Risks & Rewards

Proposed NAIC RBC C1 Factors for Life Insurers: Impact on Portfolio Optimization?

By Mark Yu and Tobias Gummersbach

This article first appeared in the April 2017 issue of Perspectives. *It is reprinted here with permission.*

This issue of *Perspectives* highlights the differences between the current and proposed C1 factors.

The National Association of Insurance Commissioners (NAIC) presented a proposal of new risk-based capital (RBC) charges for C1 investment risk in 2015. This proposal also introduced additional granularity of fixed income credit rating reporting, from six to twenty categories. Although the current proposal focuses on life insurers, NAIC has stated that the proposed structure of twenty rating categories would also apply to health, and property and casualty insurers. The numeric values of the respective C1 factors might vary by industry segments.

These proposed capital charges are developed based on the historical default probability and loss recovery experiences of corporate bonds; however, they will apply to other fixed income securities including municipal bonds, structured securities[1] and private placements. In addition to these base C1 factors, there will be portfolio adjustments to reflect company-specific portfolio characteristics to help ensure that the statistical safety level (i.e., confidence level) for the C1 component is met. Our case study focuses on the base C1 factor without applying company-specific portfolio adjustments.

This issue of *Perspectives* highlights the differences between the current and proposed C1 factors. The portfolio optimization case study then utilizes the U.S. life industry data to illustrate key differences between optimized portfolios under current and proposed C1 factors.

Risks & Rewards

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We are Investment Actuaries—Risk is our Business!

By Jeff Passmore and Kelly Featherstone

GLASS HALF EMPTY?

It would be easy to be pessimistic reading the headlines about the financial health of retirement and social insurance programs in North America. For example:

- Social Security trust fund is expected to be exhausted in 2034 and benefits only 79 percent funded thereafter

- Deferred annuity savings for retirement purposes is still marginal and will not close the gap

- Public pensions in the U.S. are only 70 percent funded (or more, or less, depending on who you ask)

- Corporate pensions are only 85 percent funded

- Corporate pensions are being replaced by 401(k) plans with risk shifted to individuals

We acknowledge these concerns and others like them but suggest that they should be viewed in context. Consider all the good that these programs have done and all the financial security they have provided and the role that actuaries have played in creating and maintaining these systems.

WHAT ABOUT ACTUARIES?

There are tremendous challenges that our aging societies will face and there is significant and growing public awareness of the size of these challenges. What a tremendous opportunity for actuaries of all types, but especially for investment actuaries! We can provide realistic assessments of the magnitude of the issues, solutions to close the funding gaps, investment approaches to manage the risks and new programs to address coverage shortfalls.

WHERE DOES THE INVESTMENT SECTION FIT IN?

Professional development content for our membership is job one and we are doing a lot! Check out our Double for Five Initiative at https://images.magnetmail.net/images/clients/SOA_/attach/Marketing/Double_for_Five_Final.pdf.

Second, we need to increase awareness among other investment professionals of who we are and what we do. Our Networking committee is scheduling joint presentations with other investment professional organizations as well as other professional development sections of the SOA.

We also want to deliver benefits for our membership today that have value well into the future. Our 2017 Redington Prize contest awards $10,000 to the winning team of authors writing on an investment actuarial topic in a peer reviewed journal—this supports academic investment actuaries expanding the base of investment knowledge.

WHERE DO YOU FIT IN?

You make a difference every day. That's something to feel proud of and it should be acknowledged. But you have more to contribute. Will it be through:

- Presenting at the Annual Meeting or one of the various symposia,

- Writing an article for *Risks & Rewards*,

- Participating in the Essay Contest,

- Volunteering on one of the various committees (Continuing Education, Communications, Networking or Membership and Contests),

- Recruiting new members to join the Section, or

- Presenting to high school or college students about what an Investment Actuary does and how to become one?

Whatever it is, you are one of us and we are part of the solution. The next time someone starts telling you some doom and gloom story about all the risk for financial security in North America, give them your best super hero look and tell them, **"Don't worry, I'm an investment actuary and risk is my business."** ■

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Kelly Featherstone, FSA, ACIA, is director, Client Relation for Alberta Investment Management Corporation (aimco). She can be reached at *kelly.l.amundson@gmail.com*.

Our analysis includes these key takeaways:

1. Proposed C1 factors reflect the underlying default risk more appropriately than current C1 factors and might affect insurers' asset allocations.

2. Portfolio optimization needs to evaluate the "risk-adjusted returns" of various asset classes along with their respective C1 charges. Use of marked-to-market metrics (Value-at-Risk or VaR) might yield different optimization outcomes.

3. Portfolio optimization studies indicate that the proposed C1 factors would result in further duration extension to achieve similar income returns, due to distinct C1 factors at more granular credit rating levels.

4. Under the proposed C1, portfolio optimization with duration constraints may favor structured securities as these tend to have high credit qualities and short durations.

NAIC RBC C1 CAPITAL CHARGES: CURRENT VS. PROPOSED

Table 1
Proposed Credit Rating Granularity and Capital Charges

Bond Rating	Current Category	Proposed Category	After-Tax		
			Current Factors	Proposed Factors	Percent Difference
Aaa	NAIC1	1-A	0.30%	0.21%	-30%
Aa1		1-B	0.30%	0.32%	7%
Aa2		1-C	0.30%	0.46%	54%
Aa3		1-D	0.30%	0.57%	93%
A1		1-E	0.30%	0.70%	136%
A2		1-F	0.30%	0.82%	177%
A3		1-G	0.30%	0.94%	219%
Baa1	NAIC2	2-A	0.96%	1.07%	12%
Baa2		2-B	0.96%	1.21%	26%
Baa3		2-C	0.96%	1.45%	51%
Ba1	NAIC3	3-A	3.39%	2.56%	-25%
Ba2		3-B	3.39%	3.16%	-7%
Ba3		3-C	3.39%	4.05%	19%
B1	NAIC4	4-A	7.38%	4.32%	-41%
B2		4-B	7.38%	5.66%	-23%
B3		4-C	7.38%	7.42%	1%
Caa1	NAIC5	5-A	16.96%	10.40%	-39%
Caa2		5-B	16.96%	14.29%	-16%
Caa3		5-C	16.96%	21.46%	27%
Below Caa3	NAIC6	6-A	19.50%	19.50%	0%

Chart 1
Percentage Difference: Proposed vs. Current Percent Difference
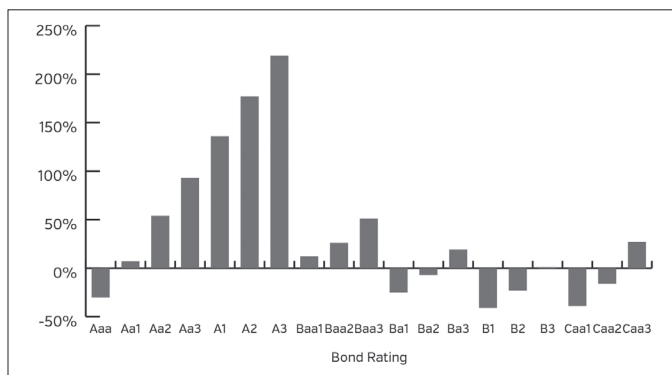
Source (for Table 1 and Chart 1): Model construction and development of RBC factors for fixed income securities for the NAIC's life RBC formula - American Academy of Actuaries, August 2015

Table 1 shows how the current C1 and proposed C1 charges have expanded from six to twenty rating categories. The current Baa3 C1 charge (0.96%) is 3.25 times the Aaa C1 charge (0.30%), while under the proposed C1 factors that multiple increases to more than seven times (1.45% vs. 0.21%). The proposed C1 factors distinguish the underlying default risk at more granular rating levels.

Chart 1 demonstrates the percentage differences between current versus proposed C1 charges. The single "A" category shows the most increases, while several lower credit rating categories reflect reduced charges. Without additional analysis, these varying levels of relative changes across rating categories might suggest benefits that may be derived from replacing single "A" securities with those of lower credit quality.

PORTFOLIO OPTIMIZATION CASE
STUDY - INITIALIZATION

A portfolio optimization framework evaluates return and risk tradeoffs among different asset classes and identifies portfolio configurations that are optimal (or more efficient) in terms of selected return and risk metrics.

Under the NAIC statutory accounting framework, life insurers typically focus on enhancing book yields (income return) while targeting certain capital ratios or liquidity scores. The risk tolerance metrics used vary by company, depending on the enterprise objectives and stakeholders' expectations. In this issue of *Perspectives*, our portfolio optimization is configured *to maximize the book yield at given levels of volatility while maintaining similar levels of NAIC RBC capital charges.* The goal of our optimization is to identify key directional differences between the optimized allocations, based on current versus proposed C1 charges.

For this portfolio optimization review, we use U.S. life industry 2015 year-end reported statutory financials, investment holdings, and generic product and liability assumptions for an Enterprise Based Asset Allocation (EBAA).[2] The EBAA starts with a breakdown of the return on equity (ROE) of a life insurance enterprise:

$$\text{Return on Equity} = \frac{\text{Earnings}}{\text{Equity}} = \frac{\text{Assets Return} - \text{Liabilities Return}}{\text{Equity}}$$

$$= \left(\frac{\text{Assets}}{\text{Equity}} \times \frac{\text{Return on Assets}}{} \right) - \left(\frac{\text{Liabilities}}{\text{Equity}} \times \frac{\text{Return on Liabilities}}{} \right)$$

Table 2
U.S. Life Industry Return-on-Equity Components and Assumptions

Components and Assumptions	
Investment Leverage (Assets/Equity)	9.1
Product Leverage (Liability/Equity)	7.5
Total Return on Assets	4.8%
Total Return on Liabilities	4.1%
Return on Equity (Pre-Tax)	12.2%

Source: NEAM, SNL

Table 2 highlights key components and contributions of ROE for the U.S. life industry. The investment and product leverage are based on 2015 year-end reported industry balance sheet financials. Total return of liabilities assumes a representative life and annuity business mix, with appropriate return and volatility assumptions. The return on assets reflects both the income return of fixed income securities and total return of equity-like assets in the investment portfolio outlined in Table 3 (see next page).

Table 3 summarizes the asset classes that are included in the EBAA process. Given that the focus of our optimization review is to evaluate the impact of proposed C1 factors on the fixed income portfolio allocation, we exclude cash and short-term holdings, contract loans, real estate and derivatives from the life industry's invested assets. Moreover, allocations to commercial mortgage loans (12.1%), equity (1.2%), and alternative investments (5.2%) are maintained at current levels throughout the optimization process.

Proposed C1 factors reflect the underlying default risk more appropriately than current C1 factors.

Table 3
U.S. Life Industry Investment Portfolio Sector Allocation

Asset Class	Percent
U.S. Government/Agency	7.2%
Public Invest Grd Corp & Taxable Muni	40.1%
Municipal - Tax Exempt	0.9%
Private Placements	13.9%
High Yield	3.2%
Structured Securities	16.4%
Commercial Mortgage Loans	12.1%
Equity (Unaffiliated common/preferred)	1.2%
Alternatives	5.2%
Total	100%

Source: NEAM, SNL

PORTFOLIO OPTIMIZATION CASE STUDY – RESULTS AND IMPLICATIONS

With the initial life industry portfolio established, the following EBAA optimization review takes several sequential steps:

1. Optimize the portfolio *to maximize the book yield (income return) while maintaining the initial C1 charges*

2. Establish the optimal asset allocations under current and proposed C1 capital charges separately

3. Evaluate the impact of duration constraints on the optimization results

4. Identify key directional differences between the optimized allocations based on current and proposed C1 charges

Chart 2
Efficient Frontiers Comparison: Current vs. Proposed C1
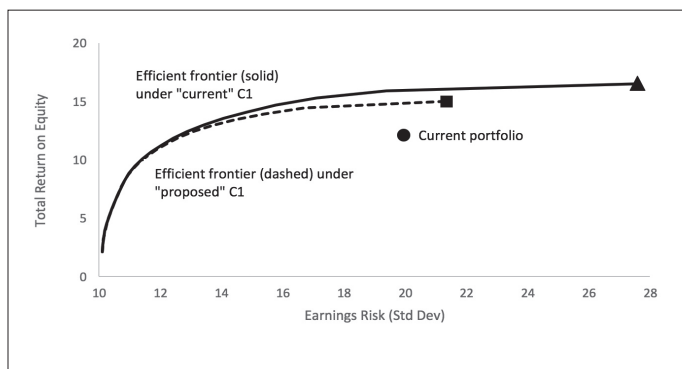
Source: NEAM

Chart 2 compares two efficient frontiers, both maximizing the income return while maintaining the initial level of C1 charges. The solid efficient frontier uses current C1 factors, while the dashed uses the proposed C1 factors. At first glance, the solid efficient frontier "trumps" the dashed efficient frontier, as points on the solid curve have better risk-adjusted returns than points on the dashed curve. But, all might not be what it initially appears.

Table 4
Baseline Optimal Portfolio Configuration Based on Current and Proposed C1

	Current Portfolio (Circle Dot)	Current C1 Maximize BY (Triangle Dot)	Proposed C1 Maximize BY (Square Dot)
Enterprise Statistics			
Total Return on Equity	12.13	16.51	14.98
Earnings Risk (Std Dev)	19.94	27.60	21.35
99.50 VAR % Capital	45.3	**63.0**	**46.9**
Total Return on Assets	4.77	5.25	5.08
Investment Leverage	9.06	9.06	9.06
Product Leverage	7.52	7.52	7.52
Product Margin	(4.13)	(4.13)	(4.13)
Additional Return/Risk Metrics			
Current RBC C1 ($)	**6,638**	**6,638**	6,329
Proposed RBC C1 ($)	**7,028**	7,425	**7,028**
Book Yield (BY)	4.80	**5.33**	**5.15**
Market Yield (OAY)	3.99	4.72	4.38
Duration (OAD)	6.73	9.04	8.48

Source: NEAM

Table 4 provides the key return and risk metrics of the current portfolio (circle dot) and the triangle and square dots (portfolios) along the two efficient frontiers in Chart 2. The triangle dot represents the portfolio on the efficient frontier that maximizes book yield (income return) at the current C1 level ($6,638). Similarly, the square dot represents the portfolio on the efficient frontier that maximizes book yield (income return) at the proposed C1 level ($7,028). The triangle dot

portfolio offers a higher book yield (5.33%) compared to the square dot portfolio (5.15%). However, when evaluated under an economic, marked-to-market framework where VaR is used as the risk metric, the triangle dot portfolio's VaR (63%) is significantly higher than the square dot portfolio's (46.9%). We need to establish a common metric, either return or risk, to achieve meaningful comparisons. Table 5 displays an approach for these comparisons (see next page).

The circle and square dot portfolios in Table 5 are the same as those in Table 4, except with additional sector and credit rating distributions. The triangle dot portfolio in Table 5 represents a different point along the solid efficient frontier that provides the identical book yield (5.15%) as that of the square dot portfolio. Both the triangle and square dot portfolios are from efficient frontiers and therefore are more "optimal" than the circle dot current portfolio (see Chart 3).

Optimized under current C1, triangle dot portfolio's enhanced risk-adjusted return is achieved through credit rotation or arbitrage (swapping AAA and AA with A, as all currently have the

same C1 capital charges) and duration extension (from 6.73 to 7.92). The square dot represents optimization under the proposed C1 and exhibits similar directional reconfigurations in terms of credit, sector and duration; however, the degrees of these rotations differ from the triangle dot.

Although the triangle dot and square dot achieve the same book yield, they have different risk profiles. The square dot has a better average credit quality (A vs. A-), but longer duration (8.48 vs. 7.92); it also has higher economic tail risk (VaR of 46.9% vs. 33.3% from the triangle dot). Next, we focus on constraining durations.

Chart 3
Efficient Frontiers Comparison: Current vs. Proposed C1 – Targeting a Relative Book Yield of 5.15%
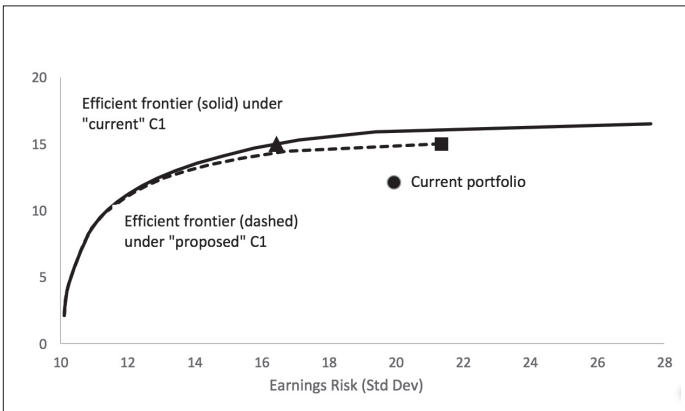
Source: NEAM

Table 5
Optimal Portfolio Configuration Based on Current and Proposed C1 –Targeting a Relative Book Yield of 5.15%

	Current Portfolio (Circle Dot)	Current C1 Maximize BY (Triangle Dot)	Proposed C1 Maximize BY (Square Dot)
Enterprise Statistics			
Total Return on Equity	12.13	14.98	14.98
Earnings Risk (Std Dev)	19.94	16.44	21.35
99.50 VAR % Capital	45.3	**33.3**	**46.9**
Total Return on Assets	4.77	5.08	5.08
Investment Leverage	9.06	9.06	9.06
Product Leverage	7.52	7.52	7.52
Product Margin	(4.13)	(4.13)	(4.13)
Additional Return/Risk Metrics			
Current RBC C1 ($)	**6,638**	**6,638**	6,329
Proposed RBC C1 ($)	**7,028**	7,314	**7,028**
Duration (OAD)	**6.73**	**7.92**	**8.48**
Book Yield	4.80	**5.15**	**5.15**
Market Yield (OAY)	3.99	4.35	4.38
Default Loss ($)	412	537	493
Quality Distribution (%)			
Average Rating	A	A-	A
AAA	7.8	7.3	7.3
AA	21.5	15.0	18.3
A	21.2	33.2	30.4
BBB	38.6	32.3	34.2
<BBB	4.8	6.3	3.9
Non-FI	6.0	6.0	6.0
Total	100	100	100
Sector Distribution (%)			
U.S. Gov't / Agncy	7.2	6.1	5.5
Public InvGrd Credit	40.1	44.8	43.5
Muni - Tax Exempt	0.9	0.9	0.6
Private Placement	13.9	13.9	13.9
High Yield	3.2	4.6	2.2
Structured Sec.	16.4	**11.3**	**15.9**
Comml Mortgage	12.1	**12.1**	**12.1**
Equity	1.2	1.2	1.2
Alternative	5.2	5.2	5.2
Total	**100.0**	**100.0**	**100.0**

Table 6
Optimal Portfolio Configuration Based on Current and Proposed C1 –Where the Duration Remains Constant

	Current Portfolio (Circle Dot)	Current C1 Maximize BY (Triangle Dot)	Proposed C1 Maximize BY (Square Dot)
Enterprise Statistics			
Total Return on Equity	12.13	15.05	14.16
Earnings Risk (Std Dev)	19.94	20.29	22.06
99.50 VAR % Capital	45.32	43.87	49.52
Total Return on Assets	4.77	5.09	4.99
Investment Leverage	9.06	9.06	9.06
Product Leverage	7.52	7.52	7.52
Product Margin	(4.13)	(4.13)	(4.13)
Additional Return/Risk Metrics			
Current RBC C1 ($)	**6,638**	**6,638**	6,582
Proposed RBC C1 ($)	**7,028**	7,269	**7,028**
Duration (OAD)	**6.73**	**6.73**	**6.73**
Book Yield	4.80	**5.16**	**5.05**
Market Yield (OAY)	3.99	4.29	4.18
Default Loss ($)	412	485	480
Quality Distribution (%)			
Average Rating	A	A-	A
AAA	7.8	6.7	15.4
AA	21.5	17.6	19.3
A	21.2	26.2	17.8
BBB	38.6	38.9	36.9
<BBB	4.8	4.6	4.6
Non-FI	6.0	6.0	6.0
Total	100	100	10
Sector Distribution (%)			
U.S. Gov't / Agncy	7.2	3.4	4.9
Public InvGrd Credit	40.1	**44.8**	**34.9**
Muni - Tax Exempt	0.9	0.4	0.9
Private Placement	13.9	13.9	13.9
High Yield	3.2	3.0	3.0
Structured Sec.	16.4	**16.1**	**24.0**
Comml Mortgage	12.1	12.1	12.1
Equity	1.2	1.2	1.2
Alternative	5.2	5.2	5.2
Total	**100.0**	**100.0**	**100.0**

Chart 4
Efficient Frontiers Comparison: Current vs. Proposed C1 –
Where the Duration Remains Constant
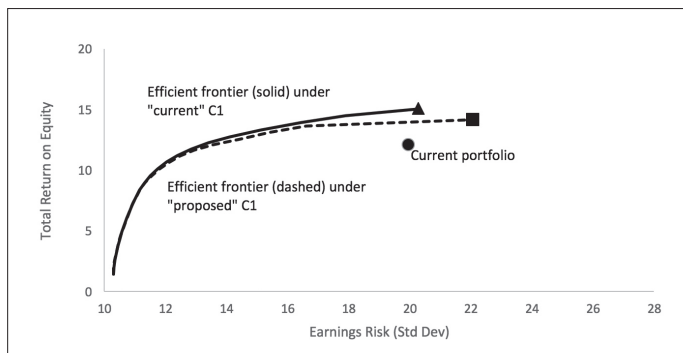
Source: NEAM

Life insurers traditionally target their asset duration at certain levels based on their liability profile. Here, we impose duration constraints on the earlier developed optimizations and the resulting efficient frontiers are shown in Chart 4. The triangle and square dots in Chart 4 correspond to those in Chart 2, but are constrained by the initial duration level (6.73). As expected, the additional duration constraint reduced the maximum achievable book yield under both current and proposed C1: 5.33% to 5.16% under current C1 and 5.15% to 5.05% under proposed C1.

The duration constraint significantly alters the optimal asset allocation. From a credit standpoint, among AAA, AA and A rating categories (current NAIC 1 category), the square dot, relative to the triangle dot, favors AAA and AA over A; and BBB allocation is actually reduced. This credit rotation is contrary to the common rationale suggested by Chart 1, which implies that single A's will be replaced by lower-rated fixed income securities. Thus, the *relative risk-adjusted return matters, not just the changes in relative capital charges.* From an asset sector perspective, structured securities are favored under proposed C1 as they tend to have high credit qualities and short durations.

CONCLUDING REMARKS

The NAIC's Life RBC proposal presents new C1 factors for fixed income securities and also expands the credit rating reporting from six to twenty categories. The proposed structure of twenty rating categories will apply to health, and property and casualty insurers, although the numeric C1 factors might vary by industry segments.

The proposed C1 factors are likely to *incentivize* life insurers to reconfigure their investment portfolio. To achieve a similar book yield from the fixed income portfolio will require extending the duration under the proposed C1 optimization. This is because the proposed C1 charges remove the credit arbitrage incentives that exist in the current RBC framework.

When duration is constrained, optimization under the proposed C1 framework will favor higher (AAA and AA) over lower (A or BBB) credit quality. Thus, under the new RBC framework, structured securities, which tend to have high credit quality and short duration, could be the winners.

We welcome your feedback and comments. Please contact us if you would like to know more about the implications that current and proposed RBC C1 charges will have for the life insurance industry and, more specifically, to your business.

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This is not an offer to conduct business in any jurisdiction in which New England Asset Management, Inc. and its subsidiaries are not registered or authorized to conduct business. ∎

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ENDNOTES

1 Structured securities will follow a two-step process. Initially, NAIC will stay with the current modeling process, but map the breakpoint price to twenty factors rather than the current six factors. The second step will be to review the entire process for establishing appropriate capital requirements for structured securities.

2 Refer to NEAM's June 2016 Perspectives – Life Insurer Asset Optimization: A Top-Down Enterprise Approach

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The Certified Actuarial Analyst (CAA) is an international professional qualification offered by CAA Global to qualify those who excel in technical and analytical skills as trained analysts, giving financial institutions qualified professionals to fill key roles.

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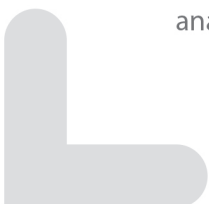
The Bulletin Board

Photo Caption 2: Clockwise from lower left: Peter Sun, Alan Levin, David Schraub, Brett Dutton, Stephen Smith, Tom Egan, Jim Kosinski, Jeff Passmore, Erik Thoren, Larry Zhao, Evan Inglis, Kevin McLaughlin

Updates on important events related to the Investment Section.

RECENT MEETINGS
Investment Symposium

The Investment Symposium general session speakers were well received. The program committee did a great job of organizing a premium educational event, geared toward the needs of expert practitioners in pension and insurance investing. After months of collaboration by phone, the committee met for a celebratory dinner. Job well done!

L&A Symposium

Your section actively supports the need for education on investment topics for all actuaries, such as the session shown here at the Life and Annuity Symposium, "Strategic Asset Allocation & Derivatives: Applications to Pricing and Asset Liability Management." Thanks to our section representatives and to the L&A program committee! ∎

Photo Caption: From left to right: Bogdan Ianev, Henry Yim and Ken Griffin

Photo Caption 1: From left to right: Moderator Suhrid Swaminarayan, FSA, FIA, and presenter Werner DeBondt, Ph.D.

Call for Essays—The 2017–2018 Essay Contest Will Debate Whether This Time It's Different

By Jim Kosinski

T he Investment Section is pleased to announce an upcoming essay contest, "This Time It's (Not?) Different." Many of you may recognize that we've borrowed our premise from the great investor Sir John Templeton, who once said "The four most expensive words in the English language are 'This time it's different.'"

This time, the essay contest itself is different. Rather than soliciting individual essays, we plan to have pairs of writers submit point/counterpoint essays on investment topics arguing opposite sides of an issue that might be "different this time," or might not.

Start thinking about what might be different this time and would make a good topic for an essay. Possible topics include:

- Lower prospective equity returns (is it possible to earn 4 percent real returns in the future?),

- Whether currently high corporate profit margins will persist,

- Low interest rates (will rates ever mean-revert to "normal" levels?),

- Low inflation/deflation (is inflation dead?),

- Secular stagnation (will we ever see a resurgence in productivity gains?),

- Impact of demographics on investments (shrinking and aging population, longer retirements),

- Displacement of fossil fuels by renewable energy,

- Potential impacts of autonomous vehicles on investing opportunities and the economy,

- Impacts of climate change on investments,

- […]

And start looking for a partner to take your counter-point.

Further details on the contest, including how and when to enter, judging criteria, and prizes will follow! Stay tuned! ∎

Jim Kosinski, FSA, CFA, MAAA, Ph.D., is VP Actuarial at Guggenheim Insurance in Indianapolis and Treasurer of the Investment Section Council. He can be reached at *jim.kosinski@ guggenheiminsurance.com.*

Calculating ROI:
Measuring the Benefits of Workplace Financial Wellness

By Gregory Ward

Editor's Note: This article is part of the 2017 Financial Wellness essay collection and won first prize for the best essay submitted.

As human resources executives and benefit-plan sponsors prepare their 2017 budgets, many will question the value of investing in a workplace financial wellness program. Determining the true value of such a program has proved to be elusive, but recent research from the Financial Finesse Financial Wellness Think Tank has introduced a viable way to forecast the potential return on investment (ROI) of the programs using data collected from actual clients. This model, as reported in a 2016 report, provides results that indicate employers can find it beneficial to invest in a high-quality financial wellness program.

WORKPLACE FINANCIAL WELLNESS ROI PREDICTIVE MODEL

The predictive model is based on the observed improvements in employee financial behavior as it relates to wage garnishments, absenteeism, and utilization of flexible spending and health savings accounts. By evaluating the difference in each behavior at each level of financial wellness (as measured on a 0–10 financial wellness scale), the model measures the value of the improvements in the following three areas.

GARNISHMENTS

According to the findings, for every level of improvement in an employee's financial wellness score, there is a decrease in the likelihood of garnishments. For example, the likelihood of garnishment fell from 4.80% to 1.84% when moving from a financial wellness score of 4 to 6. For a 50,000-life employer, this decrease in the frequency of garnishments could save more than $440,000 a year in reduced garnishment processing costs (based on an average $300 annual cost to process garnishments).

ABSENTEEISM

The study also found similar decreases in the average number of hours of unplanned absences as employee financial wellness improved. Specifically, the average number of hours of unplanned absences fell from 13.73 hours to 10.35 hours when moving from a financial wellness score of 4 to 6. Based on an average annual salary of $50,000, a 50,000-life employer could save upward of $4.2 million a year in unplanned absences.

FSA AND HSA PARTICIPATION

The study also observed steady increases in contributions to flexible spending and health savings accounts as employee financial wellness improved. The average combined contribution to a flexible spending and health savings account increased from $905.55 to $1,137.50 when moving from a financial wellness score of 4 to 6. Since contributions to flexible spending and health savings accounts are not subject to Federal Insurance Contributions Act (FICA) tax, an increase in participation could save a 50,000-life employer nearly $900,000 a year in reduced matching FICA tax payments.

Figure 1
Projected Cost Savings of Incremental Shift in Workforce Financial Wellness Score From 4 to 6 (by employer size)

	10,000	50,000	100,000
Garnishments	$88,683	$443,413	$886,827
Flex spending/ health savings	$177,446	$887,229	$1,774,457
Absenteeism	$852,879	$4,264,396	$8,528,793
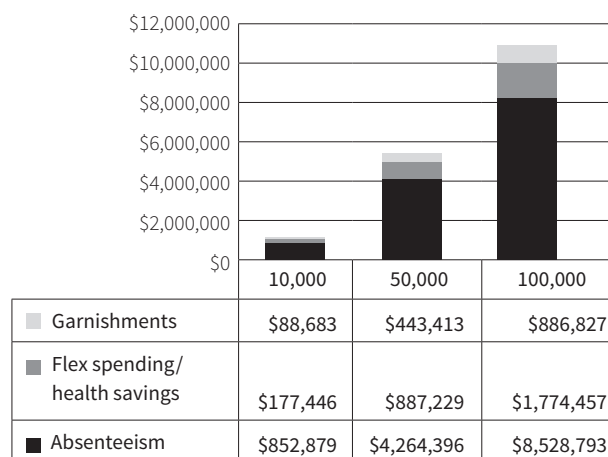
Figure 1 shows the projected cost savings of an incremental shift in the median workforce financial wellness score from 4 to 6 using the ROI model for employers of various sizes.

IMPROVING THE ROI MODEL

The cost savings illustrated are simply the tip of the iceberg. A much more in-depth analysis is needed to more accurately calculate the true financial impact of a financial wellness program. For example, previous studies suggest that a well-constructed financial wellness program may contribute to reductions in health care costs, costs associated with delayed retirement, and costs associated with recruiting, retaining and engaging employees.

HEALTH CARE COST SAVINGS

A 2014 study from the American Psychological Association reports that 64% of those surveyed cited money as a significant source of stress, and that Americans are paying for this stress with their health. Financial stress has been attributed to decreased employee productivity, increased absenteeism and increased employer health care costs.

Financial wellness programs are correlated with lower health care costs. A study of a Fortune 100 health care company found that employer health care costs associated with employees who used the company's financial wellness program actually decreased by 4.5%, while the costs associated with employees who never used the program increased by 19.4%. This equated to a cost savings of $271.50 per employee. If a 50,000-life employer experienced the same cost savings by offering a comprehensive workplace financial wellness program, it could save the employer more than $13.5 million a year, as shown in Figure 2.

REDUCING COSTS OF DELAYED RETIREMENT

Employees today are woefully underprepared for retirement, with only 21% indicating they are on track to achieve their income goals in retirement, according to recent research from Financial Finesse. As employees progress through the late career cycle, those who are underprepared may have to delay their retirement for financial reasons. This has repercussions throughout the workforce. According to the Transamerica Center for Retirement Studies, 65% of baby boomers either plan to work past age 65 or do not plan to retire at all. For every year an employee who would like to retire delays retirement for financial reasons, the employer faces estimated additional costs between $10,000 and $50,000.

Figure 3 shows that as employees' overall financial wellness levels increased, so did contribution rates to employer-sponsored

Figure 2
Potential Annual Health Care Cost Savings

19.4%	$271.50 (net health care savings per employee)
	X 50,000 (average number of employees)
Non-Users	= $13,575,000
User −4.5%	

Figure 3
Deferral Election Percent

Figure 4
Potential Improvement in Retirement Plan Balance for an Employee Making $50,000 a Year

Wellness score = 4.0
Wellness score = 5.0
Wellness score = 6.0

10 years: $50,053 / $56,244 / $63,840
20 years: $161,154 / $181,084 / $205,542
30 years: $407,757 / $458,186 / $520,069 — +27.54%
40 years: $955,127 / $1,073,251 / $1,218,206 — +12.37%

Based on an annualized 8% return on investment.
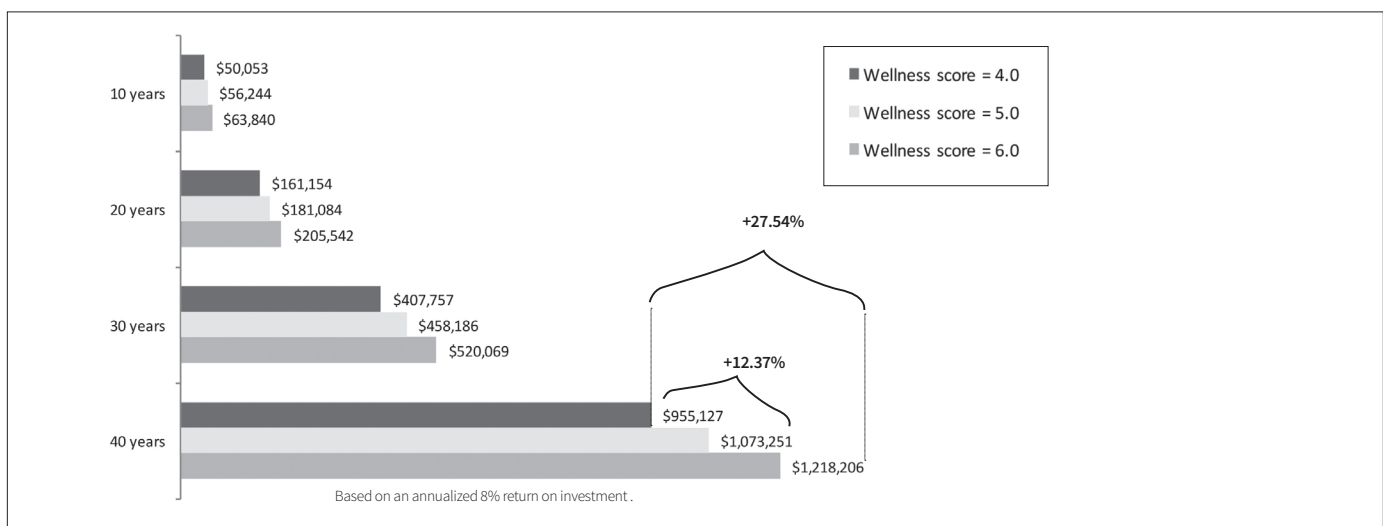
Figure 5
Potential Cost Savings for Helping Employees Retire on Time

47%

34%

1st
assessment

1 year later
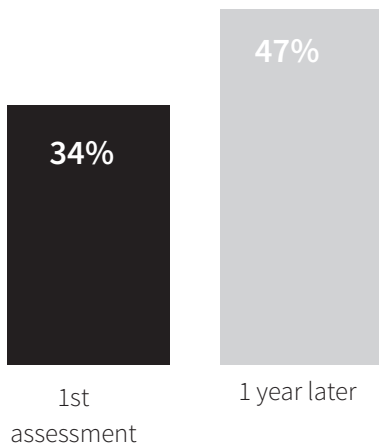
retirement plans. Higher contribution rates reduce the likelihood of delayed retirement since employees are more financially prepared.

For younger employees, the research suggests that increases in contribution rates due to improved financial wellness could increase lifetime retirement savings by as much as 12% to 28%, as shown in Figure 4.

In addition, research found that employees who engaged repeatedly in their employer's financial wellness program increased their likelihood of being on track for retirement—from 34% to 47%. Figure 5 shows that for a 50,000-life employer, this 13-point improvement could equate to nearly a $2.0 million annual cost reduction related to delayed retirement.

RECRUIT, RETAIN AND ENGAGE TOP TALENT

According to the 2016 Deloitte Millennial Survey, two-thirds of younger employees plan to leave their current job by 2020, with 25% saying they plan to leave in less than a year. Turnovers cost companies money. Citing the research of W. F. Cascio, a SHRM Foundation's report indicates that "direct replacement costs can reach as high as 50% to 60% of an employee's annual salary, with total costs associated with turnover ranging from 90% to 200% of annual salary." That puts costs anywhere between $45,000 and $100,000 when replacing an employee making $50,000 a year. A 2016 Paychex survey found that approximately 70% of employees cited low pay as a reason they have left or would leave a job, and 45% said they have or would leave due to a lack of benefits.

Most employees are dissatisfied with their pay and benefits because they haven't fully maximized the value of what their company offers. By not taking full advantage of employer-provided

Figure 6
Potential Cost Savings by Reducing Turnover

1% (projected reduction in employee turnover)

X 10% (turnover rate of employees)

X $45,000 (estimated net cost to replace employee)

X 50,000 (average number of employees)

= $2,250,000

benefits such as company matching programs, discounted voluntary benefits, and health and wellness benefits, employees potentially leave thousands of dollars on the table every year. The money they are foregoing could be the difference between sinking deeper into debt and proactively saving toward key financial goals.

If a 50,000-life company with a 10% turnover rate initiates a comprehensive workforce financial wellness program that results in 50 fewer employees leaving the company (i.e., a 1% reduction in the turnover rate), it could equate to more than $2.2 million in annual savings, as shown in Figure 6.

MEASURING AN ORGANIZATION'S ROI

Using actual, quantifiable data, Financial Finesse has developed an ROI model that can help employers project potential cost savings when implementing a financial wellness program. Based on this model, a large employer can potentially save millions of dollars every year when factoring costs such as wage garnishments, absenteeism, and utilization of flexible spending and health savings accounts. That number gets even greater when taking into account reductions in health care costs, delayed retirement and turnover. Table 1 shows the total a company could save across all categories.

Table 1
Projected Annual Savings for Company With Increased Financial Wellness

Garnishments	$443,413
FSA/HSA contributions payroll taxes	$887,229
Absenteeism	$4,264,396
Health care	$13,575,000
Delayed retirement	$1,950,000
Turnover	$2,250,000
Estimated Total	$23,370,038

While far from perfect, this model paves the way for measuring the effectiveness of corporate-sponsored workplace financial wellness programs. It will also serve as a catalyst for further development of the financial wellness industry. ■

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ENDNOTES

1   Financial Finesse, "2016 ROI Special Report," Sept. 13, 2016, *https://ffinesse.app.box.com/v/2016-ROI-Report.*

2   American Psychological Association, "Stress in America: Paying With Our Health," press release, Feb. 4, 2015, *https://www.apa.org/news/press/releases/stress/2014/stress-report.pdf.*

3   Associated Press, "Debt Stress: The Toll Owing Money Takes on the Body," AP-AOL Health Poll, 2008, *http://hosted.ap.org/specials/interactives/wdc/debt_stress/index.html.*

4   E. Thomas Garman, Irene E. Leech, and John E. Grable, "The Negative Impact of Employee Poor Personal Financial Behaviors on Employers," *Journal of Financial Counseling and Planning* 7 (January 1996), *http://pfeef.org/wp-content/uploads/2016/09/NegativeGarman.pdf.*

5   Financial Finesse, "Case Study: Impact of Employee Financial Stress on Health Care Costs," Sept. 6, 2013, *https://ffinesse.box.com/v/ROI-Case-Study-Healthcare.*

6   Financial Finesse, "Year in Review: 2015," March 8, 2016, *https://ffinesse.app.box.com/v/YearInReview2015Report.*

7   Transamerica Center for Retirement Studies, "Baby Boomer Workers are Revolutionizing Retirement: Are They and Their Employers Ready?" 15th annual Transamerica Retirement Survey, December 2014, *https://www.transamericacenter.org/docs/default-source/resources/center-research/tcrs2014_sr_baby_-boomers_and_employers.pdf.*

8   Greg Ward, "Case Study of Effectiveness of Financial Education on Pre-Retirees of a Large Utility Company," (unpublished raw data, Financial Finesse, 2014).

9   Deloitte, "The Deloitte Millennial Survey 2016: Millennials Have One Foot Out the Door," *https://www2.deloitte.com/global/en/pages/about-deloitte/articles/gx-millennials-one-foot-out-the-door.html.*

10   David G. Allen, "Retaining Talent: A Guide to Analyzing and Managing Employee Turnover," SHRM Foundation's Effective Practice Guidelines Series, 2008, *https://blog.shrm.org/sites/default/files/reports/Retaining%20Talent-%20A%20Guide%20%28Q1%29.pdf.*

11   Paychex, "Employee Retention: What Makes Employees Stay or Leave," Human Resources survey, Aug. 19, 2016, *https://www.paychex.com/articles/human-resources/employee-retention-what-makes-employees-stay-leave.*

Investment Considerations for Takaful Islamic Insurance

By Syed Danish Ali

Takaful is Islamic insurance based upon mutual cooperation between members of a group, who all contribute to a pool to indemnify the members against perils and misfortunes. This article just begins to scratch the surface to introduce the main features of Takaful and to engage on common concerns within the actuarial profession.

There are two main funds in Takaful; the policy holder fund (PTF) and the shareholders' fund (STF). The policyholders are the owners of the company and the insurer only acts as an agent (Wakeel) to bring together members collectively and manage the business. The shareholders provide capital for opening the Takaful company, for handling adverse contingencies and for providing the initial seed funds till the new company achieves sufficient economies of scale and enough underwriting experience to be viable.

Accordingly, the contributions are the premiums that policyholders pay into the PTF and from which claims are subsequently paid. The Wakala fees are the management fees that the insurer charges the policyholder owners for managing the pool. Mudharab fees are the investment return that the insurer generates from the pool. Wakala fees are transferred to STF as revenue to pay for administrative and management expenses. Underwriting surplus or deficit is generated in the PTF over a period of business activity (net of wakala contributions less claims). If there is underwriting surplus, part of it is distributed to policyholders as they are the owners of the pool. If there is deficit, funds from STF called "qard-e-hasan" are transferred to pay off losses in the PTF.

This high level of transparency clearly segregates underwriting performance from investment performance and also separates the level of expenses from underwriting profitability.

There are various sub-pools within the PTF fund too as homogenous risks have to be pooled together. It would not be fair if for example, satellite coverage is combined together with motor insurance because most of the policyholders of motor will have high frequency, low severity underwriting experience instead of satellite's low frequency high severity experience. Similarly, it is not equitable to have same funds for short-term business and long-term business, and between short-tailed and long-tailed business. Obviously this does not mean that we continue building layers, like an onion, of sub pools over and over; practical considerations are also important and have to be managed along with fairness and long-term viability of the company.

Whole life and endowment coverages are usually frowned upon by Takaful, but that does not mean that they are universally deemed forbidden by all Takaful insurers. Similarly, explicit guarantees of long duration as well as underwriting that starts entering the realm of speculation are avoided. Many safeguards are also built around consequential losses to ensure that the insured does not gain from such uncertainty over future losses instead of being compensated for losses that have already occurred.

As there are different ways in interpreting the same concepts, there are different Takaful models and accounting treatments in different parts of the world. However, the spirit of mutual cooperation and ensuring prudence and fairness are the same.

Forbidding interest instruments does not mean that any fixed payments are forbidden. Trade is allowed where the trader sells the product to the customers at a profit; rent is not forbidden from property and so on. The basic concept is that "money itself does not increase money" and any value generated even in fixed quantities from the "real economy" instead of only from paper notes and money itself is allowed. The main business framework is not an impersonal unfettered free market, but fair, socially responsible and equitable trade, services and products. This ethical consideration is not new or unique to Takaful or Islamic Finance. It is as old as Aristotle, and it is seen today among many varieties of mutual societies and socially responsible investors. Religious institutions across the spectrum advocate mutual cooperation based on fairness. If anything is new or unique indeed, it is the pace with which capitalism-based insurance has influenced us in human history.

Having said that, it is not our purpose to defend or justify Takaful in relation to other forms of insurance. Our purpose here was to simply outline some core concepts to the reader who is not familiar with Takaful and then move on to investment considerations that have to be taken into account in Takaful.

INVESTMENT CONSIDERATIONS FOR TAKAFUL

The investment policy of Islamic Insurance or Takaful Companies requires that the investments should be made on a prudent basis

with a long-term perspective whilst striking a fair balance between risk and return. The policy also requires that the portfolio should be well diversified amongst various asset classes such as bank deposits, equities, Bonds, Islamic debt instruments like sukuks, real estate, etc. As per *Financial Times Lexicon*, sukuk bonds are Islamic bonds, structured in such a way as to generate returns to investors without infringing on Islamic law (that prohibits riba or interest). Sukuk represents undivided shares in the ownership of tangible assets relating to particular projects or special investment activity.

In order to determine a suitable investment strategy, available suitable assets need to be identified and the strategy developed with this in mind. The asset portfolio should, from a matching perspective, be similar.

The Takaful company has to maintain a liability driven investment strategy to map the liability duration and hold agreed strategic asset allocation derived via this process to minimize the asset-liability mismatch risk and liquidity risk.

The two distinct types of funds described earlier, PTF and STF, each have a different liability profile and therefore different objectives.

The basic objective of each Participant Takaful Fund is the pooling of risk. Risk contributions and net of wakala fees are paid into the fund and used to pay out benefits to participants resulting from various contingencies. Given that there are some funds retained within each PTF, the company invests these in order to earn a return on these funds so as to reduce the eventual cost of covering the risks the PTF is designed to cover. The investment objective of each PTF is to earn a suitable rate of return while ensuring preservation of the amount being invested.

One of the basic objectives of the shareholder's fund is to provide a buffer against any contingency in any of the PTFs. In case of any deficit in any PTF, there is a provision of Qard-Hasan (interest free loan) to be paid out from the shareholder's fund to the PTF. Therefore, it is necessary to ensure that the assets covering this risk are invested in risk-free liquid assets.

The other objective of the fund is to cover the initial costs that were incurred on building infrastructures as well as initial cost overruns (excess of actual expenses vs wakala fees receivable, the latter building up over time as business volumes grow). Therefore, a portion of the fund needs to be invested in risk-free liquid securities to cover the expenses of the company. The fund is also required to meet any minimum capital requirement applicable to the company.

The excess of capital, over the amount required to manage expenses and to cover risk of Qard-Hasan as well as any minimum

capital requirement, is invested in relatively risky assets to generate high returns for the shareholders.

The asset profiles to match the requirements of each of these two distinct funds are:

Asset Class	Fund	
	PTF	**STF**
Bank call deposits	To cover the guaranteed nature of liabilities and provide liquidity	To cover the risk of Qard-Hasan and the expense overruns
Term deposits up to three months	Same as call deposits	Same as call deposits
Sukuks (matched to liability profile)	To match the medium- and long-term liabilities	The investments will be made to match the projected operating expenses
Equities & Real Estate	The investments in this class will be made to the extent of free cash flows available	The free cash flows will be invested to provide higher return

Some core principles relating to compliance with Islamic law Shariah are:

a. Investments made are compliant and must be compliant at all times with Islamic Shariah as advised by the Shariah Advisory Board and determined by the Investment committee.

b. Where direct investments are made, no investments are and will be made in conventional interest bearing securities.

c. Where direct investments are made in equities, as a general rule, individual companies whose activities are prohibited or are involved in sectors whose activities are prohibited ("Haram"), are not invested in. These prohibited activities are:

- alcohol and tobacco related products
- casino, hotel and gambling
- conventional banking and financial institutions
- money markets
- pork related products
- weapons related products
- leisure and illicit film industry
- conventional insurance and home financing

d. Those companies that are highly leveraged are also deleted from the remaining stocks.

e. No investments are made in conventional derivatives and no derivatives are used for speculation purposes. There are a number of Islamic derivatives in the market now—for instance, the bai salam is essentially a transaction where two parties agree to carry out the transaction of an underlying asset at a predetermined future date, but which is fully paid on the price of the present time. Other Islamic derivatives are Istisna, joala, istijrar, bai'bil wafa and bai bil istighlal contracts.

f. Investments are approved by the Islamic Shariah Consultant and have financial ratios which comply with filters that are prescribed by Islamic Shariah.

g. While the fund is not prohibited from entering into leveraging arrangements, the nature of the leveraging complies with Islamic Shariah principles and the fund may leverage up to some low specified percentage of its net asset value at any relevant time in order to take advantage of investment opportunities or meet short-term cash flow needs.

h. Investments made in mutual funds managed by third parties also have to be Shariah compliant and follow the principles set out for direct investments.

FINAL WORDS

There is a need to involve actuaries more in Islamic insurance Takaful so that many key risks can be contained. For instance, actuaries in countries with Takaful are involved in surplus sharing, product development, investments and many more to ensure that the Shariah risk is contained and minimized and that the insurer is operationally complying with requirements of Shariah. Enterprise Risk Management should also be further propagated in Takaful institutions.

There is a worldwide movement towards impact investing and social finance where finance helps the communities instead of only maximizing profits and causing financial inequality. Takaful should seize this opportunity to increase awareness among those people who are of different religions but still value socially conscious finance. Moreover, micro insurance and technology offers

> There is a worldwide movement towards impact investing and social finance.

us unique opportunities to increase the insurance penetration of Takaful.

Lemonade,[1] the mobile app home insurer, is a success story in this case. Like Takaful, the surplus left from the policyholders' pool is given to charities or given back to the policyholders. Lemonade's business model is strikingly similar to Takaful because of its focus on being socially responsible. If Takaful looks the same to consumers, with the same corporate culture and organizational dynamics as conventional corporate organizations, then the unique selling point of Takaful is significantly reduced in the eyes of the customers. Lemonade is increasingly becoming popular because of technology and will continue having an edge over Takaful because it does not feel like a typical corporation (whereas Takaful does).

As noted initially, there is a wide range of practices in the Takaful field. Readers are encouraged to contact the author directly if they would like to discuss these concepts in more depth. ∎

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ENDNOTE

1 Please go to *https://www.lemonade.com/*

Indexed Universal Life Snapshot

By Seth Detert

This article expresses the views of the author and not those of Securian Financial Group, Inc.

WHY YOU SHOULD BE AWARE?

Indexed Universal life (IUL) emerged onto the scene in the late 2000s and has achieved an outstanding level of acceptance among life insurance buyers. The growth of IUL has been impressive over the last decade under a variety of metrics. In market share of total sales IUL has grown from 3.85 percent[1] in 2007 to 21.6 percent[1] of all sales in 2016. The compound annual growth rate of sales from 2007 to 2016 is 20.17 percent.[1] The growth associated with IUL has not been confined to sales either; the number of carriers that sell IUL has doubled from 16[1] in 2007 to 32[1] in 2016. Whole life is the only other product type that has shown similar sales growth over the same time pe+riod.

WHAT IS IUL AND HOW DOES IT WORK?

IUL is a flexible premium universal life contract that credits interest to the account value based on an external index or indices of market performance over a period of time. Most IUL contracts have several index options available along with fixed crediting option to allow their clients flexibility to allocate the accumulation value within the contract. Within the industry there is a plethora of index options to choose from (and I could spend the whole article delving into the differences). I will make reference to the different options out there, but in an effort to keep the explanation simple I will be referencing the most common index structure, as defined in Actuarial Guideline 49 as the benchmark index.

Indexed Accounts generally all have these parameters:

The underlying index or combination of indices
The external index or indices for which the growth is measured. The most popular index is the S&P 500 price index.

Floor
The minimum index growth rate used for calculating a credit. The most common floors range from 0 percent to 1 percent.

Cap
The maximum index growth rate used for calculating a credit. Some index options in the industry offer an unlimited cap, but the majority of the index options offer a cap in the 6 percent to 14 percent range with the most common cap currently in the 10 percent to 12 percent range.

Participation Rate
This is the portion of the index growth rate that gets used in the index crediting calculation. The most common is 100 percent, but can range from 25 percent to 200 percent.

Calculation method
Method for which one determines the basis to apply the calculated index growth rate. The most common is Point to Point, but others include daily averaging, monthly averaging and performance triggered.

Time period
Period of time in which the index growth is calculated. Most common is one year, but it can range up to five years.

The index growth calculation generally works one of two ways:

Maximum (Minimum (Index Growth rate, Cap), Floor) * Participation Rate

Maximum (Minimum (Index Growth rate * Participation Rate, Cap), Floor)

For illustrative purposes if the index parameters were a floor of 1 percent, a cap of 12 percent, and a participation rate of 110 percent and the index growth rate was 15 percent, 10 percent and -10 percent in three time periods. The index returns respectively under those scenarios would be 13.2 percent, 11 percent, and 1.1 percent for the first calculation method and 12 percent, 11 percent, and 1 percent for the second method.

WHAT IS DRIVING THE SALES OF IUL?

This is a great question and one that has sparked much debate in the industry. Is it the product design, the market cycle, illustrations or agency rules (that is, who can sell the product) that is the driving factor for the increase in IUL sales? Let us look at these point by point.

The universal life chassis provides flexibility in:

• Varying levels and time horizon for which the client pays premiums.

• Multiple death benefit options and face amount combinations.

- Multiple index options that allow the client to select the risk/reward profile that they desire.

- Ever expanding list of riders covering anything from early values to chronic illness benefits.

- Flexibility to change in the future if needed.

All of these factors make it very easy to customize an IUL sale to the client's specific needs. These features are all important, but what I hear the most positivity about is the floor. Prospective clients are more than willing to forgo returns in excess of the cap if they can avoid the scenario where they lose 10 percent of their value over the course of the year because of a market downturn. Consider we have had one of the longest market expansions in history. Yet through the prolonged expansion people still remember how much value they lost in the 2000 and 2008 market downturns. The downside protection provided by the floor in an IUL policy is the top valued feature by clients and agents. On a side note, one would have thought the market cycle we are in would have spurred more growth in variable life sales. While variable sales have been flat or decreased over the current market cycle, IUL has seen gains.

Prior to 2015 there was inconsistency in the industry around how to illustrate IUL, even when the index parameters are the same. One company might have used the last 25-year compound average growth rate (CAGR) while the next might have used the 30-year CAGR to determine their max illustrated rate. One could argue that there were indices introduced inside of IUL specifically because they back cast well. This practice was appropriately criticized because the past performances of these indices was highly unlikely to repeat. Due to these issues, the industry needed some commonality and best practices for how IUL contracts were illustrated. In 2015/2016 Actuarial Guideline 49 was implemented which brought with it a consistent method for setting the maximum illustrated rate and illustration requirements. With the introduction of AG49 there was some belief in the industry that it would drastically curtail the growth of IUL, but that hasn't come to fruition.

A contributing factor to IUL growth is the fact that the industry treats IUL as a non-registered product. This means that advisors do not have to be licensed with the SEC to sell securities or affiliated with a broker-dealer to sell IUL. This greatly increases the pool of advisors that will show interest in IUL. These advisors are able to sell a product that participates in some of the upside of the market, with none of the downside.

> # IUL is here to stay. It will continue to be a disruptive and compelling force in the life insurance industry for years to come.

WHAT IS NEXT?

What lies ahead for IUL is a question that the industry is wrestling with. After AG49 was introduced there was lull in IUL development as carriers were determining how best to move forward under the new parameters. Already in 2017 we have seen several new entrants into the market with their products "optimized" to conform with AG49. Will agents buy into these product changes, will it lead to new regulation, will the market contract for an extended period of time, will interest rates ever increase making fixed products more attractive? The answers to these questions will play out over time, but my prediction is that IUL is here to stay. It will continue be a disruptive and compelling force in the life insurance industry for years to come. ∎

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ENDNOTE

1 U.S. Retail Individual Life Insurance Sales Participant Report Fourth Quarter Year-to-Date 2007 & 2016

Expected Returns on Indexed Credits

By Gary Hatfield

The opinions and views expressed in this article are my own and do not reflect those of my employer. I speak for myself as an actuary and a mathematician. Any errors are mine alone.

In 2014, and into early 2015, there was controversy regarding the illustration practices for Indexed Universal Life (IUL). The controversy had been brewing for a while, and in large part because there were significant differences in practices among insurers regarding the appropriate illustrated rate for an IUL policy. Most used a method called "look-back," where the crediting mechanism's returns over a prior period of history were used to establish the Assumed Indexed Credit (AIC) for the purposes of illustration. However, companies were free to "cherry-pick" details, such as the number of years, the days of the year (say January to January, or June to June), etc. These concerns were legitimate, and ultimately resulted in AG 49, which limited the maximum allowed illustrated rate for indexed credits.

However, there were other concerns that were expressed at the time that seemed to come from a poor understanding of derivatives-based strategies. In particular, claims were made that indexed crediting couldn't work as illustrated because it implied a long-term expected return of 20 percent to 50 percent (or more) on hedge budgets. The underlying premise of the argument appeared to be that a strategy that sustains returns of 20 percent to 50 percent is absurd. As actuaries, we can substitute demonstration for impressions, and I intend to do exactly that.

The organization of this paper is as follows: In the first section, I will review indexed crediting and suggest three possible criteria for the AIC. In the next session, I will discuss alternative approaches to setting assumptions for future returns, both for the underlying index and the AIC. Finally, I will assert that the corresponding returns of 20 percent to 50 percent (or more) for "hedge budgets" are not unreasonable. Along the way, I will point out limitations of my analysis.

Note that AG 49 specifically relates to the maximum allowed illustration rate for IUL products, which is not the same as the "best-estimate" return on an indexed credit. While related, I emphasize this distinction, as the former entails a host of issues that are out of scope. As such, the reader should assume that I am neither endorsing, nor criticizing, AG 49.

INDEXED CREDITS AND AIC

For the purposes of this article, I will assume an indexed credit takes its most common form: 100 percent participation in the price return of an equity index (most often the S&P500), subject to a 0 percent floor, and a cap C declared by the insurer beforehand. Written out mathematically, if S(t) is the equity price index, at time t, then the indexed credit (IC) for the period t to t+1 is given by

$$IC(t, t+1) = Min\left(Max\left(\frac{S(t+1)}{S(t)} - 1, 0\right), C\right).$$

Equivalently, the indexed credit is the payoff of a call spread consisting of two call options. A long call option struck at 100 percent, and a short call option struck at 1+C. That is, if I denote the payoff of call option expiring at time t+1 with underlying S, and struck at K as

$$Call_{payoff}\left(S(t+1), K\right) = Max(S(t+1) - K, 0)$$

then

$$IC(t, t+1) = \frac{Call_{payoff}\left(S(t+1), S(t)\right) - Call_{payoff}\left(S(t+1), (1+C) * S(t)\right)}{S(t)}.$$

What happens mechanically to the policy Account Value (AV) during the period t to t+1 is something like:

$$AV(t+1) = (AV(t) + PremiumApplied - Charges) * (1 + IC(t, t+1)).$$

The actual indexed credits will vary from year to year, and are not known upfront. So the illustration uses an AIC *vis*:

$$AV(t+1) = (AV(t) + PremiumApplied - Charges) * (1 + AIC)$$

An important question here is, "If the investor has a subjective view on the returns of the index, how should this translate into a choice for the AIC?"

To assist in answering this question, I propose three potential criteria to evaluate the choice for AIC:

In the absence of premiums and charges,

C1: The AV compounded at this rate represents the expected future account value.

C2: The rate represents the expected compounded annual return.

C3: The AV compounded at this rate represents the median future account value.

Or, if you prefer mathematical notation, for a large number of annual periods N:

C1: $E[AV(N)] \cong AV(0) * (1 + AIC)^N$

C2: $E\left[\left(\frac{AV(N)}{AV(0)}\right)^{\frac{1}{N}} - 1\right] \cong AIC$

C3: $Pr[AV(N) \geq AV(0) * (1 + AIC)^N \cong \frac{1}{2}.$

LIMITATION: In reality, the pattern of charges versus premiums matter. Typically, premiums are greater than charges early, and then opposite later. But there is not, to my knowledge, a good way to account for that in choosing the AIC because the impact depends on the pattern of higher returns versus lower returns, and other factors in a complex manner. All else being equal, this complication will not generally bias things.

I will use this equivalence to answer the following question: If I know the cap C, and have some belief on the distribution of expected returns for the index, what is the expected indexed credit $E_P[IC(t, t+1)]$? Here, I use P to represent the subjective or real-world probability measure. There is no "known" or "correct" P for the index S; by necessity, it is a belief. However, most investors harbor a belief, such as, "The expected return for the S&P500 is 8 percent with annual volatility of 15 percent." So how should I interpret this in a way that allows me to make a statement about the expected return on an index credit?

INVESTOR VIEW AND AIC

The above question and criteria assumes that the investor holds a "view" on market returns and then asks how to translate that into an appropriate AIC. In this section, I will propose two methods for developing an AIC given such a view—one of which satisfies C1 (but not C2 and C3) and the other C2 and C3 (but not C1). For the investor, however, developing a view on the return distributions that can be so translated is a highly non-trivial task. So I will also propose three approaches an investor may take (and certainly this list is not exhaustive) and show how to estimate AIC in each case.

The first method for setting AIC is simply to set the AIC to the one-period expected value of the indexed credit.

$$AIC_1 = E[IC(t, t+1)]$$

Under the *assumption* that annual price returns are Independent and Identically Distributed (IID), Condition 1 is met (exactly, not approximately).

The IID assumption is not true of course. Consider auto-correlation. Historically, the SP500 shows strong positive auto-correlation over short horizons (daily, monthly and quarterly). However, this dissipates quite a bit over longer horizons. In fact, for a one-year horizon, auto-correlation appears to have mostly dissipated, and is close to zero.[1] Similarly, return distributions are not time invariant. But since we are concerned here with long-term returns, it seems unnecessarily complicated to impose a "term structure" of return distribution into an illustration. Hence, for our purposes, I am content with the conclusion $E[AV(N)] \cong AV(0) * (1 + AIC_1)^N$ and C1 is met.

I will now show why AIC_1 most likely will not satisfy C2 or C3, and then propose a choice that will satisfy C2 or C3.

First, some notation. For each interest credit $IC(t-1, t)$, which we are treating as a random variable, define the following new random variables:
$$R_t = 1 + IC(t-1, t)$$
and
$$y_t = \ln(R_t),$$
so that
$$\frac{AV(N)}{AV(0)} = R_1 \cdot R_2 \cdot R_3 \cdots R_N = Exp(y_1 + y_2 + y_3 + \cdots + y_N)$$

The RVs y_t are certainly not normally distributed (not even "kind of"), but we will assume[2] that they are IID with some mean μ_y and some standard deviation σ_y. If N is large enough[3], the Central Limit Theorem (CLT) tells us that the sum $Y_N = y_1 + y_2 + y_3 + \cdots + y_N$ is approximately normal with mean $N * \mu_y$ and standard deviation $\sqrt{N} * \sigma_y$. From this observation, we see that
$$(1 + AIC_1)^N \cong E\left[\frac{AV(N)}{AV(0)}\right] \approx Exp\left(N\left(\mu_y + \frac{1}{2}\sigma_y^2\right)\right).$$

The *median* value of $\frac{AV(N)}{AV(0)}$ is approximately $Exp(N \mu_y)$ and
$$Pr\left[\frac{AV(N)}{AV(0)} \geq (1 + AIC_1)^N\right] \cong Pr\left[Y_N \geq N\left(\mu_y + \frac{1}{2}\sigma_y^2\right)\right] = Pr\left[\frac{Y_N - N\mu_y}{\sqrt{N}\sigma_y} \geq \frac{\sqrt{N}}{2}\sigma\right] < \frac{1}{2}$$

via the CLT. For example, for $\sigma_y = .15$ and N= 30, the probability of achieving the mean return is about 34 percent. In short, C3 is not satisfied by AIC_1

Moving on to C2, and again using the CLT,

$$E\left[\left(\frac{AV(N)}{AV(0)}\right)^{\frac{1}{N}} - 1\right] = E\left[Exp\left(\frac{y_1 + y_2 + y_3 + \cdots + y_N}{N}\right) - 1\right] \approx Exp\left(\mu_y + \frac{1}{2}\frac{\sigma_y^2}{N}\right) - 1.$$

$$\neq Exp\left(\mu_y + \frac{1}{2}\sigma_y^2\right) - 1 = AIC_1$$

The second term in the exponent will be small for reasonably large N (in fact, typically $\frac{1}{2}\sigma_y^2$ will already be somewhat small since it is related to the volatility of the indexed credit). Hence, I propose

$$AIC_2 = Exp(\mu_y) - 1, \text{ where}$$
$$\mu_y = E[y_t] = E[ln(1 + IC(t - 1, t))].$$

It is immediately evident that C2 is satisfied by this choice. But also from the observation about the median above, C3 is also satisfied.

It should be clear that satisfying all three conditions is not possible. But for purposes of illustrations, my opinion is that C2 and C3 are more appropriate for what the investor is trying to understand.

I now suggest three possible approaches for establishing a view on the distribution of returns:

A1: Parametric-subjective

This method would assume a parametric form for return distributions, (e.g., lognormal), and then allow the investor to choose the parameters to best represent their view on expected future returns. Since the price return is what matters for index credits (not total return), care must be taken that the investor understands what it is that they are providing. So for example, if the investor says, "I think the stock market will grow 10 percent per year on average" and the dividend yield is 2 percent, I would assume that they are talking about total return and the corresponding parametric distribution should have a mean return of about 8 percent (not 10 percent). But it would be better to understand exactly what they believe.

Once we have specified the parametric distribution and a parameter choice, we can calculate AIC_1 or AIC_2 via integration. In particular, if we denote the probability density function (pdf) for $X = \frac{S(t+1)}{s(t)}$ as $f(x)$, then

$$AIC_1 = E[IC(t, t + 1)] = \int_0^\infty Min(Max(x - 1, 0), C)\, f(x)\, dx.$$

And

$$AIC_2 = Exp(\mu_y) - 1$$

where $\mu_y = E[ln(1 + IC(t, t + 1))] = \int_0^\infty ln\big(Min(Max(x, 1), 1 + C)\big)\, f(x)\, dx.$

In some cases, for example when the distribution is lognormal, AIC_1 can be calculated explicitly in closed form via a Black-Scholes-like formula. However, in general this will not be true. I have personally implemented the integration for AIC_2 for the lognormal case in VBA using Simpson's rule, and it works quite well. So the need to numerically integrate shouldn't be an obstacle.

A2: Parametric-historical

This is very similar to the above, except that parameters are estimated from historical price data as opposed to subjective inputs. For example, let $S_0, S_1, S_2, \ldots S_M$ be the index prices for a period of M years. If we were to assume a lognormal return distribution, we would then assume that $u_t = S(t)/S(t-1)$ are distributed normally and estimate the parameters to be the sample mean and sample standard deviation of $u_1, u_2, \ldots, u_M$

The rest is the same as above.

A3: Non-parametric historical

One might believe that annual stock returns are not well-represented by any parametric distribution (or, at least, not any common one). This is particularly true because returns show skew and kurtosis. One approach for dealing with this is to take the empirical distribution of returns and simply fit a curve to it (via some kind of spline). For the full distribution, this is problematic in terms of fitting the tails because we just don't have that many data points.

However, the middle of the distribution is another matter. And when it comes to index credits, that is where we are playing. Because instead of empirically estimating the full distribution, we only need to estimate the probabilities that the returns fall outside the floor/cap range (both probabilities) and the distribution when returns are in between. The data point requirements for doing this are much less daunting.

The suggestion here is the following:

For a given set of historical prices $S_0, S_1, S_2, \ldots S_M$, calculate the corresponding index credits $IC_1, IC_2, \ldots IC_M$. We would then estimate

$$AIC_1 = \frac{1}{M} \sum_{k=1}^{M} IC_k$$

and

$$AIC_2 = Exp\left(\frac{1}{M} \sum_{k=1}^{M} ln(1 + IC_k)\right) - 1$$

The astute reader will no doubt realize that under this method, AIC_2 is the "look-back" method.

Does it matter whether we use A2 or A3? The answer is yes. I compared these approaches across many 30-year periods of the S&P500 in an effort to estimate AIC_2. I find that AIC_2 is typically higher via A3 than A2. Reviewing U.S. price index values from Robert Shiller (*http://www.econ.yale.edu/~shiller/data.htm*), and calculating AIC_2 via 30-year lookback and 30-year historical parametric method beginning in 1901 (considering only each January), I found A3 indicates a higher estimate for AIC_2 every

year since 1919. Why is this? I believe it is because the indexed credit mechanism cuts off negative returns. Without skew, this would not be very impactful; but with skew, it is significant[4], as illustrated in the following graph.

Excess of A3 over A2 versus skew
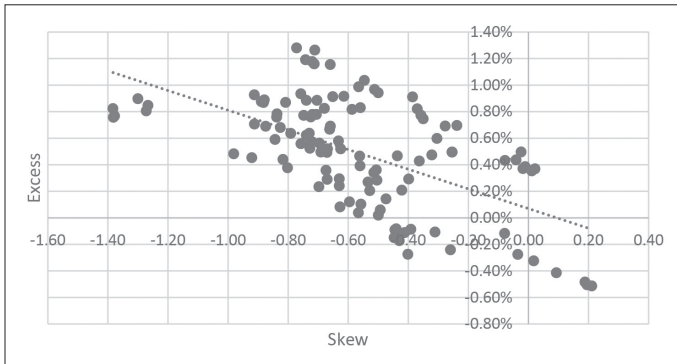
LIMITATIONS: All of the approaches above have weaknesses. All assume going forward that the return distributions are time invariant. The historical approaches assume time-invariance looking backward. The more mathematically tractable parametric approaches are typically too simple (lacking skew, for example). The truth is, there is no flawless way to choose the assumption. What you can do, however, is to make reasonable assumptions and then logically follow through on what those assumptions imply for indexed crediting while acknowledging their limitations.

RETURNS ON THE HEDGE BUDGET

Today, an indexed credit with a 12.5 percent cap can reasonably be purchased on a hedge budge of 4.5 percent. Let us apply our three approaches to calculate AIC_2 and see what kind of return on the hedge budget this corresponds with.[5]

A1: An equity investor is likely bullish on stocks (you would think, anyway). So they might say, "I expect the long-term total return on equities to be 8 percent to 12 percent." Prompted for a volatility, they might say something like "15 percent to 20 percent." These do not seem unreasonable. I will interpret their belief to mean that *median* total return is 8 percent to 12 percent (let's call it *tr*). That is, the median future value of the Total Return Index (TRI)[6] is $I(N)_{median} = (S(t)) * (1 + tr)^N$. Let's assume a lognormal model for the price index with drift g, volatility σ, and continuous dividend yield δ. Then the median long-term total return should satisfy $\frac{TRI(N)_{median}}{TRI(0)} = Exp(N * (g + \delta))$. This implies that $g = \ln(1 + tr) - \delta$

The range for tr and a choice of δ=.02 gives g=.057 or g=.093. Assuming further that σ=.15 or σ=.20, I calculate the following:

g	σ	AIC_2
5.7%	15%	5.5%
5.7%	20%	5.4%
9.3%	15%	6.6%
9.3%	20%	6.2%

This implies a "return" on the hedge budget between $\frac{5.4}{4.5} - 1 = 20$ percent and $\frac{6.6}{4.5} - 1 = 47$ percent.

A2: If we lookback at 30-years returns from various starting points going back to 1950 (similar to AG 49), but apply the parametric approach using a lognormal assumption, AIC_2 will range between 5.6 percent and 7.0 percent. This again implies "returns" on hedge budgets of 27 percent to 56 percent.

> The crediting mechanism underlying IUL is a strategy that splits investments between a "safe" bond investment and a "risky" derivative strategy.

Gary Hatfield, FSA, CERA, MAAA, is actuary—Enterprise Risk and Investments at Securian Financial Group, St. Paul, Minn. He can be contacted at *Gary.Hatfield@securian.com*

A3: Using the same returns as for A2 but using the empirical approach, AIC_2 will range between 6.4 percent and 7.8 percent. This implies "returns" on hedge budgets of 42 percent to 73 percent.

In short, there is nothing unreasonable about option strategies having high average returns. I want to add a couple of comments on this, however. These "returns" are not compounded returns. Indeed, a "fund" that fully invested in such strategy would go bankrupt with probability 1. The crediting mechanism underlying IUL is a strategy that splits investments between a "safe" bond investment and a "risky" derivative strategy. The derivative strategy may have what seems like a very high "average" return, but it loses 100 percent with great frequency. The key to resolve this paradox is to apply a long time horizon—keep playing! IUL accomplishes this with the large "safe" investment and a series of relatively small option trades over a long time horizon.[7] ∎

ENDNOTE

1 Looking at historical S&P500 data, the auto-correlation varies between -8 percent and 8 percent depending on which point in the calendar is used to compare point-to-point returns.

2 See the autocorrelation discussion above.

3 In the case of indexed credits, N = 15 seems to be large enough.

4 The estimated lognormal process and the emprical process have the same mean and volatility, but the empirical process has a lower expected return conditional on the return being negative. Therefore, cutting off negative returns has more value relative to the lognormal process with the same mean and volatility.

5 AIC_1 will be higher

6 The Total Return is simply the return on the price index assuming dividends are reinvested into the index

7 See for example the not-well-enough-known Kelly Criterion for allocating between "safe" and "risky" investments *https://en.wikipedia.org/wiki/Kelly_criterion*

Asset Allocation Contest

By Justin Owens

The 2017 Asset Allocation Contest sponsored by the SOA Investment Section is underway! The contest period will run April 1 through Sept. 30. The Investment Section simplified some rules this year to increase participation and reduce unnecessary complexity. We preserved rules intended to promote thoughtful portfolios. For example, this year we required that at least four asset classes be chosen, and that each maintained an allocation of at least 10 percent. This standard reduces some of the tendency to win the contest by randomly "throwing darts" while still preserving the ability to make large-scale bets in certain asset classes.

The contest is broken up into three subcategories, testing the skill (or luck) of section members' portfolio design capabilities. Each is intended to mimic a real-world activity that could be seen in practice:

- **Maximize risk-adjusted alpha.** In this contest, the actual portfolio return matters much less than the return relative to volatility. A relatively low-returning portfolio could fare well and well-diversified portfolios have tended to do best in early results.

- **Maximize Accumulation.** For this contest, the only result that matters is the ending asset value. In the 2017 contest, over one-third of contest participants decided to allocate at least 50 percent of their portfolio to a single asset class. Others chose to distribute over 50 percent of their assets to similar asset classes (e.g., non-U.S. equities or real assets). I expect the leaderboard to be quite fluid as various asset classes surge, benefitting certain concentrated portfolios.

- **Drawdown Risk.** This contest is similar to the accumulation contest. However, the contest design can punish volatile portfolios by withdrawing $800 every trading day. Either the last portfolio "standing" or the portfolio with the highest value on Sept. 30 will be the winner. Not surprisingly, participant portfolios tended to be more diversified than in the accumulation contest, though not as diversified as the risk-adjusted alpha contest. This contest will become much more interesting in August and September as the daily drawdown accounts for a more substantial portion of the overall portfolio.

The contest has been set up for Investment Section members as a fun way to apply skills learned on the job to a competition among peers using real-world data. Those section members that signed up for the contest this year will continue to receive regular updates and some market commentary. For those who did not sign up this year, we look forward to you participating next year!

For official contest rules see *http://www.soa.org/sections/investment/investment-allocation-contest/* ∎

Justin Owens, FSA, CFA, EA, leads the U.S. Client Strategy & Research team for Russell Investments, based in Seattle, Wash. He can be reached at *jowens@russellinvestments.com.*

US Life Insurers' Marginal Increase in Investment Risk Won't Hurt Portfolio Credit Quality

By Shachar Gonen

This article is an extract from a special comment published on www. moodys.com in May 2017. It is reprinted here with permission.

SUMMARY

Although they've risen recently, interest rates in the US remain low, and US life insurers' investment yields will continue to fall this year as insurers reinvest proceeds from maturing bonds into new, lower-yielding securities. Over the past several years, US life insurers have gradually been increasing investment risk in their portfolios to generate higher returns, according to Moody's review of insurers' investment portfolios. However, in Moody's opinion, the increase in risk has been marginal, and the credit quality of the industry's investment portfolio remains stable.

BELOW ARE KEY TAKEAWAYS FROM OUR ANALYSIS:

» US life insurers have not materially changed their portfolios' overall investment risk. Insurers continue to hold broadly diversified and conservative investment portfolios comprised mostly of high-quality fixed income investments. Credit quality in the portfolios remains steady, and the industry should be in a solid position when the long credit cycle finally turns, at which point investment losses will increase to more historic levels. Exposure to energy investments remains a challenge, and could introduce more investment losses, especially if oil prices decline. Many energy company bonds have already fallen below investment grade, or may do so, given the difficulties in that sector.

» Allocations to less-liquid securities on the rise. Life insurers have been increasing their investments in private bonds and commercial mortgage loans, giving up liquidity to gain additional yield at the margin. Within commercial real estate, exposure to the retail sector, particularly mid and lower-end Class B and Class C properties, could increase the risk of losses for insurers.

» Exposure to alternative investments declines modestly. US life insurers' allocations to alternative investments, notably hedge funds, have dropped slightly, and the aggregate allocation for the industry is now near year-end 2013 levels. Recent announcements indicate that insurers will likely further pare back investments in hedge funds over the next several years, although some of this will be reinvested back into different alternative investments, such as private equity.

LIFE INSURERS' PORTFOLIOS REMAIN BROADLY CONSERVATIVE

The historically low interest rate environment has led life insurance companies to reach for yield by modestly adding risk to their investment portfolios to ensure their investment income will cover their long-term liabilities. In Moody's view, the shifts in investment allocations to offset the decline in portfolio yields are not a credit concern at this point, because they are within historical norms and consistent with our expectations.

The 10-year US Treasury bond yield began 2016 at 2.2%, declined by mid-year to below 1.5%, then reversed course to end the year at 2.45%. Thus far in 2017, 10-year Treasury rates have been flat, ending Q1 2017 at 2.4%. In March 2017, the Federal Reserve increased short-term rates by 25bps, and has indicated there will be additional increases later in the year.

Corporate spreads are another important component of life insurers' investment returns. After peaking in Q1 2016, corporate spreads have tightened in 2016 and into 2017, pushing down reinvestment rates even further. Most life insurers have relatively long-duration portfolios, and the impact of lower reinvestment rates is felt over time, since their portfolios turn over at a rate of around 10%-15% per annum. Life insurance industry portfolio yields have continued to decline, to 4.55% in 2016 from 4.66% in 2015 and 4.83% in 2014.

The US life insurance industry's total net admitted cash and invested assets increased 5.1% to $3.9 trillion at year-end 2016 from $3.7 trillion at year-end 2015. As shown in Exhibit 1, US life insurers' portfolios remain relatively conservatively invested, with nearly three quarters of cash and invested assets invested in fixed income bonds – the vast majority of which are investment grade – for the past several years. The next largest category, which includes mortgage loans and real estate, has been gradually expanding, reaching 11.9% of cash and invested assets at year-end 2016, up from 10.8% at year-end 2013. After gradually rising for several years, Schedule BA assets – a range of alternatives assets, such as private equity and hedge funds – declined modestly over the past 18 months and represented 4.1% of cash and invested assets as of year-end 2016. Cash and short-term investments declined slightly in the second half of 2016, returning

Exhibit 1

US Life Insurance Industry General Account Asset Mix as % of Cash & Invested Assets
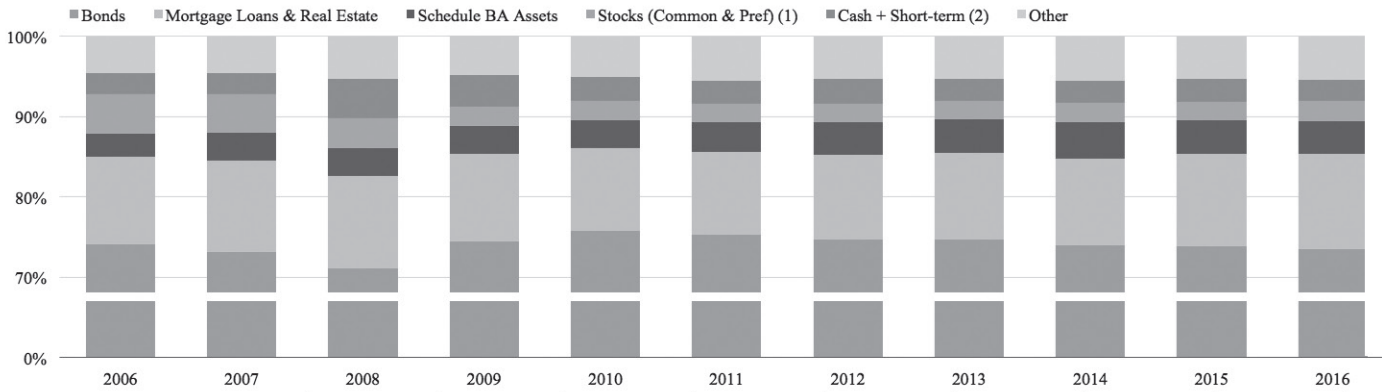

(1) Includes investments in affiliates
(2) Includes net admitted contract loans, premium notes and derivatives
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Exhibit 2

Below Investment Grade Exposures Have Stabilized

NAIC SVO Investment Class Designation as % of Total Bonds
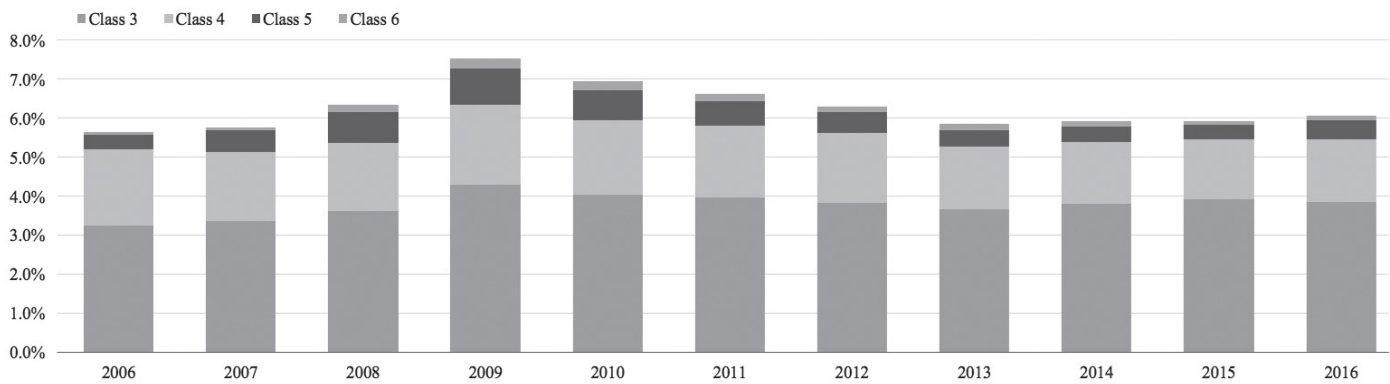
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to pre-financial crisis levels, ending 2016 at approximately 2.6% of cash and invested assets.

CREDIT QUALITY REMAINS STEADY, LEAVING THE INDUSTRY PREPARED FOR A FUTURE DOWNTURN IN THE CREDIT CYCLE

From a credit perspective, US life insurers have not been increasing their exposures to below investment grade (BIG) securities. As shown in Exhibit 2 below, BIG holdings have remained relatively steady at approximately 6.0% of total bonds for the past three years.

The Moody's US speculative grade default rate is expected to decrease to 3.0% in 2017, down from 5.7% at year-end 2016; however in the pessimistic case, this would increase to about 9.0% by year-end 2017. Nonetheless, with the US economy at full employment, the current expansion is likely entering its later stages.

ENERGY INVESTMENTS REMAIN A CHALLENGE, BUT INDUSTRY APPEARS WELL POSITIONED

Insurers' investment balances in below investment grade holdings at year-end 2016 are likely to rise as a result of fallen angels in challenged sectors. A significant number of energy sector holdings have experienced negative rating actions in 2016, lead-

Exhibit 3

Holdings of Private Securities Increasing Again

US Life Insurance Industry's Private Securities Holdings as % of Cash and Invested Assets
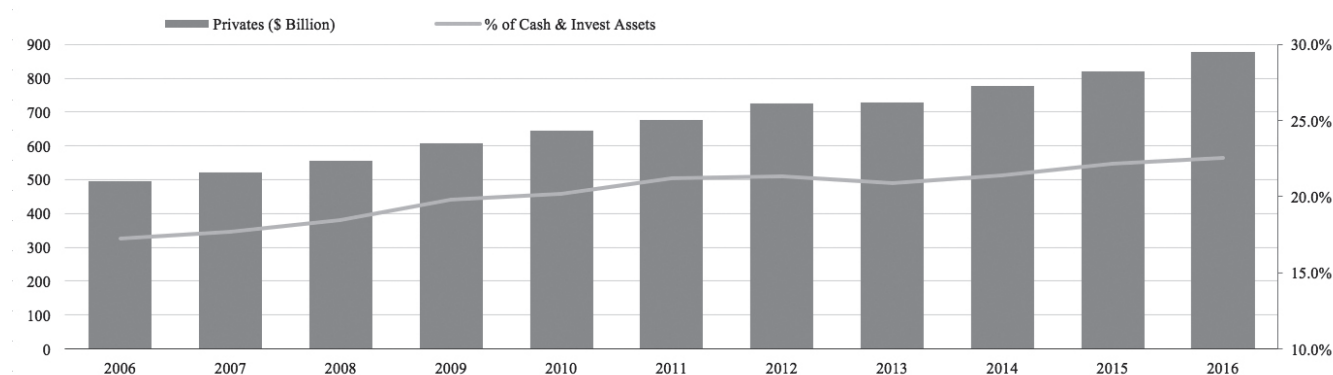
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ing many to fall below investment grade. Energy holdings are a common investment universe for life insurers and have typically represented about 6%-8% of fixed income investments. For the US life insurers' energy-related investment holdings, we expect continuing unrealized losses and modest impairments in 2017. Although Moody's does not expect energy prices to fall, lower energy prices would reduce the returns of these portfolio holdings. A number of insurers have already taken write-downs on their more troubled energy holdings, somewhat mitigating the impact of a downside scenario in energy. Additionally, some insurers took advantage of the rise in energy prices in 2016 to trim their energy-related investment holdings.

LIFE INSURANCE INVESTMENT MIX SHIFTS TOWARDS LESS LIQUID INVESTMENTS

Life insurers are increasingly sourcing private placements and commercial mortgage loans (CMLs), which are both less-liquid asset classes, to improve investment returns. With the increased focus on higher-yielding asset classes, insurers will need to carefully balance the benefits of increased yield with the impact of greater risk and/or less liquidity in their investment portfolios. Additionally, as markets become more competitive, insurers will need to balance credit risk with their search for additional yield.

During the past several years, US life insurers' allocations to private bonds have continued to increase as the companies trade liquidity for additional yield. As shown in Exhibit 3 below, the US life insurance sector's investment allocation to private bonds in-

creased to $878 billion, representing 22.5% of cash and invested assets at year-end 2016, up from 20.9% as of year-end 2013.

COMMERCIAL MORTGAGE LOAN HOLDINGS HIGHER, BUT WELL DIVERSIFIED; RETAIL EXPOSURES MANAGEABLE

Commercial mortgage loans (CMLs) are a familiar asset class with which the life insurance industry has developed a proven underwriting expertise over a long time frame. The industry's allocation to CMLs and real estate increased to $462 billion representing 11.9% of cash and invested assets at year-end 2016, up from 10.8% at year-end 2013. This reflects a gradual reallocation from corporate bonds to less liquid CMLs. The relatively longer duration of the CML asset class fits well with typical life insurance liabilities which are also typically long-term in nature.

Moody's-rated US life insurers' CML holdings are well diversified by property type. Office and apartment/multifamily property types were the most widely held by the life insurance industry at 26% and 22%, respectively. These were closely followed by retail CMLs at 21.3% at year-end 2016. Retail CML is an area of potential weak performance given the challenges facing the retail industry. Retail industry bankruptcies have increased, and in April, Moody's corporate team lowered its 2017 forecast for US retail operating income growth due primarily to underperformance of companies in five subsectors – specialty retailers, discounters and warehouse clubs, department stores, drug stores

Exhibit 4
CML Holdings broadly Diversified by Property Type
Moody's-rated US Life Insurers' CML by Property Type at Year-End 2016
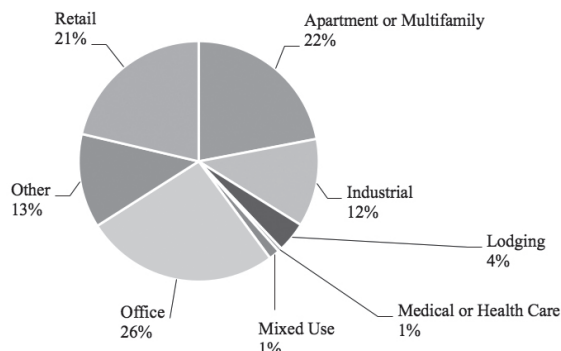
Source: Moody's Investors Service; SNL Financial LC. Contains copyrighted and trade secret materials distributed under license from SNL. For recipient's internal use only.

Exhibit 5
Good CML Performance Continues
Moody's-rated Insurers' Non-Performing CMLs by Year
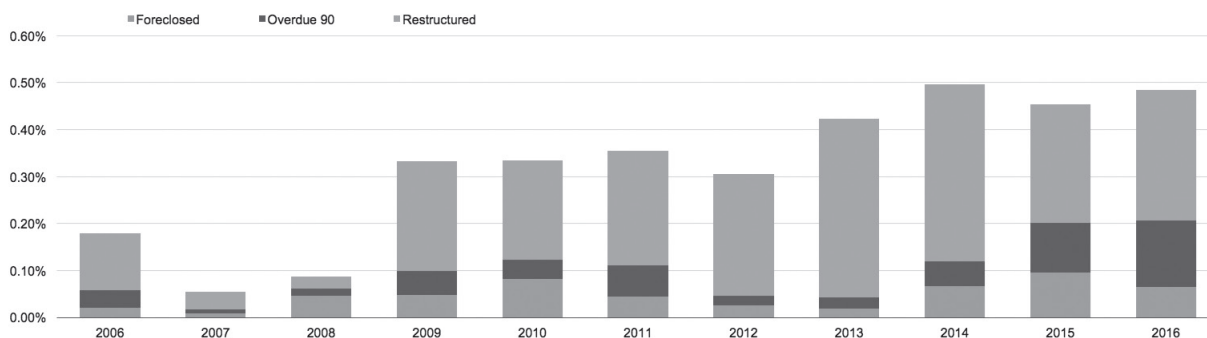
Source: Moody's Investors Service; SNL Financial LC. Contains copyrighted and trade secret materials distributed under license from SNL. For recipient's internal use only.

and office supply. Exhibit 4 below shows Moody's-rated life insurers' CML holdings by property type at year-end 2016.

In Moody's view, most of the stress from retail exposure is through Class B and Class C properties, as opposed to the higher-end Class A properties. Insurers also have exposure to this segment though CMBS investments, although frequently insurers own more senior tranches, which mitigates the risk.

US life insurers' CML portfolios have experienced good performance as less than 50bps of CMLs were overdue 90 days, in foreclosure or restructured at year-end 2016. This good performance has been consistent for the past several years. Exhibit 5 below show the industry's troubled CML holdings over time.

EXPOSURE TO ALTERNATIVE ASSETS DECLINES MODESTLY

US life insurers' allocations to Schedule BA assets – a range of alternatives assets, such as private equity and hedge funds – have moderated to 4.1% at year-end 2016, down from a peak of 4.5% at year-end 2014 as a percentage of cash and invested assets. Exhibit 6 below shows Schedule BA assets for the US life insurance industry as a percentage of cash and invested assets.

Exhibit 6
Recent Decline in Schedule BA Asset Allocation
US Life Insurance Industry Schedule BA Assets as Percentage of Cash & Invested Assets by Year
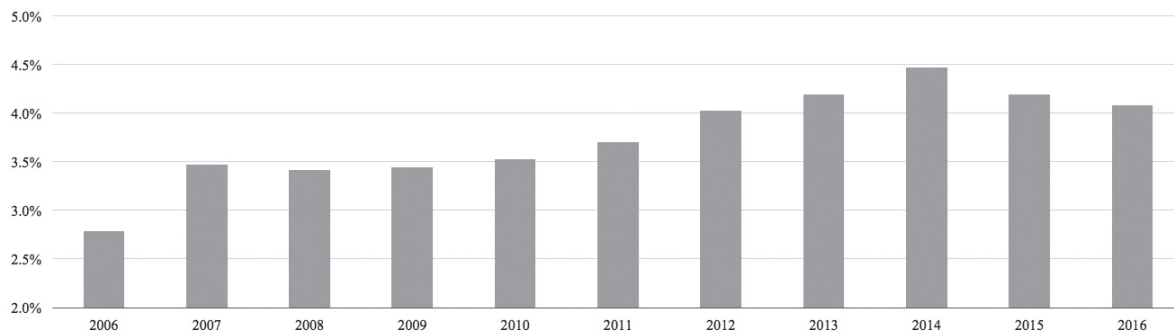
Source: Moody's Investors Service; SNL Financial LC. Contains copyrighted and trade secret materials distributed under license from SNL. For recipient's internal use only.

Moody's notes that large life insurers (based on invested assets) typically have more highly diversified portfolios, greater investment resources, and broader investment expertise, allowing them to allocate a greater percentage to alternative holdings. For the past five years, as a percentage of cash and invested assets, our 10 largest rated US life insurers have held more than twice the amount of alternatives as the remainder of our rated universe. The size variation is in part attributed to the fact that mutual life insurance companies are some of the largest companies in the industry, and have the ability to allocate more of their investments to higher risk assets because of the long duration and participating policyholder dividend feature associated with a portion of their liabilities.

HEDGE FUND ALLOCATIONS SET TO DECLINE

Announcements by several life insurers in 2016 indicate that further reductions in alternative investments, primarily hedge funds, are likely to come over the next several years. Insurers' investment income fluctuated in 2016 as a result of poor performance from alternative investments, leading several life insurers to announce plans to reduce their holdings of hedge funds. More recently, in Q1 2017, performance of this asset class rebounded. ■

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Lessons Learned from 25 Years of Variable Annuity Guarantees

By Ari Lindner

Note: This article was developed from a presentation made at the Equity-Based Insurance Guarantees conference in November 2016. Except where otherwise specified, the article refers to the U.S. market.

Variable Annuity (VA) Guarantees have had a meaningful impact on the insurance industry over the last 25 years. They remain arguably the most complex liabilities that insurers write. The list of companies that have sustained significant financial damage from VA Guarantees is long, and includes both insurers and reinsurers.

This article opens with a brief history of VA Guarantees, split into 3 eras—Infancy, Tumultuous Adolescence and Middle Age. Then it lists a number of lessons that the industry has (hopefully) learned over the last 25 years. Finally, it speculates as to where VAs and their associated guarantees might be heading in the future.

VARIABLE ANNUITIES—INFANCY

In the early years, VAs were essentially tax-advantaged mutual funds administered by insurers, with only a minor insurance component related to annuitization. At most, a simple Return of Premium Guaranteed Minimum Death Benefit (GMDB) might be included—although there was no real effort made to price this risk nor was there typically an explicit (or even implicit) charge to the policyholder. Regulations and risk management with respect to VA Guarantees were practically non-existent.

VARIABLE ANNUITIES—TUMULTUOUS ADOLESCENCE

First, insurers began to compete on the aggressiveness of their GMDBs, rapidly moving from Return of Premium and Resets to substantially riskier designs such as Ratchets and Roll-ups. Then the industry developed new guarantees that paid on events other than death—the Guaranteed Living Benefits (GLBs), such as GMABs, GMIBs, and GMWBs/GLWBs. Explicit guarantee charges were added to VAs, and reinsurance and new hedging techniques emerged as ways for insurers to manage these new risks. Insurers competed to have the most attractive benefits, and VA Guarantees became the driving factor behind rapidly increasing sales. Both insurers and reinsurers experienced enormous growth and profits—for a while. The market correction in 2000–01 caused significant losses and resulted in market exits and a re-examination of pricing and risk management. After another period of explosive growth, the market collapse in 2008–09 again caused huge losses for writers of VA risk. Along with pricing and risk management, regulations struggled (and often failed) to keep pace with product innovation.

VARIABLE ANNUITIES—MIDDLE AGE

We have experienced a period of relative stability over the last 5+ years. VA Guarantees have been "de-risked" to be more conservative and to make the risks easier to manage through hedging. Several major VA writers exited the market and the concentration of market share in the top VA writers has increased, with the top 10 writers now claiming about 75 percent of the market. Pricing, risk management and regulations have become fairly robust, although they may still be perceived as lagging newer product designs. The low interest rate environment remains a challenge, but companies continue to offer GMDBs and GLBs as riders on their VA policies. More recently, VA sales have been adversely impacted by headwinds caused by regulatory changes and uncertainty.

LESSONS LEARNED

Lesson #1: Successful products will be copied, but should they?

Every successful new product innovation has been copied, usually very quickly. The competitive advantage of a new guarantee does not last long. However, in many cases, less-disciplined competitors have taken a short cut approach, simply copying VA Guarantee language directly from a competitor's prospectus, perhaps with only minor wording or pricing changes. This approach has caused problems, as the copycat company may be unable to administer the VA Guarantee properly, may have inadequate risk management in place, or may find its sales force lacks adequate training to sell the new benefit. Minor changes to the language in a VA Guarantee can also drastically alter the risk profile—in one case, simply removing the maximum attained age language for a GMDB led directly to the severe impairment of a major VA writer.

Lesson #2: Past performance does not guarantee future results …

In the early days of VA Guarantees, actuaries and financial professionals argued over the proper pricing approach for the risk. Is it an insurance liability or a derivative? Should it be priced using historical/real-world modeling or risk-neutral/Black-Scholes option pricing? But those turned out to be less important than

the key question of how to project future results using only historical experience as a guideline. In the late 1990s, after several years of an historic bull equity market, a number of reinsurers entered the VA Guarantee reinsurance market, seemingly with overly optimistic expectations regarding future equity market growth. The 2000–01 recession proved them wrong, resulting in quick market exits and significant losses that their legacy books are still experiencing today. Other companies have relied on back-tested hedging strategies, but then found that 2008–09 was outside of the historical parameters used to calibrate the models, resulting in outsized hedge breakage and unhedged losses. One example: the U.S. 10-year treasury yield has been under 2.5 percent for the bulk of the last 6 years, a level which previously had been considered a safe "lower bound."

### Lesson #3: Policies last a looooong time—and things change!

VA Guarantees are promises that can endure over decades. In the early days of VA Guarantees, company experience was that most policyholders lapsed at the end of their Surrender Charge period (typically year 7), as agents were incented to earn another commission by moving their customers to "new and better" VA products. More recently, lapse experience has been much lower, with these unexpectedly persisting policy cohorts bringing their VA Guarantees into increasingly volatile times. Regulations around reserving and capital have changed, and will likely change again. The capital market environment can change significantly and without warning. Even changes in the tax code can alter the risk profile of in-force VA Guarantees.

Lesson #4: Anti-selection

VA Guarantees introduce mortality/longevity risk to a non-underwritten product. Experience studies now show higher mortality rates on policies electing enhanced GMDBs, and lower mortality rates on policies electing enhanced GLBs. In addition, while there has always been some expectation that lapse and withdrawal behavior will be driven in part by the value (or in-the-moneyness) of a policy's VA Guarantee, experience studies now show that larger policies (measured by dollar amount) behave more rationally, increasing the insurer's cost in providing the VA Guarantee.

Lesson #5: Partial withdrawals

Historically, some VA Guarantees were issued with a provision that partial withdrawals cause the guaranteed value to be adjusted on a dollar-for-dollar basis, rather than the more accurate proportional basis. VA Guarantees with this dollar-for-dollar treatment of partial withdrawals are exposed to the risk of policy stripping, which can exponentially increase the cost to the insurer to provide the benefit. The arguments in favor of using the "dollar-for-dollar" approach tended to be that it was easier to explain and administer, and in any case many people assumed
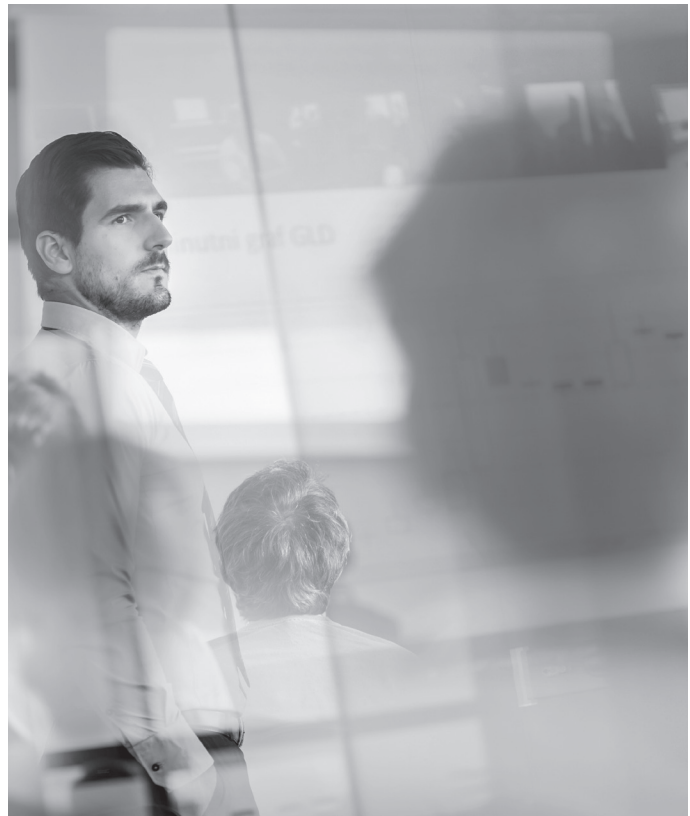
that "nobody will ever actually use it." Today we see some legacy VA books that continue to suffer losses due to the availability of this option. In a similar manner, many VA GLBs were issued with so-called hybrid withdrawals, which allow for a small withdrawal annually to be treated as dollar-for-dollar. Recent public announcements suggest that this feature is being used far more than initially expected and may result in future losses on existing VA books.

Lesson #6: Policyholder behavior can change

In the early years, VA writers often believed (and their salespeople would insist) that no policyholder would ever buy a VA Guarantee with an explicit charge of more than 30bp per year. Then that maximum charge became 50bp, then 75bp, then 100bp, and today many VA Guarantees cost over 100bp per year. Also, the so-called spike lapse at the end of the surrender charge period has changed from 30 percent to 50 percent (or more) to a much lower level, often 10 percent to 20 percent (or less). This change results from a number of factors, including the increasing difficulty that salespeople have in moving a policy (and earning a new commission) because there are typically not any better policies to justify a move, and also increased regulatory scrutiny of salesforce behavior with respect to treating their customers fairly. Finally, experience has shown that the rationality or efficiency of policyholder behavior has increased substantially over

time. In other words, a VA Guarantee's in-the-moneyness has a much greater impact on the lapse and withdrawal behavior of a policyholder today than it did in prior periods. There appears to have been a significant change industry-wide in this level of efficient behavior, particularly after 2008–09.

Lesson #7: Policyholder behavior can vary by location/company

We see significantly different behavior, including fund selections and lapse/withdrawal behavior, between North American (US/ Canada) policyholders and Asian (Japan/Taiwan) policyholders. The policyholders in Asia are much more likely to take advantage of every option provided to them in order to maximize the value of the VA Guarantee. We also see significantly different behavior by company, even within the U.S. market. Lapse/annuitization/withdrawal behavior can vary by a factor of 3x–5x or more, even controlling for policy features and other factors. The driver(s) of this extreme variation remain unclear.

Lesson #8: Investments

Policyholders tend to be lousy market timers—they are more likely to reduce (rather than increase) their equity exposure following a severe market drop. As a result, their account values may be less likely to participate in subsequent equity market recoveries. This is rarely factored into pricing or hedging strategies. In addition, equities can be far more volatile than expected, which may be a problem if the volatility risk is not specifically hedged; and also hedgeable indices may be poor proxies for the actively managed funds in a VA account. We have seen many of the major VA writers shift away from offering actively managed funds, instead offering more hedgeable funds such as index-trackers or volatility-controlled/target-volatility funds.

Lesson #9: Regulation is slow to react

VA Guarantee product development has consistently outpaced regulation. Statutory reserve guidelines AG34, AG39, and AG43 lagged the respective VA Guarantees they governed by as much as 10 years. US GAAP rules FAS133, FAS157 and FAS159, and the classification of VA Guarantees as insurance or derivatives, were similarly lagged. The Risk-Based Capital C-3 Phase 2 calculation methodology is disconnected from both statutory and GAAP calculations; as a result, there are additional future modifications expected to help bring the three calculations more in line with each other. Market events can also outpace regulations; for example the 2008–09 market collapse demonstrated weaknesses in existing regulations as companies struggled with rules that became perceived as overly harsh in the post-collapse environment.

Lesson #10: Hedging

In the late 1990s, as VA writers began to incorporate delta hedging in their VA Guarantee risk management programs, they wrongly assumed that the delta hedging would remove the bulk of the risk. Most of these hedging programs failed in the 2000–01 recession. Similarly, the emergence of dynamic multi-greek hedging strategies did not protect VA writers from significant hedge breakage in the 2008–09 market collapse. Companies have learned that hedging strategies can be somewhat mutually exclusive. That is, the hedge program's goal might be to protect GAAP income statement volatility, or statutory capital, or long-term economic losses, but it will not be able to accomplish all three equally well. Even the most robust hedging strategies are now understood to experience regular breakage, due to the need to balance liability matching precision against over-trading (a buy high/sell low problem that introduces frictional costs). There are also a number of non-hedgeable risks, including both financial (basis, correlation) and non-financial (mortality, behavior) risks, all of which can generate substantial income statement and balance sheet volatility.

Lesson #11: Consistency vs. Flexibility

Some companies have been successful with a more consistent approach to the VA market. They have not made frequent product changes and do not typically make dramatic changes to their market share of new sales in the short term. But in other cases, failing to respond quickly can exacerbate problems. Some companies have suffered materially from being too slow to adjust poorly designed products or risk management strategies, or from being too slow to de-risk VA Guarantees, increase rider prices, accept the low interest rate environment, or apply newly emerging policyholder behavior data. Striking a balance between stability and responsiveness is a key ingredient in a company's long-term success.

Lessons #12+: What might we learn in the future?

It can be difficult to anticipate future lessons, as they are almost by definition unknown unknowns. But we can speculate on some possibilities. Perhaps large-scale transfers between equity and fixed income investments will be impossible in practice; that is, in a severe equity market downturn the market may lack the liquidity necessary to convert the volume of equities to fixed income that is required to maintain a CPPI-style approach to fund management or risk management/dynamic hedging. Perhaps policyholder behavior will become more efficient/rational/ anti-selective. Perhaps longevity risk on GLBs will be far greater than currently anticipated.

Final Thoughts – What is Next for Variable Annuities?

Possibility #1: A Leisurely Retirement. In this scenario, VAs experience stable or moderately slowing sales with somewhat negative net flows. This may be due to a number of factors, including: regulatory changes, the cost/benefit of the guarantees may no longer seem attractive to investors, persisting low interest

rates, or companies shifting towards products with fewer long-term guarantees.

Possibility #2: Death. In this scenario, VAs experience rapidly declining sales with companies exiting the market. This may be due to factors such as: a severe market downturn resulting in losses and increased capital requirements, particularly onerous regulatory or tax changes, an increase in longevity risk (real or perceived), demographic changes, or simply insurers finding they are unable to achieve a sufficient return on capital in their VA products.

Possibility #3: Reincarnation. In this scenario, substantive change reinvigorates the VA product line. This may be due to factors such as increased customer demand for longevity, health care, LTC or other protections to be included in retirement savings products, tax or regulatory change improving the value of a

VA, high interest rates/low volatility allowing for more aggressive VA Guarantee design and pricing, or an internet sales model that dramatically lowers the VA cost.

The last 25 years have seen the Variable Annuity marketplace experience a roller coaster in all aspects—product and guarantee design, accounting, regulations, risk management, etc. Important lessons can be learned from a review of the various ups and downs, twists and turns, and successes and failures that have occurred during this period. ∎

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Passive Investing—A Great Idea Gone Bad

By Steve Scoles

DISCLAIMER: This article is for informational purposes and is not intended as an investment recommendation. It is likely that if the author turns out to be wrong, he hopes that you will forget about this article. If he turns out to be correct, keep an eye out for future advertisements for his new hedge fund.

The acceptance of passive investing has grown in fits and starts over most of the last 40 years. However, in the last few years, passive investing has become very mainstream and has had phenomenal growth—with both retail and institutional investors pouring in. The story of Vanguard Funds illustrates this growth.

In 1976, Vanguard Funds launched their first index mutual fund. While they offered up to $100 million to prospective investors, they saw very little interest and their total initial subscription was a disappointing $11 million. Fast forward to 2017 and Vanguard, now synonymous with passive investing, is the largest mutual fund company in the world with over $4 trillion in assets.

Here are a couple more stats on Vanguard according to the New York Times:
- On some days they invest up to $2 billion of new money—which is almost 200-times their total initial subscription back in 1976!

- They achieved mutual fund inflows of $823 billion over the last three years compared to only $97 billion for the rest of the entire mutual fund industry.

The benefits of passive investing are now clear to many people—it's a low cost, broadly diversified, and tax efficient way to get exposure to financial markets.

Opposite to this growth in passive investing, active investing has diminished in use and reputation. This decline in active investing is highlighted by the once glorious hedge fund industry becoming a pariah to many large institutional investors.

As I write this in early June, I see many people characterizing the growth of passive investing as mainly a battle between passive and active. Some view this battle as passive rightfully gaining an upper hand on active investing. Others view it as temporary with a resurgence of active investing soon at hand.

My interpretation of this growth in passive investing is a bit different from most and likely a bit controversial. It appears to me that this recent surge in passive investing is really just the chasing of recent favorable financial market gains, particularly equity market gains. I see more and more people jumping on the passive investing bandwagon in what seems to me to just be a way to rationalize their extrapolation of past market returns. This return-chasing behavior is quite normal in the history of financial markets, and I think that passive investing is just the vehicle of choice at this moment in time. It's the cheapest and most efficient way to chase.

THE MARKET ECOSYSTEM

Financial markets are essentially a complex ecosystem of different types of investment participants applying different strategies over different time horizons. Over time, different strategies ebb and flow and pick up more adherents at the expense of other strategies. There is passive versus active, value versus growth, short-term trading versus long-term investing, and so on.

In addition to these shifting currents, you can have the amplifying effects of positive feedback loops. That is, the early successes of a particular strategy further perpetuates that strategy by bringing in more followers resulting in more buying of those investments that the strategy seeks out, and so on. Financial market history shows this can go on longer than you can imagine.

One example of this ebb and flow of investing strategies from the recent past was the significant swing towards value investing in the years after the bursting of the tech bubble. At the turn of the millennium, with the tech bubble in full force, value investing was dismissed as being out of touch with the new economy. But 6 years later, after a period of magnificent returns for the value approach and a lean period for growth investing, value investing was viewed by many as the best approach to success in financial markets.

One anecdote I have of this time was in 2006 when I overheard a conversation between a small mutual fund company CEO and his colleagues. He was explaining that his star value fund manager, who had generated excellent 5-year returns, was about to retire and the CEO was begging the manager to stick around for one more year. He then explained to his colleagues he wanted the manager to stay not because of the great returns, but rather because the value fund was experiencing dramatic inflows at the time and the CEO wanted those flows to continue for at least a bit longer.

Value investing's period of success ultimately led to many value-oriented funds being the hardest hit for outflows in the financial crisis of 2008–2009. The dramatic inflows to value funds were likely a sign that investors were chasing the great returns of the strategy and not a sign of value investing's intrinsic value. (Pun intended.)

Currently, some point to the recent spectacular fund flows into passive investing as a signal that people are becoming more rational by focusing on the efficiency of index investing. However, I think it's more likely that the fund flows are a symptom of recent positive returns fueling more followers of passive investing. For now, the strategy seems to be benefitting from positive feedback within the market ecosystem.

RETURN-SEEKING VERSUS LOSS-AVOIDANCE

Currently, many investment commentators view the current growth in passive investing as mainly a passive versus active debate. While I think that is part of the current ecosystem ebb, I think it is much more than that—specifically, it seems to signal much less concern for risk.

In addition to the varying shifts in different investment strategies in the financial market ecosystem, there is a larger, overriding component. That component is the dichotomy between seeking returns and avoiding losses. Regardless of the strategy used, market participants can be at varying degrees of focusing on the returns they can achieve and their concern for future losses.

A short book written over a hundred years ago illustrates this phenomenon well. *One-Way Pockets* was the work of a man who carefully studied the brokerage records of his investment firm's clients. After a solid bear market, clients seemed much more concerned with risk management. Typically, they would be careful in setting stop-losses on any trade or quick to sell on downturns. Over time, the ups and downs of a bull market seemed to condition the clients to worry less about risk and focus more on returns. As the bull market matured and entered its late stages, the stop-losses were rarely put in place and the purchase of the best-performing stocks were aggressively pursued. As a new bear market unfolded, the market seemed to condition a return to loss-avoidance and so on it went.

I think this kind of return-focused behavior (and less focus on risk) is evident now in an unusual way—the growth in the use of passive funds by large institutional investors has come at the expense of hedge funds. While it seems that history would imply that an **increase** in the use of hedge funds would signal return-seeking, I believe things have changed a bit in the last 10 years in the hedge fund industry.

My sense is that many of the extreme risk-taking hedge funds got wiped out in the financial crisis of 2008–2009. In response, the hedge fund industry (which was at that time trying to meet a demand for **less** risk-taking) became much more focused on

> The future unwind of this lower concern for risk will hurt both passive and active management long-only strategies.

long-short strategies (i.e., market neutral strategies). As the bull market in both equities and bonds progressed, the returns on these long-short strategies significantly lagged the major indexes. It appears to me that many large institutional investors soon started to focus more on return (by pursuing fully long passive strategies) and have now become less concerned with risk (by eschewing long-short hedge funds).

This lower concern for risk likely signals we are in the very late stages of the bull markets in both equities and bonds. In addition, my best guess is that the future unwind of this lower concern for risk will hurt both passive and active management long-only strategies.

CONCLUSION

Passive investing has become a very dominant investing approach in the last few years. It would be nice if this was because investors are becoming more rational, but I see it as much more about return-chasing and a significant decrease in concerns about market risk. I am not trying to diminish the many positive qualities of passive indexing. Rather, I think that the significant number of indexers-come-lately are signalling that the recent bull market is in its very late stages.

REFERENCES

"Investors Yank Money From Hedge Funds After Poor Performance," *Marketwatch.com*, August 17, 2016. www.marketwatch.com/story/investors-yank-money-from-hedge-funds-after-poor-performance-2016-08-17

*One-Way Pockets:* The Book of Books on Wall Street Speculation, Don Guyon, Cosimo Classics

"Vanguard Is Growing Faster Than Everybody Else Combined," *New York Times*, April 14, 2017. *www.nytimes.com/2017/04/14/business/mutfund/vanguard-mutual-index-funds-growth.html* ∎

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Crossword Puzzle: Inv Concepts

By Warren Manners
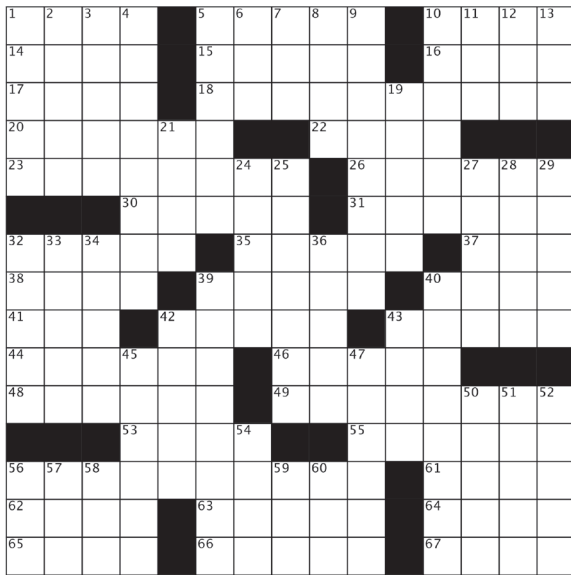
The solution will be provided in the next issue of *Risks & Rewards* along with the names of those who were able to successfully complete it. Submissions should be made to warren_manners@swissre.com by Nov. 30, 2017. For submissions received before the posted deadline and 100 percent correct, a winner will be selected at random and awarded a $25 Amazon gift card. Note, previous winners will not be eligible to win the very next issue's prize. ■

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Across

1 Shock, in Cannes
5 _____ delta function
10 Soul mate
14 Cicero's "man"
15 Both a river and a virus
16 Orchestra member
17 Ten more than 30 across
18 Eschewer of the bandwagon?
20 Motion detector
22 Poetic peepers
23 Abuse
26 America's Cup contenders
30 The final digit in 17 across
31 Not quite a B
32 City in Texas
35 Gimmick
37 Better than Diego
38 Cadence
39 High flyer
40 List
41 Tumult
42 To invest
43 Nimrods
44 Cup of mud
46 Ruhr Valley hub
48 Perfume ingredients
49 Reserve
53 Sacrament
55 British academic exam
56 Subj. of Ed Thorpe's "Beat the Market"?
61 Qum coin
62 ish
63 Stud declaration
64 Stylish Wang
65 One way to the top
66 Pursue
67 Freezer case brand

Down

1 Grand opening?
2 Japanese God of contentment
3 Signs
4 Inverse of 40 across, with "mix"?
5 Edict
6 Lennox Lewis org.
7 Wood of Stones
8 Glee club member
9 Tote
10 Ukrainian for beet soup
11 Eastern sash
12 E.R. status
13 Eastern cash
19 Defame
21 Pasta variety
24 Objectivism creator, abbr.
25 Depressed during exams
27 Permissible, in Islam
28 Staffordshire river
29 Makes out
32 Card or kicker
33 Beach resorts
34 Overhead
36 Where to get down
39 Not in heat
40 Common investment approach, verb form?
42 Bizarre
43 You're on!
45 Elan
47 Constant
50 Covered with climbers
51 Drab
52 Greece to Greeks
54 Make an impression?
56 Camp sight
57 Eyeball
58 Spy org.
59 Act. org.
60 Dr. J and Mr. H author

48 Hours Solution

Risks and Rewards 2017–2018 Best Article Competition

By Ladelia Berger

The Investment Section Council encourages authors to submit articles for publication in upcoming issues of *Risks & Rewards* for a chance to earn the title of 2017–2018 Best Article.

Articles published in the August 2017 and February and August 2018 issues are automatically eligible to be selected as the 2017–2018 Best Article. Each issue includes between four to 10 articles. Once all the 2018 issues of *Risks & Rewards* have been published, a panel of judges will select the 2017–2018 Best Article in *Risks & Rewards.*

ENTERING AN ARTICLE

Submit an article for publication to the Investment Section August Newsletter Editor: Joseph Koltisko *(jkoltisko@nyl.com)* or February Newsletter Editor: Nino Boezio *(Nino.Boezio@fsco.gov.on.ca).*

Deadlines for Article Submission in the upcoming *Risks & Rewards* Issues

February 2018 issue submission deadline Nov. 20, 2017
August 2018 issue submission deadline June 7, 2018

JUDGING CRITERIA

A three member jury will judge the articles based on the following criteria:

- Intellectual Rigor
- Practical Significance
- Investment Content
- Educational Value
- Originality

The jury will be composed of elected Investment Section Council members and/or *Risks & Rewards* editors.

2017–2018 BEST ARTICLE

The 2017–2018 Best Article winners will be eligible for an award from a pool of $1,000 USD[2], split between the Best Article winners at the discretion of the jury.

General questions regarding this call should be directed to David Schraub (SOA Staff Fellow) at *dschraub@soa.org.* ∎

ENDNOTES

1 By submitting an article for publication consideration in *Risk & Rewards* Best Article Competition, you verify ownership of the paper and agree to assign the copyright to the Society of Actuaries (SOA). Additionally, the author(s) must permit the SOA to use their likeness, name, and biographical information, or any portion thereof, in conjunction with their paper and the promotion of the article, in any and all media and formats, in whole or in part, throughout the world.

2 All taxes on the award and other expenses related to accepting and/or using the award are the sole responsibility of the winner, who will receive an IRS Form 1099 reflecting the final actual value of the award.

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