MILLIMAN CONCEPT PAPER

Registered Indexed Universal Life

Enrich Policyholder Value

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Registered Indexed Universal Life (RIUL) is a modified version of Indexed Universal Life (IUL) that can provide enhanced policyholder value compared to IUL. Such a product is especially relevant in the prevailing, persistent low interest rate environment.

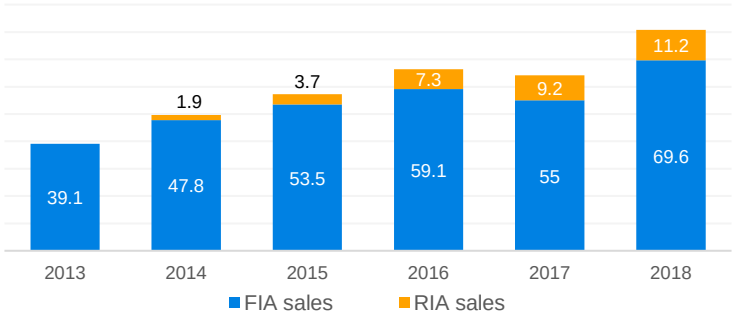
Similar to IUL, RIUL will credit interest based on index growth. Unlike IUL and similar to variable universal life (VUL), the policyholder assumes some degree of downside market risk that will result in limited negative growth in account value during a market downturn. In exchange for this risk, the policyholder is rewarded with increased participation in market growth during a market upturn and / or savings directly via reduced premiums or reduced charges compared to IUL. An RIUL with the same product features as an IUL other than the index crediting strategy design can provide greater account value growth and policyholder value over long-term investment horizons. RIUL compared to VUL offers greater tail risk protection in the case of a severe market downturn while yet providing substantial market upside potential.

We anticipate that RIUL will be attractive to consumers seeking cash accumulation universal life (UL) and IUL products and who have a greater risk appetite and longer investment horizon.

Background

Registered indexed annuities (RIA), also known as hybrid or structured annuities, are popular products in the indexed annuity space that serve the investment needs of policyholders rather than their retirement or income needs. Sales of these products have sizably increased over the past five years as shown in Figure 1.

FIGURE 1: SALES IN USD BILLIONS



Registered Indexed Annuities have attracted an increasing share of new indexed annuity premiums over the last five years

Source: LIMRA Annuity Year Book

The RIA product design and product mechanics have largely been borrowed from fixed indexed annuity (FIA) products. Similar to FIAs, RIAs credit interest to the policyholder account value when there is a market upturn. The interest being credited is based on index growth and capped at pre-specified levels. However, in the event of a market downturn, an RIA's floor on the account value can be below zero, whereas an FIA's floor is 0%. Secondly, unlike a variable annuity (VA), the negative growth in an RIA is limited by a non-zero negative floor. In return for accepting limited downside market risk, insurance entities can offer higher index cap rates or participation rates.

The concepts of index-based interest crediting to policyholder account value were adopted by UL products to create IULs. One can also observe similarities between FIA and IUL sales trends over the last decade, with both gaining increasing market share.

Based on this strong correlation in sales and product innovation between FIAs and IULs, the next innovation in the IUL space could be the advent of RIUL products.

The Crediting Strategy

RIUL interest crediting is effectively a hybrid of the mechanism that exists in IUL and VUL. There can be two possible RIUL crediting strategy designs as described below:

FLOOR DESIGN

Similar to IUL, RIUL credits the account value with interest based on index growth. That interest can be capped or uncapped. However, the account value is subject to a loss down to the floor in the event of a market downturn. For example, for an RIUL with a negative 10% floor, if the index growth during the crediting period is negative 15%, the account value loss is limited to 10%. If the index falls by 5%, the account value is reduced by 5%.

BUFFER DESIGN

The account value growth is similar to IUL and RIUL with the floor design, with respect to market upturn. However, in RIUL with a buffer instead of a floor, the account value is protected up to the buffer and subject to a loss thereafter in the event of a market downturn. For an RIUL with a 10% buffer, if the index growth during the crediting period is negative 15%, the account value loss is limited to 5%. If the index falls by 5%, the account value experiences no loss.

We have pictorially illustrated the account value growth of IUL and VUL and compared to RIULs with floor and buffer designs in Figures 2 and 3.

FIGURE 2: INTEREST CREDITED FOR IUL AND VUL

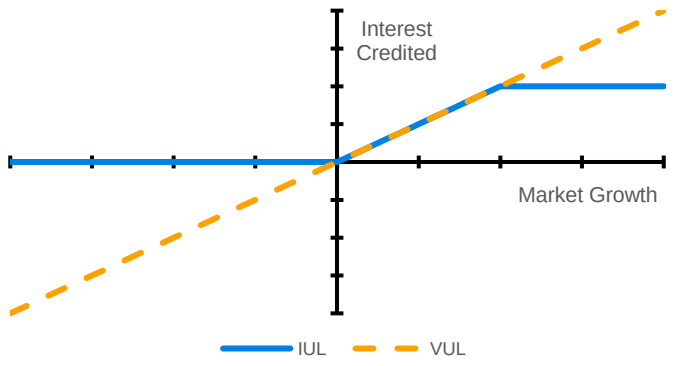
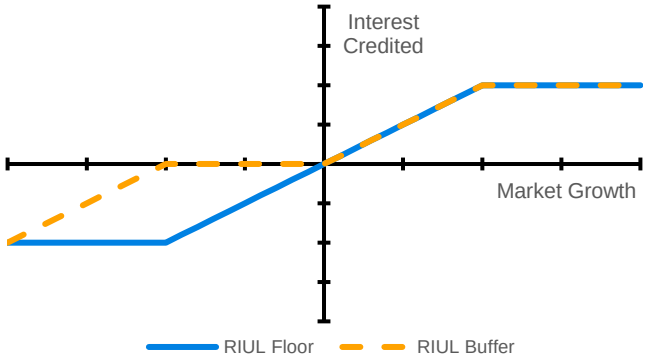


FIGURE 3: INTEREST CREDITED FOR RIUL



The Hedge Cost of a Floor Design RIUL

For purposes of simplicity and brevity, we have limited our analysis and commentary to the floor design instead of both floor and buffer designs. In the remainder of this paper, unless explicitly mentioned, RIUL refers to RIUL with floor design.

The hedge cost for IUL is the cost of an at-the-money (ATM) call option less the cost of the out-of-the-money (OTM) call option at the specified cap rate (i.e., strike of OTM call option is 1 plus the cap rate). The hedge cost of an RIUL for the same cap rate as an IUL is the IUL's hedge cost less the cost of an ATM put option plus the cost of an OTM put option at the specified floor. As the strike of the OTM call option sold is based on the cap rate, a strategy becomes uncapped by omitting the OTM call sale altogether. The hedge cost of an uncapped RIUL is the cost of an ATM call option less the cost of an ATM put option plus the cost of an OTM put option at the specified floor.

We have reiterated the hedge strategies in the formulas below:

Traditional Capped IUL = $ATM\ Call - OTM\ Call$

Capped Floor RIUL = $ATM\ Call - OTM\ Call - ATM\ Put + OTM\ Put$

Uncapped Floor RIUL = $ATM\ Call - ATM\ Put + OTM\ Put$

The cap rate offered in the current IUL market is approximately 10.5% for an annual point-to-point strategy. Using publicly available option trading prices and data from Chicago Board Option Exchange (CBOE), we considered the following product definitions:

- an IUL with a 10.5% cap
- a RIUL with a 10.5% cap and a -10% floor
- an uncapped RIUL with a -10% floor

As of 6/30/2019, the hedge costs for these three options are 4.69%, 1.98%, and 3.27%, respectively. We have summarized this in Figure 4 below. These data show that, in contrast to an IUL with the same cap, the option budget for a capped RIUL could be much lower, leaving more room for enhanced equity upside participation, reduced premiums, costs of insurance (COIs) or expense loads. Even with no cap at all, the RIUL option budget is lower.

FIGURE 4: HEDGE COST AS OF JUNE 30, 2019

	IUL	CAPPED RIUL	UNCAPPED RIUL
ATM Call Buy (Ask)	+5.97%	+5.97%	+5.97%
OTM Call Sell (Bid) for cap of 10.5%	-1.29%	-1.29%	
ATM Put Sell (Bid)		-5.74%	-5.74%
OTM Put Buy (Ask) for floor of -10%		+3.03%	+3.03%
Total Hedge Cost	4.69%	1.98%	3.27%

The option budget for RIUL could be much lower, leaving more room for enhanced equity upside participation, reduced premiums, COIs or expense loads.

If the current low interest rate environment were to persist, investment yields may not be able to sustain a hedge cost (aka, option budget) of 4.69% to support a typical cap rate of 10.5% offered currently in IULs. Companies instead tend to supplement investment yields with premium loads and other charges to support these high cap rates. However, as discussed in the analysis below, if companies were to lower cap rates in IULs, an RIUL with the same lower cap rate as the IUL will continue to offer greater value proposition to the policyholder compared to an IUL.

Enhanced Equity Upside Participation

As an alternative to the lower option budget, we solved for the participation rate on the upside potential of the account value growth on the RIULs such that the hedge costs were the same as the IUL with a 10.5% cap and 100% participation rate as of June 30, 2019. Figure 5 shows that the participation rates for the RIULs with and without the cap of 10.5% was 157.8% and 123.8%, respectively.

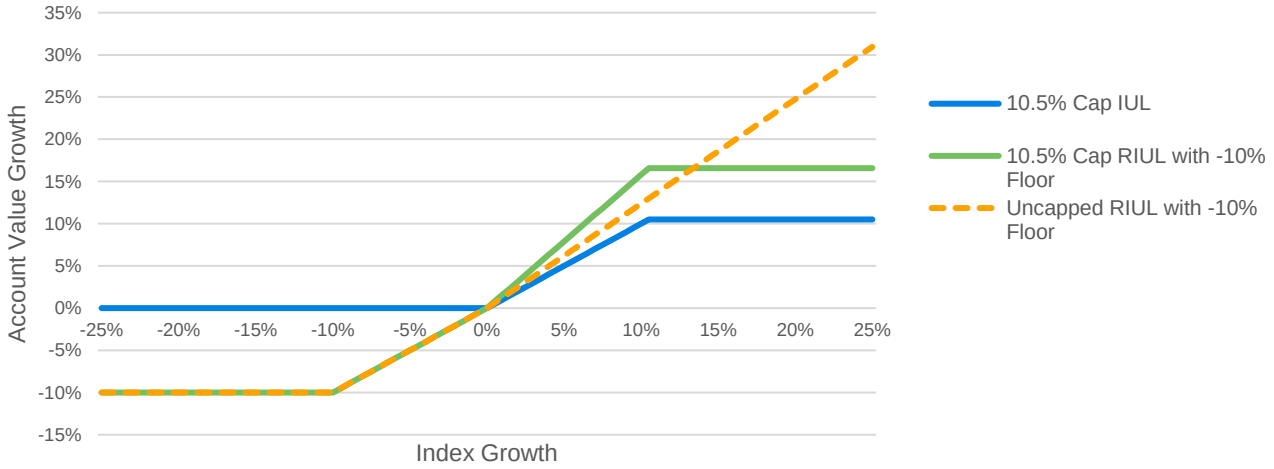
FIGURE 5: ADJUSTED PARTICIPATION RATES FOR A TOTAL HEDGE COST OF 4.69% AT JUNE 30, 2019

PRODUCT TYPE	CAP RATE	FLOOR	HEDGE COST	PARTICIPATION RATE
IUL	10.5%	0.0%	4.69%	100.0%
RIUL	10.5%	-10.0%	4.69%	157.8%
RIUL	Uncapped	-10.0%	4.69%	123.8%

Participation rates for the RIULs shown with and without the cap of 10.5% was 157.8% and 123.8%, respectively.

In Figure 6, we illustrate the account value growth for an IUL and capped and uncapped RIULs with the same total hedge cost.

FIGURE 6: ADJUSTED ACCOUNT VALUE GROWTH FOR IUL AND RIULS FOR A TOTAL HEDGE COST OF 4.69% AT JUNE 30, 2019



As stated above, index upside participation rates of 157.8% for 10.5% capped RIUL and 123.8% for uncapped RIUL are needed to ensure equivalency in hedge costs compared to a 10.5% capped IUL. However, rather than focusing on hedge costs, if we look to achieve the same account value at policy year 30 as the 10.5% capped IUL, the required participation rate needed for a 10.5% capped RIUL and an uncapped RIUL is significantly lower at approximately 141.4% and 77.3%, respectively. These participation rates are based on modeling an illustrative policy under the American Academy of Actuaries (AAA) scenarios. Any greater RIUL participation rates than these will provide a better equity market upside potential and account value accumulation to the policyholder. We have provided more details of this illustrative modeling under the AAA scenarios in the Enhanced Account Value Growth section below.

To examine if there is empirical evidence to support the possibility of consistently achieving these participation rates for RIUL, we solved for RIUL participation rates using the daily option trading data from 2004 to 2018. In the absence of option trading data with a 12-month expiration date and exact strike levels, we used various reasonable interpolation methods to determine option prices.

Using the daily option trading data as discussed above, we solved for RIUL participation rates such that their hedge costs were the same as a 10.5% capped IUL with a participation rate of 100%. The RIUL participation rates we solved for are summarized in the frequency charts in Figures 7 and 8 below. The frequency charts show that it is consistently possible to achieve high participation rates for RIUL.

FIGURE 7: PARTICIPATION RATES FOR 10.5% CAPPED RIUL WITH NEGATIVE 10% FLOOR TO ENSURE HEDGE COST IS SAME AS AN IUL WITH 10.5% CAP AND 100% PARTICIPATION RATE

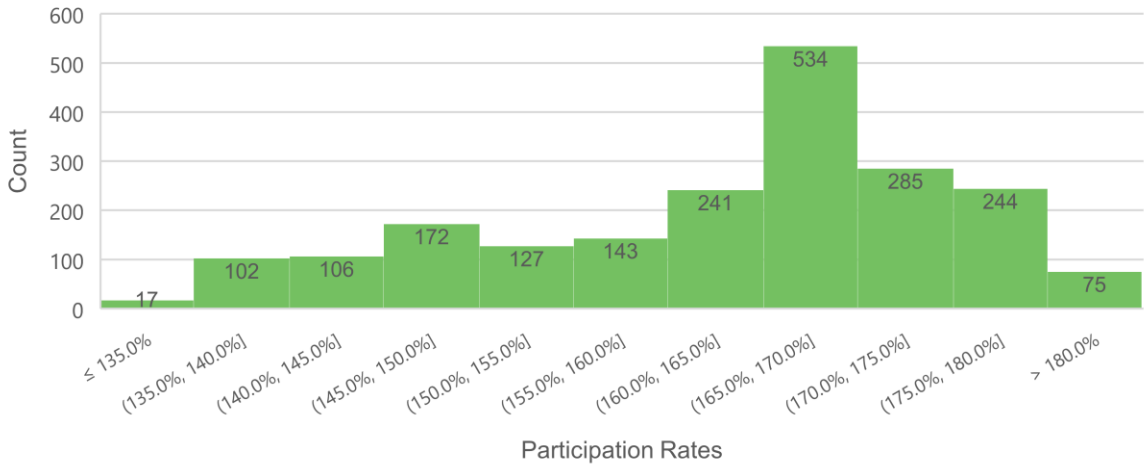
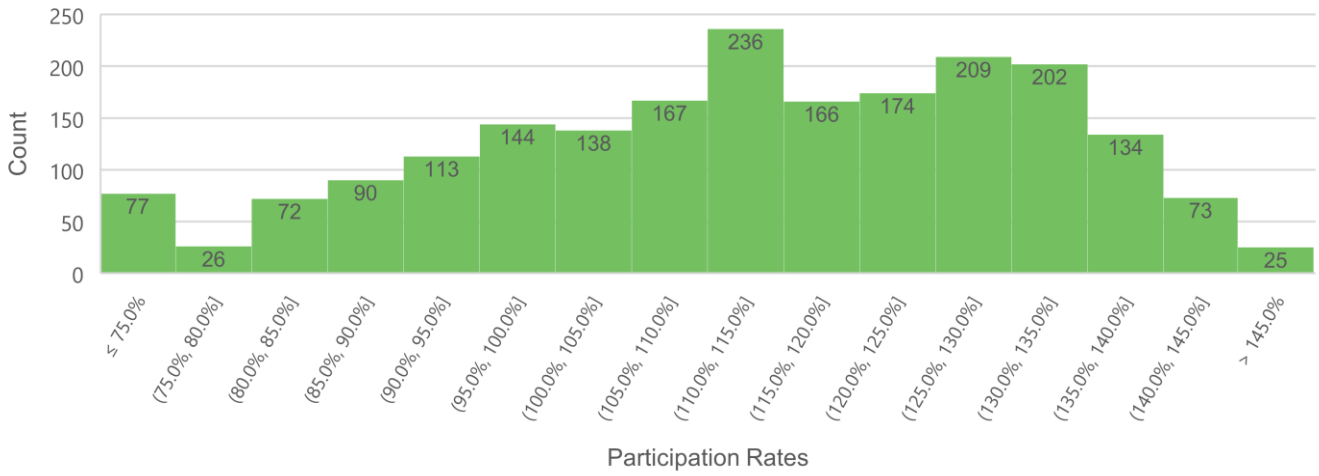
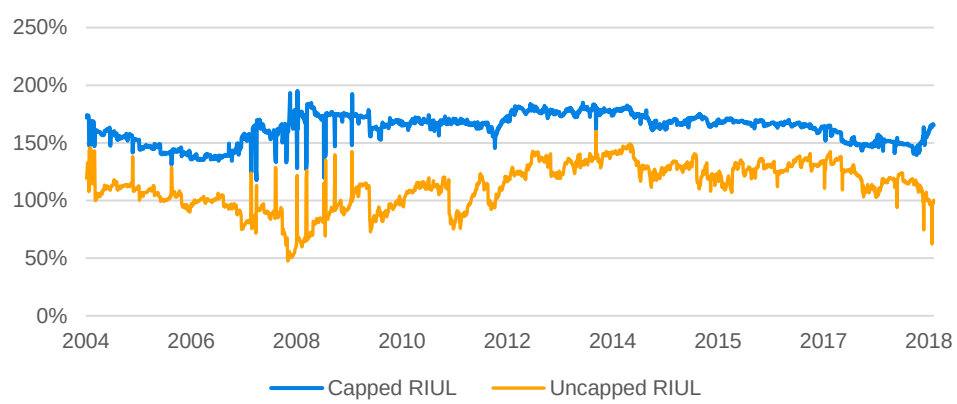


FIGURE 8: PARTICIPATION RATES FOR UNCAPPED RIUL WITH NEGATIVE 10% FLOOR TO ENSURE HEDGE COST IS SAME AS AN IUL WITH 10.5% CAP AND 100% PARTICIPATION RATE



As shown in Figure 9 below, the participation rates below 150% for the capped RIUL and below 100% for the uncapped RIUL are largely before 2009, and especially during the financial crisis of 2007 to 2009. In volatile and bear markets, higher participation rates may still be achievable, as entities would tend to offer lower cap rates on IULs to ensure that the hedge costs do not exceed the available hedge budget.

FIGURE 9: PARTICIPATION RATES FOR CAPPED AND UNCAPPED RIUL BY CALENDAR YEAR



The participation rates below 150% for the capped RIUL and below 100% for the uncapped RIUL are largely before 2009, and especially during the financial crisis of 2007 to 2009.

Enhanced Illustrated Rates

Illustrated growth rates for IUL in the U.S. are limited by Actuarial Guideline XLIX: The Application of the Life Illustration Model Regulation to Policies with Index-Based Interest (AG49). AG49 effectively mandates that the illustrated rate cannot be more than the average of the geometric average annual credited rate for each applicable 25-year period in the 66 years prior to the current calendar year. Each annual credited rate is calculated by applying the declared cap rate, a 0% floor, and a 100% participation rate to the historical S&P 500 value. From Figure 10, the illustrated rate is directly correlated to the cap rate.

FIGURE 10: ILLUSTRATED GROWTH RATES

CAP RATE	6.0%	6.5%	7.0%	7.5%	8.0%	8.5%	9.0%	9.5%	10.0%	10.5%	10.8%	11.0%	11.5%	12.0%	12.5%	13.0%
ILLUSTRATED RATE	4.0%	4.3%	4.6%	4.8%	5.1%	5.4%	5.6%	5.9%	6.1%	6.4%	6.5%	6.6%	6.8%	7.0%	7.2%	7.4%

If we apply AG49 principles to an RIUL with a floor of negative 10% and use the adjusted participation rate on upside growth that we previously calculated to ensure equivalency in hedge cost as a 10.5% capped IUL as of June 30, 2019, RIUL can support greater illustrated rates, as shown in Figure 11 below.

FIGURE 11: RIUL VS. IUL – ILLUSTRATED GROWTH RATES

PRODUCT TYPE	CAP RATE	FLOOR	PARTICIPATION RATE	ILLUSTRATED RATE
IUL	10.5%	0.0%	100.0%	6.4%
RIUL	10.5%	-10.0%	157.8%	7.6%
RIUL	Uncapped	-10.0%	123.8%	11.4%

RIUL can support greater illustrated rates than IUL under AG49.

Enhanced Account Value Growth

Our next step was to understand the impact of the index crediting strategies on the level of account value growth. We modeled a single illustrative policy with the following specifications, where the only non-guaranteed element was the cost of insurance rates:

- Male Standard Nonsmoker, Issue Age 35
- $1,500,000 of face amount at issue
- Matures at age 120
- Five annual premium payments of $42,000, which approximates to the amount necessary to endow the policy at maturity on a current basis using the AG49 IUL allowed illustration rate. These premium amounts meet the GPT requirements

- Current COI rates grading linearly from issue to maturity and from 120% to 100% of the VBT 2015 Select & Ultimate Male / Female, Nonsmoker / Smoker
- Guaranteed COI rates are set to the 2017 CSO table
- Annual asset charges of 30 bps of account value for 30 years
- Premium load of 6%
- Annual per policy charge of $60
- Annual load of $2.40 per 1,000 of face amount
- Death Benefit Option A (death benefit is equal to face amount at issue increased only by the required corridor to ensure IRC 7702 compliance during the life of the policy)

We modeled the above illustrative policy using the AAA real world economic scenarios as of June 30, 2019. We chose the scenarios generated for the Diversified Large Cap U.S. Equity Fund, which is commonly used as a proxy for S&P 500 Total Return Index. We converted the total returns from the AAA scenarios to index price returns by subtracting a 2% dividend yield. As this is an illustration, we did not model any mortality, lapses, or other policyholder behavior. We solved for an internal rate of return (IRR) such that the present value (PV) of premiums was equal to the PV of average account value over the 1,000 scenarios at the end of the 30th year of projection.

As shown in Figure 12 below, the average growth rate for the capped RIUL is higher than the IUL and the growth rate for the uncapped RIUL is substantially higher for the RIUL.

FIGURE 12: RIUL VS. IUL – ACCOUNT VALUE GROWTH RATES

PRODUCT TYPE	CAP RATE	FLOOR	PARTICIPATION RATE	POLICYHOLDER RETURN ON SURRENDER	AV AT 30TH YEAR, IN '000
IUL	10.50%	0.00%	100.00%	2.46%	415
RIUL	10.50%	-10.00%	157.80%	3.69%	581
RIUL	Uncapped	-10.00%	123.80%	8.15%	1,896

Figures 13 and 14 show account value and policyholder return rate on surrender using several combinations of caps and participation rates for RIUL and IUL. The tables demonstrate the potential sensitivity of account value growth to the index crediting parameters. We applied to Figure 13 and 14 the method we described and used in Figure 12.

FIGURE 13: RIUL VS IUL – ACCOUNT VALUE GROWTH IN '000 AT 30TH YEAR SENSITIVITY TO CAP AND PARTICIPATION RATES

CAP RATE	IUL WITH 100% PARTICIPATION RATE	75%	85%	95%	100%	110%	120%	130%	140%	150%	160%	170%	175%
		CAPPED RIUL WITH FLOOR OF NEGATIVE 10%											
7.5%	240	23	36	53	62	85	112	144	180	222	270	325	354
8.0%	267	28	43	63	74	101	132	169	212	261	317	381	416
9.0%	323	39	59	85	100	135	176	225	281	346	422	508	556
10.0%	383	51	77	110	129	173	225	287	359	444	541	655	717
10.5%	415	58	87	123	145	193	252	320	401	496	607	734	805
11.0%	447	65	97	137	160	214	279	355	446	551	675	818	898
12.0%	512	79	118	166	193	258	336	429	539	668	821	999	1,098
12.5%	546	87	128	180	211	281	365	467	587	730	898	1,094	1,205
		UNCAPPED RIUL WITH FLOOR OF NEGATIVE 10%											
		375	550	779	919	1,258	1,697	2,263	2,992	3,930	5,136	6,681	7,610

FIGURE 14: RIUL VS IUL – POLICYHOLDER RATE OF RETURN ON SURRENDER, SENSITIVITY TO CAP AND PARTICIPATION RATES

CAP RATE	IUL WITH 100% PARTICIPATION RATE	75%	85%	95%	100%	110%	120%	130%	140%	150%	160%	170%	175%
		CAPPED RIUL WITH FLOOR OF NEGATIVE 10%											
7.5%	0.5%	-7.7%	-6.1%	-4.8%	-4.2%	-3.2%	-2.2%	-1.3%	-0.5%	0.2%	0.9%	1.6%	1.9%
8.0%	0.9%	-7.0%	-5.5%	-4.2%	-3.6%	-2.6%	-1.6%	-0.8%	0.0%	0.8%	1.5%	2.1%	2.5%
9.0%	1.6%	-5.9%	-4.4%	-3.2%	-2.6%	-1.6%	-0.6%	0.2%	1.0%	1.8%	2.5%	3.2%	3.5%
10.0%	2.2%	-4.9%	-3.5%	-2.3%	-1.7%	-0.7%	0.3%	1.1%	1.9%	2.7%	3.4%	4.1%	4.5%
10.5%	2.5%	-4.5%	-3.1%	-1.9%	-1.3%	-0.3%	0.6%	1.5%	2.3%	3.1%	3.9%	4.6%	4.9%
11.0%	2.7%	-4.1%	-2.7%	-1.5%	-1.0%	0.1%	1.0%	1.9%	2.7%	3.5%	4.3%	5.0%	5.3%
12.0%	3.2%	-3.4%	-2.1%	-0.8%	-0.3%	0.7%	1.7%	2.6%	3.4%	4.2%	5.0%	5.7%	6.1%
12.5%	3.5%	-3.1%	-1.7%	-0.5%	0.0%	1.0%	2.0%	2.9%	3.7%	4.5%	5.3%	6.1%	6.4%
		UNCAPPED RIUL WITH FLOOR OF NEGATIVE 10%											
		2.1%	3.5%	4.8%	5.4%	6.6%	7.7%	8.8%	9.9%	11.0%	12.0%	13.1%	13.6%

From Figures 13 and 14, it is evident that:

1. For IULs, despite high-cap rates, significant account value growth is not achieved due to policy loads and charges.
2. For capped RIULs, cap rates in excess of 10.5% and participation rates in excess of 160% are needed to achieve significant account value growth.
3. Participation rates in excess of 95% produce significant account value growth in uncapped RIULs.
4. Participation rates as low as 75% on the uncapped RIULs provide positive net account value growth.

Enhanced Policyholder Value

The above analysis does not account for the death benefit protection value to the policyholder. To highlight the value in totality of the RIUL to the policyholder, we calculated the premium needed to endow the RIUL policies at maturity compared to the IUL policy.

As discussed above and shown in Figure 12 below, the IUL and RIULs with the tabulated cap, floor, and participation rates have a hedge cost of 4.69% as of June 30, 2019. The illustrated account value growth rates calculated in accordance to AG49 are also tabulated below. Using these as model inputs, we solved for premium levels for each product that would endow them at maturity at the current rates and account value charges discussed in the section above. As shown in Figure 15 below, the premiums needed for the RIULs are substantially lower than for the IUL.

FIGURE 15: FIVE ANNUAL PREMIUM AMOUNTS NEEDED TO ENDOW POLICY AT MATURITY

PRODUCT	CAP	FLOOR	PAR RATE	ILLUSTRATED RATE	ANNUAL PREMIUM AMOUNT
IUL	10.50%	0.00%	100.00%	6.35%	41,299
RIUL	10.50%	-10.00%	157.78%	7.61%	30,556
RIUL	Uncapped	-10.00%	123.82%	11.42%	15,971

The premiums needed for the RIULs are substantially lower than premiums needed for the IUL.

The above analysis does not capture any volatility in the S&P index value. To illustrate the impact of volatility, we chose two real world S&P scenarios. We solved for a schedule of five annual premiums that endowed the policies at maturity for each scenario. The two scenarios were:

Scenario 1: S&P 500 annual growth rates from June 30, 1953 to June 30, 2019, as the index growth rates for policy years 1 to 66. We reduced the annual growth rates by an annual dividend rate assumption of 2%. From policy year 67 to maturity, we used a constant index growth rate of approximately 5.52%, which was also the average S&P growth rate from June 30, 1953 to June 30, 2019, net of dividends.

Scenario 2: To illustrate a more upfront impact of the recent S&P trend, we reversed the order of the index growth rates in policy years 1 to 66, using the same index rates as Scenario 1 above. Example: June 30, 2018 to June 30, 2019, S&P growth rates (net of 2% dividend) served as the growth rate for policy year 1; June 30, 2017 to June 30 2018, S&P growth rates (net of 2% dividend) served as the growth rate for policy year 2, etc.

As shown in Figure 16 below, the premiums needed to endow the policy at maturity and for these scenarios is greater than the premiums needed when using the AG49 illustration rates for all products. However, premiums needed for both the capped and uncapped RIULs continue to be lower than premiums needed for the IUL. The premiums needed endow the uncapped RIUL at maturity continue to be significantly lower than the premiums needed for the IUL.

FIGURE 16: FIVE ANNUAL PREMIUM AMOUNTS NEEDED TO ENDOW POLICY AT MATURITY

PRODUCT	CAP	FLOOR	PAR RATE	ANNUAL PREMIUM AMOUNT	
				SCENARIO 1	SCENARIO 2
IUL	10.50%	0.00%	100.00%	55,247	47,208
Capped RIUL	10.50%	-10.00%	157.78%	52,333	36,333
Uncapped RIUL	N/A	-10.00%	123.82%	26,405	21,164

Additional Considerations

While RIULs can be an attractive alternative or addition to the family of IUL products, we have outlined below additional aspects that an entity should consider while developing and pricing RIULs.

1. As discussed above, an alternate design would be the buffer design where the policyholder is protected up to the buffer in the event of a market downturn. Such a crediting strategy can be hedged by buying an ATM call and selling an OTM call and put. The strike prices for the OTM call and OTM put is the cap rate and buffer level, respectively. While such a design may be attractive because of lower hedge costs compared to the floor design, it does not protect the policyholder from the market tail risk. An occasional severe market downturn can significantly erode the account value. Increasing the size of the buffer may help mitigate some of the market tail risk. However, the hedge costs increase as the size of the buffer increases.
2. Increasing the size of the negative floor may allow higher cap and participation rates or lower the hedge costs. However, the more negative the floor size, the greater chance of significant account value loss. Recovery time to recoup this account value loss via the higher cap and participation rates can increase significantly.
3. Persistent bear market conditions over a sustained time period can make an RIUL with a floor design less attractive compared to an IUL. An actuary may want to examine product profitability in equity down and up scenarios where the floor is breached over a sustained projection period followed by a sustained recovery in the index levels.
4. A moderate no-lapse guarantee feature to keep the policy inforce if the account value were to become insufficient to fund the COIs due to negative account value growth, can help attract and retain RIUL policyholders.
5. Consistent with the policyholder bearing some of the market risk when interest is credited to the account value, the policyholder should bear the market risk upon surrender. The cash surrender value for such a product should be the account value less the surrender charges plus the market value of options. The market value of options can be a positive or negative addition to the account value after the surrender charge deduction.
6. Developing and selling RIULs may entail a significant upfront investment for the reasons outlined below:
   - RIULs may not meet the standard non-forfeiture requirements, thus necessitating entities to file these RIULs as a registered product with the Securities and Exchange Commission.
   - Agents selling these products may need additional training. They may also need to meet additional regulatory licensing requirements to sell these separate account products.
   - As with any new product design, the entity's policy administration systems, accounting, and valuation systems could require modifications or upgrades to administer and account for RIUL policies.
   - Entities may need to shore up their hedging capabilities to effectively hedge the interest-credited aspect of RIUL products.
7. Entities will need to understand the impact of VM-20 requirements for RIULs compared to IULs. Similarly, entities may need to attune their IUL mortality and policyholder behavior assumptions when using them for RIUL pricing.
8. Assets backing RIUL policies will be invested in bonds and other general account assets similar to assets used to back IUL liabilities. However, the assets may need to be reported on a market value basis instead of book value, which may add volatility to the entity's balance sheet and income statement.

Conclusion

As stated above, RIUL is likely to be an exciting innovation in the IUL product space. RIUL can be attractive alternative to IUL in this persistent low interest rate environment and enhance policyholder value or provide increase profitability to entities.

Based on the analysis above, we can conclude that the policyholder can benefit from the risk premium embedded in the RIUL and gain superior value compared to an IUL if he/she is invested in the RIUL policy over a long-term horizon.

While there are several aspects to consider when developing, pricing, and selling RIULs, our hope is that this concept paper promotes further discussions and sparks innovation in the IUL and life insurance product space.

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