	4,024	0	7.80%	14,661	204,638
56	204,638	4,215	0	7.80%	16,126	224,979
57	224,979	4,415	0	7.80%	17,721	247,115
58	247,115	4,625	0	7.80%	19,455	271,195
59	271,195	4,844	0	7.80%	21,342	297,381
60	297,381	5,074	0	7.80%	23,394	325,849
61	325,849	5,316	0	7.80%	25,624	356,789
62	356,789	5,568	0	7.80%	28,047	390,403
63	390,403	5,832	0	7.80%	30,679	426,915
64	426,915	6,110	0	7.80%	33,538	466,562

Total distributions drop from \$1,162,505 to \$1,156,060.

If a -20% investment return is substituted into the final year of the analysis, then the results are identical to the base case until the final year (age 64). That year becomes:

Age at start of year	Account balance at start of year	Savings added to account	Distributions from account	Investment rate of return	Investment return earned	Account balance at end of year
64	429,327	6,110	0	-20.00%	-86,476	348,961

Total distributions in this case drop to \$864,665.