



SOCIETY OF ACTUARIES

Article from:

# Risks and Rewards Newsletter

February 2002 – Issue No. 38



# RISKS and REWARDS

The Newsletter of the Investment Section of the Society of Actuaries

NUMBER 38

FEBRUARY 2002

## Swap It! Variable M&E Revenue for Fixed M&E Revenue

by Marshall Greenbaum & Adam Zivotofsky

Insurers who issue variable life and annuity products are currently rethinking their risk management practices. As equity markets decline and become more volatile, the likelihood of significant guaranteed benefit claims increases, while the anticipated revenue from mortality and expense (M&E) fees declines. Current market conditions are leading to undesirable earnings volatility on both Statutory and GAAP accounting statements for companies with large in-force blocks of variable policies. This paper illustrates how to use a derivative contract, a properly structured *total return swap*, to turn a company's uncertain M&E revenue patterns into predictable revenue.

### M&E Fee Basics

Insurers assess M&E fees against their policyholders' current account balances as the primary source of revenue to cover their servicing and benefit costs, and to provide a source of profit. They are collected as a fixed percentage rate (basis point charge) of the current account balances over the life of the contract. Typically, policyholders allocate most of their premiums to the equity-based subaccounts. Any percentage decline in account balances driven by equity markets leads to a corresponding percentage decline in the level of M&E fees

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## 30-Year Treasury Rates and Defined Benefit Pension Plans

by Victor Modugno

*Editor's Note: This report is one of two reports prepared on commission for the Society of Actuaries with the objective of identifying one or more indices designed to approximate the interest assumption underlying group "close out" annuity quotes for terminating pension plans. The opinions expressed and conclusions reached by the author are his own and do not represent any official position or opinion of the Society of Actuaries or its members. This report can also be found on the SOA Web site at: <http://www.soa.org/sections/dbpp.pdf>.*

### Abstract

This paper concludes that there are two index rates that could best replace the 30-year Treasury in the calculation of the Current Liability<sup>1</sup> of a pension plan—either the 30-year swap rate, as published in Federal Reserve Board Statistical Release H.15 or the benchmark 30-year FNMA<sup>2</sup>



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received by an insurer. Thus, market declines can have a dramatic and immediate negative impact on a company's current income statement because of reduced M&E fees earned during the period. Other companies with asset-based fee products, such as mutual fund distributors, are suffering from declining revenues for exactly the same reason.

### Swap Review

A swap is a contract entered into by two counterparties in which each party agrees to exchange cash flows at pre-determined dates. For example, Party A agrees to pay Party B a fixed rate of interest on \$1 million (the notional) every quarter (the reset frequency) for 10 years (the tenor) and Party B agrees to pay Party A a floating rate of interest each quarter for 10 years. Market makers typically base the floating rate on a debt instrument benchmark (the underlying) such as the London Interbank Offer Rate (LIBOR).

The financial industry commonly refers to this example as a *fixed-for-floating interest rate swap*. The counterparties usually net the two cash flows so that one payment occurs between the parties on the settlement dates. Swaps can also involve equity-based returns on either one or both sides of the swap. The most readily available equity swaps are based on an equity index such as the S&P 500 Index. Swaps are a very flexible, effective risk management tool as they are tailored to satisfy one or both parties hedge requirements.

### The M&E Fee Total Return Swap

An insurer can use a total return swap to eliminate the market risk associated with M&E fees. Each of the swap attributes are flexible based on the individual insurer's needs. The key basic terms of an *M&E fee total return swap* are as follows:

- **Notional Principal:** Notional = M&E fee (%) \* Remaining Units<sub>t</sub> \* Initial Unit Value; A declining schedule consistent with remaining policies in force at future settlement dates (time t).

- **Total Return Payment<sub>t</sub>:** Notional \* (1 + Cumulative Actual Total Subaccount Return<sub>t</sub>)
- **Fixed Rate Payment<sub>t</sub>:** Notional \* (1 + Cumulative Fixed Rate Return<sub>t</sub>)

Since the insurer receives M&E fees driven by the returns on the subaccounts underlying the contract, the insurer has the option to pass the returns along (or swap them) to a counterparty for current fixed rates of interest. The insurer needs to design the swap to achieve the desired hedge, from partial to full market risk protection.

The insurer is likely to establish a declining notional schedule for the swap structure based on expected persistency of the existing block of policyholders over time, as opposed to a level notional principal typical in swap arrangements. One challenge to establish the notional is to predict the remaining amount of business that will be in force at certain times in the future. An insurer is likely to use past surrender experience and projected behavior in setting the swap notional. The insurer might put an additional swap arrangement in place for every sub-account due to differing anticipated persistency patterns within each sub-account. If the insurer is writing new variable business, it may enter into a number of swaps as new business is acquired to assure all fees are completely hedged.

Note that the payment formulas use *cumulative* total returns from the transaction commencement through the time of payment. If an insurer wishes to hedge its M&E fee received, say five years from today, it will collect X basis points times the actual account value in five years. The account value in five years equals the initial account balance plus all accrued cumulative returns for the five years, the desired hedgeable item. The cumulative fixed rate return can be expressed as a level annualized fixed rate. This rate is similar to a fixed rate quoted in a "plain vanilla swap" as it would not change for the life of the swap agreement. An alternative structure might swap the total return of the subaccounts

for a *floating* interest rate. In this structure, the floating rate and the sub-account returns are unknown until the settlement dates.

To hedge M&E fees assessed against sub-accounts, the insurer needs to swap the return of its *actual* underlying sub-accounts to avoid retaining basis risk. Basis risk is the risk associated with any mismatch between the sub-account return and its benchmark indices. An insurer would retain this basis risk if it swapped index returns, as opposed to actual sub-account returns for fixed rates. Thus, using the actual sub-account is ideal for the insurer.

The market bases the fixed rate for swap transaction on a number of factors. These include the current rates on risk-free investments at the time of the transaction and any risk charges the fixed payor requires for retaining the unhedgeable basis risk. The fixed rate is typically set so that there is no initial payment from one party to another.

The following table illustrates the net payments received by the variable payor (the insurer) under a hypothetical scenario in which the assumed sub-account total returns are 1% per annum, used solely for illustration purposes. In practice, the payments are based on actual sub-account returns known only after the period has elapsed. For simplicity, the example assumes that the fixed rate price for the transaction is 5% and the M&E fees are collected annually at the end of each year. Other assumptions are as follows: 1) expected total withdrawals are 5% per annum, 2) the M&E fee is 1.0%, 3) the initial unit value is \$1 and 4) the insurer is hedging total account balances of \$1 million.

As stated previously the swap structure is flexible enough to achieve other objectives. For example, it can be set to eliminate any market risk associated with surrender charges assessed against the account value. Additionally, call options embedded into the structure can allow the insurer to participate in rising markets while providing a floor protection on the downside.

Assumes Sub-account gross returns are 1% per annum

Years	Expected Persistence	Units Remaining	Annual M&E Swapped	Swap Notional	Annualized Fixed Rate	Fixed Cumulative Total Growth	Annual Actual SA Gross Total Return(1)	Subaccount Cumulative Total Growth	Annual Fixed Payment	Annual Variable Payment(2)	Net Settlement to Variable Payor
0	100.0%	1,000,000									
1	95.0%	950,000	1.00%	\$ 9,500	5.0%	105.0%	1.0%	101.0%	\$ 9,975	\$ 9,595	\$ 380
2	90.3%	902,500	1.00%	9,025	5.0%	110.3%	1.0%	102.0%	9,950	9,206	744
3	85.7%	857,375	1.00%	8,574	5.0%	115.8%	1.0%	103.0%	9,925	8,834	1,092
4	81.5%	814,506	1.00%	8,145	5.0%	121.6%	1.0%	104.1%	9,900	8,476	1,425
5	77.4%	773,781	1.00%	7,738	5.0%	127.6%	1.0%	105.1%	9,876	8,133	1,743
6	73.5%	735,092	1.00%	7,351	5.0%	134.0%	1.0%	106.2%	9,851	7,803	2,048
7	69.8%	698,337	1.00%	6,983	5.0%	140.7%	1.0%	107.2%	9,826	7,487	2,339
8	66.3%	663,420	1.00%	6,634	5.0%	147.7%	1.0%	108.3%	9,802	7,184	2,618
9	63.0%	630,249	1.00%	6,302	5.0%	155.1%	1.0%	109.4%	9,777	6,893	2,884
10	59.9%	598,737	1.00%	5,987	5.0%	162.9%	1.0%	110.5%	9,753	6,614	3,139

(1) Total return of subaccount calculated before any management, performance or any other fees assessed  
 (2) Equals actual M&E fees received if actual persistency equals expected

### Accounting Ramifications

Before implementing any risk management solution a complete analysis of its accounting ramifications is warranted. The hedge described above fits the definition of a derivative under the recent accounting statement FAS 133, *Accounting for Derivatives Instruments and Hedging Activities*. Under FAS 133, the AICPA considers a financial instrument to be a derivative if it 1) has cash flow that varies with one or more variables (the underlying), 2) requires no initial investment, and 3) is net settled. The *M&E fee total return swap* satisfies all of these criteria. Derivatives under FAS 133 are required to be marked-to-market with changes in market value flowing through the income statement. However, the contract described above is likely to qualify as a cash flow hedge under the statement as the hedged item, M&E revenue, affects reported income. Under hedge accounting treatment, net settlements flow through the income statement when they are actually made or received and changes in the mark-to-market value of the swap do not flow through current period income. These are desirable attributes from the insurer’s perspective since future expected M&E revenue is not marked-to-market on its financial statements. According to FAS 133, “hedging ineffectiveness” of a cash flow hedge needs to flow through the income statement when it occurs. However, since the underlying of the swap is the actual subaccount, the swap will be highly, if not “perfectly effective.”

The above structure would be perfectly effective only if actual persistency exactly equaled the expected persistency that determined the swap notional set at the swap’s commencement. Thus, if an insurer tried to completely hedge all of its exposure and fewer policies persisted than anticipated, the insurer would have an overhedged position as the swap notional would exceed the amount actually needed. As a result, the insurers would have to recognize this hedging ineffectiveness in their GAAP income statement. However, even with hedging ineffectiveness flowing through the income statement, earnings volatility is likely to be substantially lower with the M&E fee swap than without the swap. One solution to avoid being overhedged is to hedge against only a portion of the business at the onset.

It is interesting to note that the above structure would provide for capital relief for all companies following Canadian reporting guidelines. Briefly, the new capital requirements issued by OSFI, the regulating body in Canada, require companies to perform Monte Carlo valuations of the present value of guarantee fee revenue less claims and hold capital to satisfy somewhere between the 95<sup>th</sup>–99<sup>th</sup> percentile of the projected scenario set. Clearly, a swap contract like the one described above would provide net payments to an insurer in these tail scenarios thus lowering capital requirements. This makes the use of the swap described above very desirable for companies that are required to hold capital under the new Canadian standards.

### Conclusion

Currently, very few insurers hedge the market risk associated with their variable products. In light of recent events, insurers should conduct a prudent analysis of this risk and the potential earnings volatility it produces. A swap, while not the only solution to stabilize current volatile earnings, is one worth exploring for many variable product insurers.

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