New opportunities for U.S. life insurers on pension risk transfer

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EXECUTIVE SUMMARY

Plan sponsors of defined benefit pensions face many uncertainties. These range from internal factors such as managing the investment and longevity risk of the pension obligations to external factors such as pension reforms. In the face of such uncertainty, transfer and termination of on-balance-sheet pension risk are at the forefront of many plan sponsor agendas.

Against this backdrop, we believe there is a tremendous amount of opportunity for U.S. life insurance companies to fulfill the role of financial intermediary between corporate pension plans and U.S. pensioners. This paper examines the current defined benefit pension risk transfer market and offers potential new solutions for companies to consider. Specifically, we discuss:

- How a separate account pension risk transfer product can be used to provide a structure for transferring pension risk while providing credit protection and maintaining control over investment strategies
- U.S. life insurance regulations that set risk based capital levels, and the compatibility of these regulations with the need to assess total asset requirements for pension liabilities and ensure that the liabilities are sufficiently funded
- A case study that lays out the risk and reward drivers of a representative pension risk transfer transaction and illustrates how investment strategies and mortality underwriting affect deal economics

The case study shows that pension risk transfer transactions are economically viable and potentially offer attractive pricing for plan sponsors. Determining the appropriate pension risk transfer strategy is a complex decision and will ultimately depend on the prevailing market environment and individual plan characteristics. As plan sponsors and life insurers work together to create new solutions, we foresee potential for significant innovation, which can create attractive new platforms for managing pension risk.

OVERVIEW

The life insurance industry is facing an enormous opportunity. Pension reforms and uncertain market environments have increased plan sponsor interest in mitigating or terminating defined benefit pension risk. Recent financial crises have shown that pension liabilities can add significant volatility to corporate balance sheets if not properly managed. As a result of these internal and external factors, more and more plan sponsors are turning to life insurance companies for risk transfer solutions.

Defined benefit pension plans promise to provide a fixed stream of cash flows upon retirement. The benefits are determined based on a number of factors such as salary, age, years of service with the company, and in some cases future inflation. The plan sponsors are tasked with the fiduciary responsibility of investing plan assets and fulfilling benefit payments to retired employees. Due to these guaranteed obligations to employees, plan sponsors (which are typically corporations with core business outside of insurance) are tasked with managing guaranteed liabilities that expose them to long-term investment risk and longevity risk.

Against this backdrop, we believe there is a tremendous amount of opportunity for insurance companies to fulfill the role of financial intermediary between corporate pension plans and U.S. pensioners. A recent survey found that 25% of private plans are either currently transferring risk or are likely to consider transferring risk to a third-party insurer.[1]

In the current market, there are a handful of insurance companies operating in this space where the deal volume is mostly constrained by premium cost and supply rather than by demand. Pension transfer to an insurance company essentially converts the pension obligations into a life annuity contract subject to life insurance regulations. The specific risks in pension plans, such as investment and longevity risk, are ones that the U.S. life insurance industry is especially well positioned to manage.

Product development in the pension risk transfer space continues to evolve. In larger transactions, insurers have developed separate account approaches in order to mitigate credit risk and satisfy fiduciary concerns that the insurer meets “safest available annuity” requirements. The U.S. regulatory framework may be well suited for structuring and facilitating deals that take advantage of the benefits of equity market participation within separate account formulations. Until now, the common practice has been for insurers to price pension annuities using long-term bond rates. However, plan sponsors have not been excited about locking in pricing in a historically low interest rate environment. In this case study, we demonstrate how insurers can offer pension annuity products that benefit from long-term equity participation in a way that is analogous to how companies offer and manage variable annuity (VA) products. We believe that there is an enormous opportunity for insurers who can participate in this revolution.

[1] Clear Path Analysis (May 2015). ,Pension Plan De-risking, North America.

SEPARATE ACCOUNT PENSION RISK TRANSFER SOLUTIONS

Pension risk transfer deals have traditionally been structured as a group annuity contract supported primarily by fixed-income assets. However, plan sponsors generally see these products as fairly costly, especially as interest rates remain at historically low levels. The Penbridge's PRT Index showed that the average risk transfer cost (offered by the winning insurer) was at an approximately 11% premium above the corporate pension accounting basis as of September 2015. There are several reasons for the relatively high cost:

1. Discount rates built into life insurer prices have been based on fixed-income assets that can be acquired in the market, which reflect the current low interest rate environment and limited supply of long-duration, high-yield assets. On the other hand, discount rates used to determine pension liabilities reflect regulations that ease the near-term burden on corporations and recognize a plan's ability to invest in asset classes with higher long-term expected yields.
2. Unlike pension plans, insurance companies are required to hold capital in excess of reserve requirements. Insurer prices reflect the cost of capital on insurer balance sheets.
3. Insurance company annuity prices include margins for risk and profit.

The upfront cost burden of pension risk transfer is one of the main deterrents that prevent plan sponsors from pursuing this option. Furthermore, there is the sentiment that once the assets are transferred to the insurance company, any potential upside associated with the asset growth will also be lost. One potential way to address these concerns is with a separate account approach that combines the various attributes of existing annuity products offered by the life insurers.

The concept of separate account pension annuities is not new. In fact, a review of the SEC filings reveals that some of the biggest pension risk transfer transactions done in recent years have utilized to some extent a separate investment account for managing the underlying investments. Historically, the primary purpose of the group annuity contract with a separate investment account is to provide the plan sponsor with additional credit protection from the rest of the insurance company's balance sheet. While the insurer's guarantee means that it ultimately takes on the investment risk, a key feature of the separate account product is that the contract holder has ownership of the separate account assets. The separate account is a segregated investment account that is not commingled with the insurer's other general assets. Under the separate account approach, an insurer can take on risks associated with certain investments that are deemed attractive, as long as an appropriate amount of capital is held and the annuity premium charged reflects the cost to the insurance company of offering guarantees on the investment returns.

The separate account investment concept is particularly interesting in the context of pension funding because it allows the insurance company to fine-tune investment strategy for segments of business where the investment objective differs from that of other business supported by the general account. Separate accounts are an important aspect of many insurance products (e.g., variable annuities), allowing policyholders to achieve alternative returns from those yielded by the insurer's general account. In this paper, we consider a case study of a separate account product, which allows the company to benefit from investing in index funds and other non-traditional risk managed funds while maintaining a high probability of reaching the funding target and a good match with the long duration of pension benefits.

CAPITAL CONSIDERATIONS

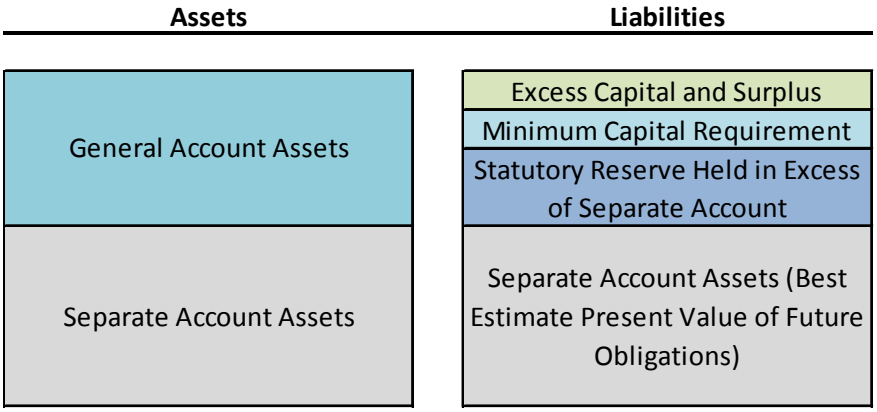
While pension plans are regulated by ERISA and the Pension Protection Act, U.S. life insurance companies are subject to capital requirements set by the National Association of Insurance Commissioners (NAIC), which prescribes a sufficient amount of capital to protect against insolvency and implicitly sets capital strength requirements for participating in the insurance market.

The NAIC's Risk-Based Capital (RBC) requirements provide a well-established framework for setting capital for many products, such as variable annuities, based on the conditional tail expectation (CTE) across a set of stochastic scenarios. In particular, the standard capital measure of CTE 90 is an average minimum surplus in the worst 10% of scenarios. The scenarios are calibrated to fund performance criteria published by the American Academy of Actuaries (AAA) that meet certain distribution standards in order to cover a wide range of possible outcomes. Our view in this case study is that this existing capital requirement for variable annuities would also apply to separate account pension variable annuities that have similar risks and are managed in a similar manner. As such, the capital held would ensure a high degree of certainty that the insurer will be able to fulfill all future pension obligations given the potential claim on the insurance company if the separate account assets were depleted prior to the last pension payment.

Furthermore, these RBC regulatory capital requirements seem to be a good fit with fiduciary responsibilities to meet future obligations across potential market scenarios and the need to demonstrate that the liabilities are adequately funded to a very high degree of certainty.

Figure 1 shows how the separate account structure fits into the balance sheet of a typical insurance company.

Figure 1: Typical insurance company balance sheet



INVESTMENT STRATEGIES

There is a large amount of literature on pension asset investments focused on equity and fixed-income products. Equity investment is favored by pension funds that are return seeking due to the historically higher returns associated with equity risk premium, whereas fixed-income products are typically used for cash-flow immunization and by pension funds looking to de-risk. Both types of assets have their place in pension investments.

For group annuity insurers, the financing vehicle is typically fixed-income and credit-based products. With the recent focus on liability-driven investing, portfolio immunization, and demographic shifts, we expect the demand for long-maturity, fixed-income products to increase significantly in the future. In the recent low-yield environment, institutional investors are forced to take on additional credit risk to meet certain yield targets. The demand for long-dated government bonds, corporate bonds, and other credit products may further lower long-term yields. A 2009 Society of Actuaries (SOA) study found that the supply of long-term bonds is far from sufficient to meet the growing demand from pension funds, and the inadequate supply may result in a statistically and economically significant impact on bond yields and an actuarially significant impact on the cost of providing pension benefits.[2] In addition, pension liabilities run further than 30 years into the future, which is a longer duration than the fixed-income assets typically available in the market. While we certainly do not disagree with the importance of liability-driven investment and immunization strategies, an investment strategy based on fixed income alone has its own challenges.

Companies that would be interested in taking on equity risk instead of credit risk, but prefer to avoid the high volatility associated with many equity investments, may be interested in approaches commonly used for manufacturing variable annuity investment guarantees. Since the 2008 financial crisis, insurance companies with variable annuity business have significantly de-risked their products, and in particular have introduced risk management strategies within their fund offerings. One of the biggest drivers of risk during the financial crisis was the uncontrolled volatility of the policyholder's separate account investment, and funds with volatility control and other risk management mechanisms are designed to mitigate this risk.

The Milliman Managed Risk Strategy™ (MMRS) funds are one of the first widely adopted portfolio risk management strategies that VA insurers used to manage volatility risk of separate account assets. Unlike traditional target allocation funds, which utilize a fixed allocation for equity and bond funds, the volatility-managed funds aim to stabilize the volatility of the investment return. This is often coupled with a capital protection strategy to provide a cushion against losses during major market declines.

In the following sections, we will study the likely effect of an equity-based investment strategy on the return profile of a pension risk transfer transaction structured with a separate account investment.

[2] Xiao, Y. J. & Xiao, Y. (2009). Adequacy of Bond Supply and Cost of Pension Benefits: A Financial Economics Perspective. SOA Research Projects in Pension .

CASE STUDY

This case study focuses on the potential risk and reward of alternative pension de-risking products that seek to optimize the relationship between pension risk transfer transaction pricing and the risk and return profile of the insurer.

Under the proposed approach, the plan sponsor can purchase a separate account pension annuity product from an insurance company that will, in turn, guarantee payment of the ongoing pension obligations. For the purpose of the case study, the upfront premium for the product is based on the present value of the projected benefit obligations at a predetermined interest rate and standard mortality table, to facilitate pricing and alignment with a company's GAAP accounting for liabilities.

From the perspective of the insurance company, the sources of income and disbursements of a separate account pension variable annuity solution are as follows:

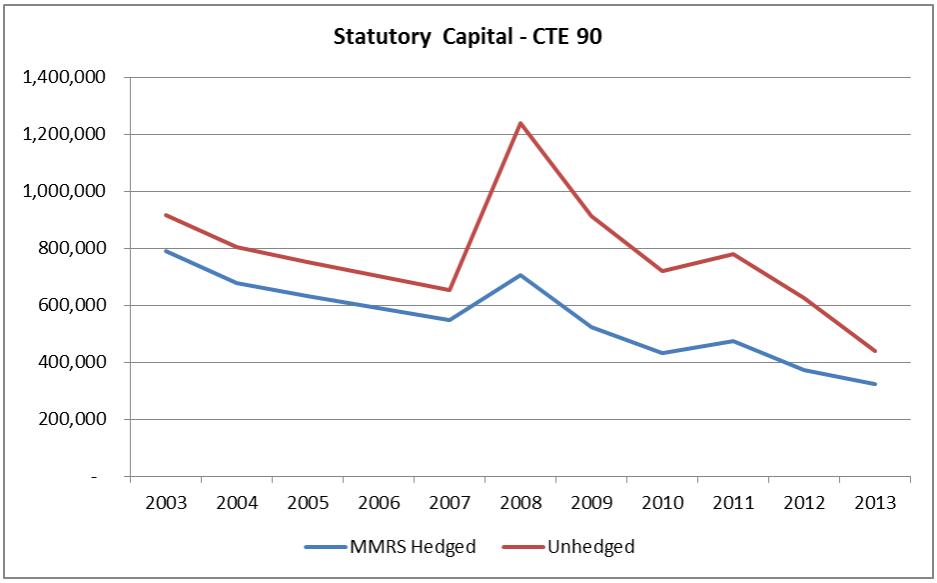
- Investment income: Investment gains and losses arising from the separate account.
- Pension obligation payment: Withdrawals from the separate account to pay for pension cash flows.
- Surplus distribution: If separate account assets meet a pre-set funding ratio relative to the present value of pension obligations, then additional surplus is released to the general account.
- Change in reserve: Reserve is held in the company's general account and is calculated as the average pre-tax loss of the worst 30% of scenarios.
- Change in capital: Under C3 Phase II RBC, total asset requirement is the 90th CTE level of the worst present value of after tax surplus.
- Interest on reserve and capital: Total required assets (i.e., reserves and capital) in excess of that in the separate account are maintained in the general account. The general account assets are typically invested in conservative asset classes earning a fixed yield.
- Dividends: Surplus in excess of the total asset requirement is considered to be distributable earnings.

Under U.S. solvency regulations for variable annuities, the insurance company is required to hold reserves equal to pre-tax CTE 70 and capital equal to post-tax CTE 90. Assuming that the benefit design for this type of product leads to a similar variable component, we assume a similar regulatory and capital regime would apply. As such, the amount of reserve and capital required depends on the performance of the underlying separate account. During market downturns, the insurance company would need to increase reserve and capital to cover the potential increase in likelihood of a funding shortfall. This is accounted for on the insurer's general account balance sheet. To mitigate risks of excessive reserve and capital calls as experienced during market downturns such as the 2008 financial crisis, most insurance companies will likely only offer products where separate account funds with equity participation have embedded risk management strategies. For example, studies have shown that the reduction in losses for a risk-managed fund is approximately 56% during 2008 compared with an unhedged fund.[3] Figure 2 on page 9 shows backtesting of the CTE 90 for a separate account pension variable annuity from 2003 to 2013.

[3] Mungan, K. (2013). Creating a reliable lifetime income: Addressing the sequence-of-returns dilemma through portfolio risk management.

As Figure 2 shows, the capital requirement of using a risk-managed asset-investment strategy (blue line) is significantly less volatile and more predicable compared with the capital requirement without any risk management (red line).

Figure 2: Backtesting of CTE 90 for separate account pension variable annuity – 2003 to 2013



We based our analysis on a sample representative block of pension liabilities.[4] The present value of the projected pension obligations is $3.15 million, assuming a 3% discount rate. For this case study, we assumed that the separate account is funded by the plan sponsor with starting assets equal to the present value of the projected pension obligations. These assets are invested according to an investment strategy with target volatility of 16%. For the "inner loop" stochastic capital calculations, we generated a set of 1,000 scenarios consistent with AAA assumptions. For the "outer loop" cash-flow projections, we used a deterministic 6% per annum return, consistent with the average of AAA scenarios. This deterministic projection was performed for illustrative purposes; for comparison, we also show a representative percentile outcome for a fully stochastic real-world scenario set.

Additional details of the investment assumptions are summarized in Appendix 1 on page 13.

[4] This case study uses the same hypothetical pension portfolio illustrated in Stuart Silverman and Jennifer Wang's 2014 case study, Understanding risks and solutions: A pension de-risking case study.

Figure 3 shows the initial investment and potential returns under the base scenario as well as up and down 30% and 50% equity shocks for the separate account pension variable annuity, assuming the separate account is invested in volatility managed funds.

Figure 3: Separate account pension variable annuity – Initial investment and potential returns

Equity Shock	Shock to Unhedged Fund (60%/40% Equity/Fixed)	Shock to Representative Hedged Fund	Separate Account Assets	Total Asset Requirement in excess of Separate Account	NPV at 10% discount rate	IRR	Representative Percentile IRR Outcome in full real-world simulation
50%	30%	15%	3,618,542	493,093	695,762	51.6%	80%
30%	18%	10%	3,461,214	493,093	558,337	36.5%	72%
0%	0%	0%	3,146,558	539,867	282,283	18.8%	44%
-30%	-18%	-10%	2,831,902	709,912	22,296	10.6%	34%
-50%	-30%	-15%	2,674,574	830,875	(102,74)	7.5%	27%

These results are based on simulated or hypothetical performance results that have certain inherent limitations. Unlike the results shown in an actual performance record, these results do not represent actual trading. Also, because these trades have not actually been executed, these results may have under-or over-compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated or hypothetical trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. No representation is being made that any account will or is likely to achieve profits or losses similar to these being shown.

As Figure 3 shows, the average IRR that can be achieved in this transaction for the insurer is 18.8% on initial outlay. The drivers of profitablity are the amount of separate account surplus that can be released as a result of investment performance exceeding expected liability and release in capital as the business runs off. Therefore, in a “good” scenario (in which equity increases 50% and results in a 15% increase in the separate account assets) projected return on capital also improves. Conversely, if equity drops by 50%, there will also be a deterioriation on the expected return as the company needs to increase capital held in the general account to offset the lower level of assets in the separate account.

The initial premium under this approach could in principle be significantly less than current pension buyout offerings offered in the market. Unlike traditional buyout annuities that require the plan sponsor to cover the insurer’s cost of capital, the separate account pension variable annuity allows insurers to benefit from market performance. This case study assumed that these savings are passed back to the plan sponsor, but in practice the product design will be customized to each plan and the savings associated with this structure could be shared with the corporation acquiring the annuity and plan participants.

Risk management mechanisms within the separate account fund provide some risk mitigation benefits, but the insurer’s risk return profile for this type of transaction could in principle be further tuned by making use of hedge instruments on the insurer’s balance sheet. Typical practice for writers of variable annuities is to hedge some (but not all) of the investment risk embedded in the products they issue, as measured within a market-consistent balance sheet view. As such, insurers who have experience with formulating variable annuity hedge strategies to target certain risk return tradeoffs will already have access to much of the technology and expertise needed to address similar challenges in analogous products.

For simplicity in this case study, we have assumed that this transaction is carried out by a standalone entity. In reality, we expect that for insurance companies with diversified lines of business, there will be further diversification benefits not reflected in our analysis.

MORTALITY UNDERWRITING

An important aspect of underwriting these deals, from the life insurer's standpoint, will be an assessment of projected mortality levels. For life insurers newer to pension transfer transactions, the underwriting is likely to be more challenging than for other common kinds of transactions. Historical inputs into mortality projections include age, gender, income level or industry code, and perhaps a geographic area rating factor.

We consider here the Milliman Intelliscript® PopulationRx™ product, which can improve mortality insight, thus adding significant value for longevity underwriting. PopulationRx uses individual prescription histories via a de-identified (generating no protected health information [PHI]) method, to produce an aggregate risk score for a group of lives. This risk score has shown a high degree of correlation with the future relative mortality of an employer-based group. The duration of impact of the score is not known definitively; however, studies have shown that it has a high degree of predictability for a minimum of five years, and perhaps up to 10 or more. As a result, the score should be applied for five years, with a wear-off period during the subsequent five-year period. The range of the relative risk score varies based on the number of lives in the group. For groups of under 1,000 lives, scores typically vary from 75% up to 200% or more. For groups of between 1,000 and 3,000 lives, the scores typically vary from 80% to 120%. For groups of more than 3,000 lives, the score typically varies from 95% to 105%. Typical application of this product involves selecting a random sample from populations underlying potential transactions and determining which populations have the most attractive upcoming mortality forecasts (usually over a period of about five years). Although typical pension business will survive for periods much longer than five years, we expect that these mortality forecasts can nonetheless materially impact pricing of pension transfer risk transactions.

CONCLUSIONS

The long-term nature of pension cash flows should be managed with an objective that is in line with the investment horizon. Life insurance companies have a great deal of experience managing long-tail liabilities, which could be leveraged to develop attractive approaches for transferring and managing long-duration pension risk.

We have carried out a case study illustrating how a life insurer might structure a pension risk transfer transaction, so as to benefit from equity market participation within separate account investments used to fund the pension liability. Key risk management mechanisms include:

1. Use of modern risk management techniques within the separate account fund, such as volatility management and dynamic replication of capital protection. These techniques have already become the dominant approach for manufacturing investment guarantees in the variable annuity marketplace.
2. Holding and managing risk-based capital to protect against adverse scenarios. This case study assumes that the separate account pension variable annuity is designed such that standard U.S. variable annuity regulation applies. Thus, we demonstrated a real-world CTE approach to risk-based capital that leads to a high degree of certainty that the separate account earnings will fund the pension liabilities.
3. Measurement of sensitivity to market stresses, which could be the basis for use of hedge instruments on the balance sheet, to enhance consistency with the insurer's target risk return trade-off.
4. Mortality underwriting approaches to build appropriate risk margin into the premium charged for pension risk transfer.

Based on this case study, we conclude that use of a separate account including equity market participation is a viable way to structure pension transfer transactions. The attractiveness of this approach, relative to other approaches such as funding with fixed-income instruments, will depend on market conditions at the time of the transaction and the insurer's desired risk/return profile.

APPENDIX 1: ADDITIONAL INFORMATION ON CASE STUDY

In this section, we provide additional information about the case study.

Pension plan retirees

It is obviously not possible to analyze all types of pension plans. For the case study shown, we selected a final pay career average defined benefit plan with 45% male and 55% female all in retired status. Total monthly benefit is $22,367.

AAA scenarios

For the capital calculations, we used scenarios published by the AAA Economic Scenario Generator. The scenario distributions are summarized in Figures 4 and 5.

Figure 4: AAA Scenario Calibration Accumulation Factors for Equity

Tails	Percentiles	1 Year	5 Year	10 Year	15 Year
Left	2.50%	78%	72%	79%	
	5.00%	84%	81%	94%	151%
	10.00%	90%	94%	116%	210%
Right	90.00%	128%	217%	363%	902%
	95.00%	135%	245%	436%	1170%
	97.50%	142%	272%	512%	

Figure 5: Distribution of Fund Returns

	Percentile	MMRS 16% Volatility Target	MMRS 10% Volatility Target	60% Equity /40% Bond	40% Equity /60% Bond
Fund Return	10	3.79%	3.31%	3.58%	3.30%
	25	5.05%	4.15%	4.78%	4.18%
	50	6.48%	5.11%	5.93%	5.08%
	75	7.88%	6.06%	7.21%	6.07%
	90	9.12%	6.99%	8.31%	6.98%

The performance shown is for informational purposes only, not reflective of any investment and does not guarantee future results. These results are based on simulated or hypothetical performance results that have certain inherent limitations. Unlike the results shown in an actual performance record, these results do not represent actual trading. Also, because these trades have not actually been executed, these results may have under-or over-compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated or hypothetical trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. No representation is being made that any account will or is likely to achieve profits or losses similar to these being shown.

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