Hedging and Risk Management

1. Introduction

This white paper introduces how insurance companies manage risk. Insurance companies, whether life, health, or property and casualty, employ similar techniques to manage insurance risk. The paper uses life insurance company management of mortality risk to illustrate examples of risk management techniques. The final section of the white paper describes capital markets' risks and how insurance companies have adopted hedging as a risk management tool. It also describes the impediments in U.S. GAAP to some hedges the insurance companies would like to implement.

This white paper does not address general business risks, such as reputational damage or regulatory action triggered by market conduct. Nor does it propose specific changes to U.S. GAAP accounting.

2. Executive Summary

Insurance companies typically approach risk management by introducing robust risk governance structures to manage and report risks. Most insurers adopt the "three lines of defense" model. The first line of defense is performed by business and process owners, the second line identifies oversight of risk-taking activities, the third line constitutes reviews undertaken by internal auditors.

Insurance Risk Mitigation

Typical risks for insurers include mortality risk, longevity risk, morbidity risk, and property and casualty risk. Insurance companies pool these insurable risks, resulting in less risk for the insurance company than for the insured. However, insurance companies still face risk. Examples include anti-selection, pandemic, medical breakthroughs (for annuities), terrorism, cybersecurity and catastrophe risks. Risk mitigation takes the form of underwriting, policy provisions and reinsurance. After these risk mitigation activities, mortality risk is often low. Unlike market risk, mortality risks have been predictable and are generally independent of each other.

Underwriting mitigates anti-selection by setting up processes by which the pool of lives insured has the characteristics that the insurance company assumed for pricing that pool. For an individual life policy, an individual's age, gender, smoking status, dangerous avocations and medical information are evaluated. For employer group policies, many employees are insured, reducing the risk that only unhealthy individuals will be insured. To mitigate risk from natural catastrophes or terrorism, a company may institute geographic limits or issue both life insurance and annuity contracts because the mortality risks offset.

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Policy provisions also mitigate risk. A policy may be contested in its first two years to avoid paying early claims for material omissions or policyholder errors. The company may reserve the right to increase premiums, though the exercise of that right is generally limited by competition rather than regulation. An increase in premiums above market price likely would cause consistently healthy people to seek lower-cost coverage elsewhere, resulting in an unbalanced pool that does not align with pricing. Participation features lead to the charging of premiums that are higher than necessary to meet contract obligations and pay dividends to return excess premiums.

Reinsurance is the transfer of risk borne by the direct writer of insurance to another insurance company (the reinsurer). Reinsurance can mitigate the volatility of life insurance claims, thereby limiting the volatility of reported earnings and statutory capital. Reinsurers also have access to large amounts of mortality information and can assist in underwriting a specific case. Reinsurers pay a ceding commission to cover sales and underwriting costs and an expense allowance to cover administrative costs.

The primary types of reinsurance are yearly renewable term, coinsurance, and stop loss. Yearly renewable term reinsurance transfers mortality risk to the reinsurer, which charges a premium that increases with the insured's age and policy duration. It helps companies mitigate claim volatility and stay within their retention limits. Coinsurance transfers a pro-rata share of contract risks, premiums, claim reserves, and expenses. A coinsurance agreement may establish a collateral trust (owned by the reinsurer) or a segregated account (owned by the ceding company as either modified coinsurance or coinsurance with funds withheld) to protect the ceding company from reinsurer failure. Stop loss reinsurance pays benefits to the ceding company but only after a specific claims' threshold has been exceeded.

Hedging Insurance Contracts

Life insurance financial risks are often addressed by hedging. Annuities, long-term care, and universal life with secondary guarantees have cash flows that extend many years beyond Macaulay or option-adjusted duration. These contracts' durations can exceed 60 years, but most fixed-income securities have maturities of 30 years or less.

Cash flow hedges can address the risk resulting from the fact that insurance contracts often have Macaulay durations longer than the maturity of available assets and a significant part of the asset cash flow in the form of future assets has not yet been received. It may be possible to lengthen the assets' duration to match the liability duration using swaps, bond forwards or reverse Treasury locks. However, accounting guidelines make these hedges undesirable or infeasible. Per the accounting guidance, the insurer must designate the hedge as a purchase of future assets, which must have existed at the time of hedge inception, severely limiting types of assets that may be acquired.

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Insurance companies also hedge risks other than duration mismatches, such as financial guarantees. The types of risks that insurance companies typically hedge include minimum interest rate guarantees, book value withdrawals, variable annuity guarantees, index credits, inflation risk and foreign exchange risks.

It is often impossible to achieve fair value hedge accounting treatment for guarantees within insurance contract liabilities. Because insurance liabilities involve uncertainties in cash flow timing and/or amounts, it is not feasible to qualify for fair value hedge accounting on a contract-by-contract basis. Hedging must be done on a cohort or portfolio basis involving reasonably predictable cash flows. However, fair value hedges must be expected to respond proportionately to the overall change in fair value of the aggregate portfolio attributable to the hedge risk. This response can rarely be achieved for a portfolio of insurance liabilities due to differences in age, gender, and policyholder behavior. Unexpected terminations and closed portfolios also jeopardize hedge effectiveness.

Contracts may credit an interest rate that is subject to a guarantee. Minimum interest guarantees are options that can be effectively hedged with derivatives using a fair value hedge. However, since the fair value of each underlying contract would not typically respond proportionately to a change in interest rates, insurers are precluded from qualifying for hedge accounting by using options to hedge.

Most account balance products allow a policyholder to withdraw the account balance at any time, subject to a decreasing surrender charge. A policyholder can benefit by withdrawing account balances at book value and purchasing a new contract at a higher interest rate. The insurer takes a loss when forced to sell assets at market value in a high interest rate environment. Alternatively, the insurer can pay a higher credited interest rate than the assets are earning.

Traditional insurance contracts allow fixed cash surrender values at various points in time that are determined when the contract is issued regardless of investment performance. This puts the insurer at risk of liquidating assets at a market value below the fixed cash surrender value if the policyholder exercises this option when current market rates are higher than the yield of the underlying assets. Insurers manage this risk by matching the duration of assets against the liabilities, but this is not a complete solution. The use of put options and caps to supplement duration matching would result in more effective risk management, but these techniques would generally not be eligible for fair value hedge accounting treatment.

Variable annuity guarantees protect policyholders against decreases in the separate account balances. They may consist of a guaranteed minimum death benefit, guaranteed minimum income benefit, guaranteed minimum accumulation benefit or guaranteed minimum withdrawal benefit (known as GMDB, GMIB, GMAB, GMWB or GMxB collectively). These guarantees expose the insurer to equity and interest rate risks. To mitigate these risks, insurers may engage in dynamic hedging programs to hedge the equity and interest rate risks by using delta, rho, and vega hedging, and to hedge second order effects.

Variable universal life no-lapse guarantees keep the policy in force, even if the separate account balance goes to zero. The resulting liability for the guarantee is not reported at fair value and so there is an accounting mismatch with any derivatives used to hedge the guarantee.

Indexed annuities and indexed universal life contracts provide an equity-based return in lieu of an interest credit. The credit is a percentage of return on the index, subject to a cap or floor. There is no accounting mismatch from hedging the current index period as the indexed credit return is an embedded derivative reported at fair value through net income.

Insurers may want to hedge against inflation risks. A Treasury Inflation-Protected Security (known as a TIPS bond) can hedge inflation, but it does not align with the way insurance benefits adjust for inflation. Derivative contracts are a preferable approach to hedging inflation risk. However, derivatives are reported at fair value through net income, which is inconsistent with the accounting for most contracts being hedged.

3. Risk Management Governance Structure

Insurance companies approach risk management with robust risk governance structures to manage and report key risks. Most insurers adopt the "three lines of defense" model, a common governance model of an organization's Enterprise Risk Management framework. The "first line" is applied by the organization's business and process owners. The "second line" identifies where separate oversight of risk-taking activities occurs, with some independence from the first line. The "third line" is the internal auditors' role, which includes reviewing the effectiveness of the second line and the Enterprise Risk Management framework. Special considerations may be warranted if there are limitations to satisfying the three-tier framework, especially for smaller companies.

4. Mortality Risk Management

Most insurance companies accept a very large amount of inherent insurance risk. For life insurance companies, this risk primarily manifests itself as mortality risk (some life insurers may also take on material amounts of longevity risk and disability risk).

Although inherent mortality risk may be characterized as very high (often higher than market or interest rate risk), after risk mitigation, the residual mortality risk is often low. Unlike market risk, in which there is often a high correlation of loss between different asset classes and among individual assets, mortality risk for each life is, for the most part, independent. Potential exceptions include pandemics, natural and human-caused disasters, and joint accidents. (These exceptions tend to be more significant, for example, in property insurance where multiple properties in a geographic area may be damaged in a single natural disaster.)

In practice, over many insureds, there is a good deal of independence across the lives. The law of large numbers, therefore, makes mortality experience reasonably predictable, with actual experience often being within a few percentage points of expected each year.

Sources of Risk

One important source of risk to the insurer is anti-selection at the time of policy issue. Anti-selection occurs when an insured who knows they are ill, or has a risky profession or hobby, contracts with an insurer. Often this occurs because certain information about the insured's current health is withheld at the time of application, and the underwriting process is not able to catch outright fraud and/or misrepresentations. It is also possible for someone who suspects illness to apply for insurance and receive a policy before seeking treatment. As a result, information about that insured's illness has not yet made its way into the medical system.

Anti-selection is not necessarily a phenomenon that occurs only at the time of policy issue. Life insurers watch for the possibility of deteriorating experience that can occur due to higher than anticipated lapse or surrender of healthy lives, leaving behind a group of lives that is unhealthier than expected.

Other sources of risk are pandemics, terrorism or catastrophe. From a risk mitigation standpoint, the insurer would want the probability of death of each insured life to be independent of the death of any other insured. However, this does not always happen in these examples.

Another example of anti-selection is longevity risk for the purchaser of a life annuity. Since these policies typically are not underwritten for superior health, people with a family history of longevity or healthy lifestyles may be more likely to purchase a life annuity. In this example, anti-selection can be built into the price of the product.

Risk Mitigation Activities

Insurers employ several processes and procedures to lower the inherent mortality risk. For the most part, these activities are designed to ensure that the insured is unable to anti-select against a life insurance company.

Underwriting is the most important risk mitigant (after the law of large numbers) for individual life insurance. The insurer will gather information from questionnaires, including height, weight, blood pressure measurements, blood work, information about prescribed medications and physician information, to slot a person into a particular risk classification. The premium for each risk classification will be different and will reflect the underlying health prediction from the information gathered. The risk classification will often reflect that individual's age, gender, smoking status, dangerous avocations and underlying medical information. People with very poor mortality outlooks may not be offered insurance.

Not all life insurance is individually underwritten. For employer groups, typically everyone in the group may be automatically enrolled for insurance, and the premium will not vary based on each insured's health status. Being employed implies a certain level of health, and insuring all employees reduces the risk of anti-selection. However, because underwriting is limited and some unhealthy lives are expected to be in the insured group, the cost for insuring a healthy life in an employer group would normally be greater than that for insuring that life on an individual basis.

Companies typically have committees that review and approve underwriting rules, which can include limits on the amount of insurance that will be accepted on a single life (retention limit). Any excess of the retention limit would be reinsured. The amount of insurance a company is willing to take on a single life is typically a function of the company's surplus and its ability to place enough contracts for the law of large numbers to function; this means that larger companies are more able to assume the risk of large life insurance policies.

To mitigate risk from natural catastrophes or terrorism, a company may institute geographical limits, for example by zip code. Alternatively, some companies mitigate risk by issuing both life insurance and annuity contracts. These two product categories will often provide offsetting mortality risks, particularly at older ages. Population life expectancy that increases more than expected is advantageous for life insurance and disadvantageous for annuities. Alternatively, a higher-than-expected mortality rate is disadvantageous for life insurance and advantageous for annuities.

A life insurance policy typically includes provisions designed to partially mitigate the risk of anti-selection. One provision is the right of the insurance company to contest the payment of a claim that is incurred within the first two years (some states may require different contract language) after issue. This allows the company to avoid the payment of early duration claims when material omissions or errors occurred during the underwriting process.

Another source of risk mitigation for life insurance is the fact that, for many products issued, as the probability of death increases with age, the amount of risk the life insurer is exposed to declines. Many insurance contracts are sold with level premiums so that the insured's out-of-pocket payment does not increase with age. The policy holder overpays in the earlier years of the contract and underpays in the later years. Because the insurer is undercharging in the later years of the contract, a reserve is established to reflect the difference between the present value of future benefits and the present value of future premiums. At time of death that reserve is used to pay a portion of the claim. The insurer must make up the difference between the face amount of the policy and the reserve (the net amount at risk), but since the reserve grows as the policyholder ages, the net amount at risk declines over time.

For certain contracts, the risk of anti-selection caused by lapsation is mitigated by contractual provisions that reserve the insurer's right to increase premiums if data confirm that future mortality experience is projected to be worse than expected. Although, theoretically, the ability to increase premiums should provide an offset to the deteriorating mortality experience, the insurance company retains the risk that by raising the premiums, another round of lapsation occurs and the mortality deteriorates further. In certain situations, the premiums can never catch up to the experience. This is called a "death spiral" and results in the insurer inevitably incurring losses from mortality.

Mutual insurance companies issue a type of contract called participating whole life insurance. These contracts typically charge higher premiums, and the amounts collected are expected to exceed, ultimately, those needed to meet contractual obligations. The excess premiums, along with any interest earned beyond the amount necessary to fund the reserve, are returned to the policyholders as dividends. If necessary, the dividends can be reduced to cover significant levels of excess mortality, as well as lower than expected earned interest, making whole life contracts one of the less risky contracts life insurance companies issue. These policies can also be attractive to buyers since the net cost, after taking account of dividends, can be lower than for policies without dividends.

Experience Studies/Stress Testing

An important element in determining the price for any life insurance contract is the development of the best-estimate mortality assumption. Most large insurers can perform credible experience studies on their own mortality and lapse experience to understand expected mortality based on their historical underwriting methods.

Companies will typically also stress test potential mortality losses from pandemics, natural and human-caused catastrophes, and terrorism.

5. Reinsurance

One very important risk mitigation tool for life insurance companies is reinsurance, which, in its simplest form, is the transfer of risk borne by the direct writer of the insurance policy to another insurance company, the reinsurer.

Reinsurance allows companies to stay within the range of their mortality risk appetite and manage the growth of liabilities on the balance sheet and required capital. Reinsurance of contracts with large face amounts can also be particularly useful in mitigating the volatility of life insurance claims and, thereby, of reported earnings and capital. Reinsurance also deals with cases involving insured amounts that exceed a company's retention limit. The writing company will hold on to its retention limit, with the amount above the retention limit transferred to a reinsurer. In effect, reinsurance facilitates the spreading of risk over a larger number of individual risks.

For types of insurance risk in which independence cannot be presumed, reinsurance can serve to spread risk over a larger area with greater independence. For example, when geographic concentration involves multiple properties' exposure to risk of damage from a single natural disaster, reinsurance can manage risk by spreading it among multiple insurers and pooling risks across a larger geographic area.

Reinsurers also provide valuable services to the ceding company in certain areas. Large reinsurers often work with many companies and have access to large amounts of mortality information—larger than any single company may have. This allows the reinsurer to provide mortality information to the ceding company that supplements the ceding company's mortality studies.

Another service involves cases in which the underwriting is complicated (due to certain health conditions or a combination of health conditions). These cases are not automatically sent to the reinsurer but are sent individually to the reinsurer by the direct writer. The reinsurer's underwriter will then quote on that life, which may provide a more advantageous rate for the policyholder than the direct insurer is able to offer. In this way, individuals with substandard health ratings can sometimes get lower premiums for their insurance or be able to obtain insurance.

Insurers sometimes decide to exit a line of business. In the absence of a separate legal entity to sell to, reinsurance is the customary vehicle used to sell a block of business to another insurer. Transferring the contract to another reinsurer requires novation (each insured person must approve the transfer). But novation can be very time-consuming and does not always result in 100% of the insureds agreeing to the transfer. As a result, it is easier to facilitate the "sale" by transferring 100% of the risk via indemnity reinsurance. If the reinsurer fails, that liability would return to the ceding company, ensuring the insured remains protected by the company with which they originally contracted. To protect against the risk of failure, reinsurers frequently establish collateral trusts.

Types of Reinsurance

Reinsurance comes in many forms, and the impacts on risk and a company's capital position can be quite different depending on the type of reinsurance deployed.

a. Yearly Renewable Term Insurance (YRT)

YRT reinsurance involves the transfer of mortality risk alone to the reinsurer. The premium the reinsurer charges changes each year to reflect the insured policyholder's increasing age and the elapsed time since underwriting was completed. YRT is used to mitigate claims volatility and help companies stay within retention limits.

YRT reinsurance premiums are usually an amount per 1,000 of net amount at risk assumed by the reinsurer, with the amount per 1,000 varying by age, gender, risk class, etc.

b. Coinsurance

Coinsurance involves transferring a pro-rata share of most, if not all, of the risks in the contract to the reinsurer. As part of the coinsurance agreement, the reinsurer will receive the pro-rata share of any premiums and will then be responsible for its share of claims, reserves and expenses. When reinsurance begins, the reinsurer typically pays a ceding commission to the direct writer. The ceding commission reimburses the direct writer for a portion of the acquisition expenses incurred when the policy was written. Expense allowances may be used to reimburse the direct writer for a portion of ongoing costs to administer the business.

c. Coinsurance with Funds Withheld

As with coinsurance, under coinsurance with funds withheld a pro-rata share of most, if not all, of the contract risks is transferred to the reinsurer. However, in this form of reinsurance, the assets backing the liabilities are held by the ceding company in a segmented account, with the investment experience shared with the reinsurer. The ceding company records a payable to the reinsurer for retained assets. This arrangement allows the ceding company to limit its exposure to a failure of the reinsurer (since if the reinsurer fails, the ceding company has all the assets to back the liability it is again responsible for). Another benefit of coinsurance with funds withheld is that if interest is being credited to the policyholder, all assets backing the liabilities are held in the same account.

d. Modified Coinsurance

Modified coinsurance, known as modco, arrangements are economically the same as coinsurance funds withheld. Investment experience is passed on to the reinsurer based on the experience of the assets held at the ceding company. Modified coinsurance would typically be used in place of coinsurance with funds withheld if the assets are held in separate accounts at the insurance company and cannot be transferred into a segmented account.

e. Stop Loss

Stop loss reinsurance arrangements pay benefits to the ceding company only after a certain threshold of claims has been exceeded. Stop loss arrangements are primarily used to limit the amount of down-side mortality risk on a block of business or for the entire company and, thereby, limit possible loss from catastrophic claims and/or manage potential claims volatility.

Risk from Reinsurance Transactions

Entering into a reinsurance treaty creates potential risk for the ceding company. Some treaties may remain in effect for a long period of time, and the ceding company assumes counterparty risk over that period related to the reinsurer's ability to meet its obligations under the terms of the treaty. As a result, ceding companies will perform due diligence and add provisions to the treaties to mitigate this risk.

Before entering into a treaty, it is common practice for the ceding company to perform a credit analysis of the reinsurer, including an evaluation of the reinsurer's capital position, supplemented by rating agency analyses. Many companies will have minimum rating standards that the reinsurer must meet before the companies will enter into a treaty.

It is common for reinsurance treaties to include recapture provisions if, over time, a reinsurer's financial strength rating, either defined as a minimum statutory capital ratio and/or a certain rating agency financial strength level, falls below certain thresholds. In these situations, if a reinsurer fails to meet the financial strength threshold, the ceding company retains the right to terminate the treaty and take back the risk it had ceded to the reinsurer.

The amount of credit risk the ceding company takes in relation to a specific reinsurer may be limited in a similar way that credit risk is limited in any single name included in the investment portfolio. As noted earlier, one way to limit credit risk to the reinsurer is to hold assets backing liabilities at the ceding company, either in the form of a funds withheld account or by using modified coinsurance. If the reinsurer should fail, the funds withheld account, or the modified coinsurance structure, ensures the ceding company maintains access to the assets. Alternatively, if the reinsurer continues to hold the assets, the reinsurer may be required to post collateral in a trust.

6. Insurance Risks Other Than Mortality

An insurable risk involves the mathematical law of large numbers. The concept of insurable risk posits that a large number of similar, independent risks will cause the total experience to approximate the expected cost. Although mortality is a major insurable risk for many insurance companies, other risks include health and property and casualty insurance.

Insurance companies, whether they be life, health, or property and casualty, typically use the techniques described above in underwriting or reinsurance, for example, to manage their insurable risks.

Insurance companies collect premiums in advance of having to pay claims. In many cases, they have large assets portfolios, and the returns on these assets are an important part of their product pricing and profits. Insurance companies may also sell products that involve an expectation of market returns. Financial risks generally are not subject to the mathematical law of large numbers, since all contracts are subject to the same risk, and so the risks cannot be pooled. This is where hedging is used as a risk mitigation technique. Finding a third party to take the other side of a financial risk usually requires a fee.

7. Hedging and Hedge Accounting

Accounting generally does not impact risk management of insurance risks, although there may be accounting provisions that impact the way reinsurance or other insurance risk mitigation is handled.

The same cannot be said about interest rate risk. Significant accounting issues persist that can create disincentives for companies to mitigate interest rate risk appropriately. These issues create accounting mismatches between the way the hedged risks are accounted for and the way the

hedging instruments are accounted for. These accounting mismatches can generate misleading gains or losses in GAAP financial statements, as well as GAAP earnings volatility that does not reflect the underlying economics or effectiveness of the risk mitigation strategies. Insurance companies may introduce non-GAAP measures that they feel will better reflect the risk being measured in the GAAP financial statements.

It is often impossible to achieve fair value hedge accounting treatment for insurance contract liabilities, which inherently involve uncertainties in cash flow timing and/or amounts. In the case of life insurance, any individual policyholder may die tomorrow or continue to live for several decades. As a result, it is not feasible to get fair value hedge accounting treatment on a contract-by-contract basis, even if that were practical, given the many individual contracts that are in force. Therefore, for most life insurance products, hedging must be done on a cohort or portfolio basis. The cash flows are reasonably predictable for a portfolio of contracts, which makes the hedging mathematically possible, but ASC 815-20-25-12 states that for fair value hedges:

> If similar assets or similar liabilities are aggregated and hedged as a portfolio, the individual assets or individual liabilities shall share the risk exposure for which they are designated as being hedged. The change in fair value attributable to the hedged risk for each individual item in a hedged portfolio shall be expected to respond in a generally proportionate manner to the overall change in fair value of the aggregate portfolio attributable to the hedged risk. See the discussion beginning in paragraph 815-20-55-14 for related implementation guidance. An entity may use different stratification criteria for the purposes of impairment testing and for the purposes of grouping similar assets to be designated as a hedged portfolio in a fair value hedge.

The criterion stated in the second sentence of that statement can rarely be met for a portfolio of insurance contract liabilities. Each insured person may be a different age or gender from other insureds, with a corresponding difference in expected future cash flows; therefore, the change in fair value will differ for each contract. Further, different policyholders may exercise their rights under a contract in different ways: one may expect to use the cash value to surrender the contract in a few years, while another may plan to hold the contract for life. These differences in policyholder behavior also result in differences in how each contract's fair value responds to a hedged risk. For example, the fair value of a contract that will be surrendered tomorrow will remain unchanged due to a later change in interest rates, whereas a contract that will be held for an extended period could have a substantial change in fair value for the same change in interest rates. And once a contract is surrendered, its fair value of course is zero, and it no longer responds to changes in the hedged risk.

To the extent insurance companies have unexpected policy terminations, these companies would have more hedges in place than hedged contracts, eventually rendering a hedge ineffective. Or if a company has fewer terminations than expected, it would have more hedged contracts than hedges, also creating potential hedge ineffectiveness.

The need to identify a closed-ended portfolio on which to perform the fair value hedge is also an issue for companies. Although companies could identify a current inforce portfolio to hedge, as new business is sold, the company would need to create new hedged portfolios (if it wanted to hedge the new business), which can become inefficient.

There are circumstances in which cash flow hedges can be used to address insurance risks. This is particularly the case for insurance contracts with very long (Macaulay) durations, which are often longer than the maturity of any available assets. In those situations, it is possible to effectively lengthen the duration of the assets to match the liability duration by using instruments such as forward-starting swaps, bond forwards or reverse Treasury locks. These instruments effectively hedge a forecasted transaction. But restrictions resulting from the hedge accounting guidelines make such hedges undesirable or infeasible. If the insurer designates the hedge as the purchase of future assets, those assets (which would be purchased in future years) must have existed at hedge inception, severely limiting the types of assets that can be acquired. Perhaps more crucially, if the asset subject to the forecasted transaction must have existed when the hedge was put in place, that prevents the hedge from achieving the objective of extending the duration of the investments beyond that of available assets when the insurance contract was issued. If the insurer designates the hedge as protection against changes in coupons, and there is a business need to sell assets (due to credit concerns, portfolio rebalancing or other reasons), it has been very difficult in practice to find suitable replacement assets. Some examples of risks that insurers hedge or may prefer to hedge are described below.

Minimum Interest Rate Guarantees

Many account balance products allow the insurer to reset the credited rate periodically. The rate reset for some contracts occurs annually; for others, the rate may be reset only after several years. The rate reset is often at the insurer's discretion but is subject to a minimum guarantee. Currently in the United States, interest rate guarantees may be close to 1%, but historically, minimum interest rate guarantees of 3%, 4% or more were common—and still are in some countries. Depending on the course of future interest rates, the minimum interest guarantee may or may not come in-the-money. Thus, these minimum interest rate guarantees are options that can be effectively hedged with derivatives using a fair value hedge. However, since the fair value of each underlying contract would not typically respond proportionately to a change in interest rates, insurers are precluded from getting hedge accounting treatment for such guarantees.

Book Value Withdrawals

Many account balance products allow policyholders to withdraw their account balances at any time, often subject to a surrender charge that is a percentage of the account balance. The surrender charge percentage typically decreases over time and eventually drops to 0%. This means that, if interest rates rise enough, especially when the surrender charge is low or zero, it can be beneficial for policyholders to withdraw their account balances essentially at book value, since a new contract may pay a higher interest rate than the current contract. The insurer then generally takes a loss when it is forced to sell assets at market value, which is generally depressed due to the high interest rate environment. Alternatively, the insurer may need to pay a higher credited interest rate than the assets are earning to discourage policyholders from withdrawing.

Many traditional insurance contracts also allow for cash surrenders with fixed cash surrender values at various points in time. With traditional insurance contracts, there is an interest rate implicit in the cash surrender values, although it is often not transparent, and generally remains constant over the life of the contract. Similar to account balance products, these fixed cash surrender values put the insurer at the risk that, if interest rates rise, the policyholder will surrender the policy, effectively at book value, and could use the proceeds to purchase a new contract that implicitly credits a higher interest rate.

Insurers often manage this risk by effectively matching the duration of assets against the liabilities. However, because the book value withdrawals are essentially a put option the policyholder holds against the insurer, pure asset/liability duration matching cannot entirely eliminate the risk. The insurer needs to use put options or caps to mitigate this risk. Without hedge accounting treatment, the changes in fair value of the options used to hedge would not match the change in reserves. It may be possible to get hedge accounting treatment by using the portfolio layer method for assets, although, to date, it has been more common to use the portfolio layer method when the hedging instruments are swaps as opposed to options. In addition, it is not always clear whether options can be used as hedging instruments under the portfolio layer method for assets.

Duration Management

Many insurance contracts have cash flows that extend for many years, and often the Macaulay or option-adjusted duration of such contracts is longer than any readily available appropriate assets. Most investable fixed-income securities have maturities of 30 years or less and durations of 20 years or less, but some insurance contracts have Macaulay durations that are much longer than this, even 60 years or more.

Annuity contract example

One example of an insurance contract with a long duration is a structured settlement annuity. These annuities are generally sold to fund large legal settlements. For example, a teenager severely injured in an accident who receives a multimillion-dollar settlement may receive it in the form of a structured settlement annuity that will provide them with payments for many years, possibly the rest of their life, with significant expected cash flows that may last 60 years or more. Few or no assets exist to fund the longer-term expected payouts. In such cases, derivatives are used to either lengthen the duration of the assets or shorten the duration of the liabilities. For example, the liability might be hedged using a swap to convert the fixed cash flows in the annuity for floating cash flows, effectively reducing the liability duration. The changes in the fair value of the derivatives do not match the changes in the liability for future policyholder benefits for the annuity.

Some structured settlement annuities do not have any life-contingent cash flows, in which case, hedge accounting treatment may be feasible. But if any payments are contingent on the annuitant's survival, the uncertainty of future cash flows makes hedge accounting on an individual contract infeasible. Each structured settlement annuity has its own pattern of cash flows, and

each annuitant's situation is unique regarding age, gender and health, so no two life-contingent structured settlement annuities will have fair values that respond to interest rate changes in a proportionate manner.

In some cases, companies with large blocks of structured settlement annuities may be able to aggregate specific tenors of life-contingent cash flows from multiple annuities in ways that permit these tranches of the annuity to meet the qualifications for a fair value hedge. But this is only possible under certain circumstances and is particularly unlikely for smaller companies with small blocks of structured settlement annuities—for which hedging might otherwise be an especially useful tool to manage risk.

One possible solution is to perform a cash flow hedge on the asset cash flows backing the structured settlement annuity. For example, the entity may use forward-starting swaps to hedge the long-dated cash flows and, thus, effectively extend the asset duration. Similar instruments, such as reverse Treasury locks or bond forwards, might also be used. However, the available derivatives to hedge these cash flows cannot necessarily hedge cash flows far enough in the future to fully hedge the risk. And as noted above, there are restrictions resulting from the hedge accounting guidelines that make such cash flow hedges undesirable or infeasible. If the insurer designates the hedge as the purchase of future assets, the assets to be purchased (in future years) must have existed at hedge inception, severely limiting the types of assets that can be acquired. Further, the hedge is intended to extend the duration of the investments that back the annuity beyond the duration of available assets when the annuity is sold. But if the asset to be acquired under the hedge must exist when the annuity is sold, the duration extension the hedge can provide is limited to the duration of available assets at that time. If the insurer designates the hedge as protection against changes in coupons and there is a business need to sell assets (due to credit concerns, portfolio rebalancing or other reasons), it has been very difficult to find suitable replacement assets under ASC 815.

Another type of annuity that can have long duration cash flows is a pension closeout annuity, through which an employer with a defined benefit pension plan purchases an annuity to cover its pension obligations. As employees retire, the insurer pays the pension benefits. This type of annuity can have long duration payments because many of the annuity payments may not start until many years later, when the employees retire. Even though these contracts contain long duration, life-contingent payments, it is potentially less problematic to get hedge accounting for these annuities than for many other insurance products, because a single contract covers many lives, making the cash flows reasonably predictable.

Long-term care insurance example

Other types of products generate more complicated issues. For example, although structured settlement annuities involve only a single premium payment, other types of contracts, such as long-term care insurance, present more complicated duration matching issues. Under a long-term care insurance contract, policyholders pay premiums until they require nursing home or similar care. At that point, the insurer starts making payments to cover all or part of the care. Long-term

care insurance contracts typically have little or no cash surrender value; as a result, surrenders tend to be minimal. This means that, for a portfolio of long-term care insurance contracts, there are many years (maybe 20 or more) of premium cash inflows to the insurer, followed by decades of benefit cash outflows. This pattern means the Macaulay duration can be extremely long, sometimes 60 years or longer.

Long-term care insurance contracts have an issue similar to that of structured settlements in that the benefit cash flows extend well beyond the period that can be funded with assets that existed at contract inception. But the years or decades of cash inflows present an additional challenge. To fully match the liability cash flows to asset cash flows, at contract inception, the insurer would need to use short sales to sell bonds covering the cash flows over the period when the insurer receives net cash inflows. The insurer would then use the short sales' proceeds to purchase bonds covering the later benefit cash outflows. Adding to the lack of availability of bonds covering the full term of benefit cash outflows, such short selling is generally not feasible. An efficient solution would be to use derivatives to achieve a reasonable duration match between assets and liabilities. For example, the insurer might swap fixed interest rate cash flows in the liability for floating rate cash flows to reduce the liability duration. But, since long-term care insurance contracts are generally sold to individual policyholders whose individual circumstances are unique, the fair value of individual contracts does not respond proportionately to changes in interest rates, which precludes qualifying for fair value hedge accounting treatment. Without hedge accounting treatment, changes in the fair value of derivatives used to hedge the interest rate risk do not match the changes in the liability for future policyholder benefits in long-term care insurance contracts.

Alternatively, the insurer might purchase qualified forward-starting swaps or bond forwards to lock in the interest rate earned from investing future premium inflows. However, this approach would run into the same issues that inhibit using such instruments to match asset and liability duration for structured settlement annuities.

Universal life with secondary guarantees example

Universal life contracts with secondary guarantees present challenges similar to those for long-term care contracts, but with additional complications that are similar to those that apply to minimum interest guarantees. A universal life contract with a secondary guarantee typically allows for flexible premiums that fund an account balance, as is the case with other universal life contracts. As is true of other universal life contracts, fees are deducted from the account balance to cover the cost of insurance charges, as long as the account balance remains positive and the death benefit is paid if the policyholder dies while the account balance is positive. However, unlike other universal life contracts, the secondary guarantee keeps the death benefit in force even if the account balance goes to zero, as long as certain conditions are met. These conditions typically call for a minimum amount of premium to be paid for a minimum number of years and may include other more complex conditions.

Because the death benefit can remain in force even if the account balance goes to zero, many policyholders only pay the minimum premium needed to keep the death benefit in force. As a result, the account balance tends to be small and often eventually decreases to zero. As a result, and, as is true of long-term care contracts, surrender benefits are typically small. This means that the pattern of cash flows is similar to that of long-term care contracts—cash inflows for several years while minimum premiums are being paid, followed by a period of cash outflows once death benefits start to exceed the premiums. This generates a very long Macaulay duration that is often longer than available invested assets. And as with long-term care insurance, a pure cash flow match of assets and liabilities would require the insurer to use short sales at contract inception to sell bonds covering the cash flows while the insurer is receiving net cash inflows, and use the proceeds from the short sales to purchase bonds covering the later benefit cash outflows. Alternatively, derivatives can be used to extend the duration of the invested assets to match the liability duration, or to shorten the liability duration to match the asset duration.

But a number of factors complicate the hedging of the interest rate risk inherent in universal life contracts with secondary guarantees. Policyholders can and sometimes do pay more than the minimum premium to maintain the secondary guarantee. This means that the policyholder account balance will not necessarily go to zero as quickly as it would if all policyholders paid the minimum premium. Also, if interest rates are high enough, the account balance will also not go to zero as quickly as it would at a lower interest rate. If premium payments and/or interest rates are high enough, the account balance may never go to zero, and the secondary guarantee may not be needed at all. In this regard, the secondary guarantee behaves much like a minimum interest guarantee and requires the purchase and rebalancing of derivatives such as options to effectively hedge. And if the account balance grows large enough, the insurer can also be subject to the risk of book value withdrawals as with other account balance products.

Universal life secondary guarantees are generally accounted for with a "liability for death or other insurance benefits" per ASC 944-40-25-27A. While such liabilities take into account multiple scenarios, consistent with the fair value of an option that might be used to hedge these guarantees, the liability for death or other insurance benefits is not consistent with fair value due to several considerations, including:

1. The liability for death or other insurance benefits is based on best-estimate assumptions rather than market-consistent assumptions.

2. The liability for death or other insurance benefits incorporates a benefit ratio that is updated retrospectively, which is inconsistent with the fair value of an option.

3. Unlike the net premium ratio for liabilities for future policy benefits, the benefit ratio of the liability for death or other insurance benefits is not capped at 100% with an additional liability recorded. As a result, losses are not recognized immediately; rather, they are amortized into income over the life of the contract, whereas the fair value of a hedging instrument would react immediately to offset the loss.

Variable Annuity Guarantees

Variable annuities often have funds invested in separate accounts. These accounts are often invested in assets that can decrease in value, such as equities and bonds. Many variable annuity contracts include guarantees, such as the guaranteed minimum death, income, accumulation or withdrawal benefit (the GMDB, GMIB, GMAB and GMWB described below), to help protect policyholders against decreases in their separate account balances.

A GMDB will pay the policyholder's beneficiary a minimum amount upon the policyholder's death, even if the separate account balance has decreased. The minimum amount is often the amount of any deposits to the annuity, and, in some contracts, the minimum amount may increase by a fixed percentage each year, or may "ratchet" up periodically if the investment experience has been positive.

A GMIB will allow the policyholder to convert a minimum amount into a lifetime payout annuity contract, even if the separate account balance has declined. Generally, there is a waiting period of a number of years before the policyholder can exercise the GMIB option. A GMAB will add an amount to the policyholder's account balance after several years if the separate account has decreased due to investment performance since contract inception. This effectively guarantees a minimum accumulation of investment income through the date that the amount is added. A GMWB will allow the policyholder to take withdrawals from the contract up to a minimum amount, even if the separate account has declined below that amount. Some versions of GMWB also allow the policyholder to receive additional payments beyond the minimum amount until that policyholder dies.

These variable annuity guarantees are effectively options that expose the insurer to equity and interest rate risk. Equity risk arises because, if equity prices decline, the separate account balance will decrease, which may put the guarantees in-the-money. Interest rate risk arises for a variety of reasons. Under a risk-neutral framework, the future returns on the separate account are assumed to equal the risk-free interest rate. This means that a low interest rate environment would presume lower future separate account returns, so that, if the guarantees are in-the-money, there is a lower probability of eventually getting out-of-the-money and, even if the guarantees are not in-the-money, low interest rates increase the probability that they will go in-the-money in the future. To the extent that the separate accounts are invested in bonds, interest rate increases can cause a decrease in the separate account balance, causing the guarantees to go in-the-money. Low interest rates also increase the present value of future projected guaranteed payments. This is especially significant for guaranteed benefits that are paid over time, such as GMIB and GMWB.

To mitigate the risk from such guarantees, insurers often engage in sophisticated dynamic hedging programs to hedge the equity and interest rate risks (including risk of increased equity and interest rate volatility). This is so-called delta, rho, and vega hedging. Sometimes insurers also hedge second order effects, such as gamma, and cross effects, which include the risk of equities and interest rates declining simultaneously. Accounting Standards Update (ASU) 2018-12 introduced the concept of market risk benefits, which are reported at fair value, with most changes in fair value reported in net income, but changes in fair value resulting from own credit risk reported in other comprehensive income. The market risk benefit concept alleviated most of the accounting mismatches insurers previously incurred when hedging these variable annuity guarantees.

Many of the guarantees available on variable annuities also apply to indexed annuities. The concept of market risk benefits introduced by ASU 2018-12 also effectively addressed the accounting mismatches resulting from hedging such indexed annuity guarantees.

Other Equity-Based Guarantees

Although ASU 2018-12 addressed the GAAP issues insurers had when hedging variable annuity guarantees, it did not address other insurance guarantees based on equity returns. One is the no-lapse guarantee on variable universal life contracts, which is somewhat similar to the secondary guarantee on non-variable universal life contracts. In a variable universal life contract, policyholders can invest their funds in separate accounts that contain equities, bonds and other instruments that may decline in value. With a no-lapse guarantee, assuming certain conditions are met, such as a minimum premium payment, the insurer guarantees that, even if the separate account balance declines to zero, the death benefit of the variable universal life contract will remain in force.

In the United States, payments under variable universal life no-lapse guarantees have been rare. However, in other countries, such as Japan, where there have been more severe stock market declines, insurers suffered very large losses due to paying out on variable universal life no-lapse guarantees. To effectively hedge this risk, insurers need to invest in option contracts. But variable universal life no-lapse guarantees are accounted for as a liability for death or other insurance benefits per ASC 944-40-25-27A. The changes in fair value of the option contracts used to hedge no-lapse guarantees do not match the change in a liability for death or other insurance benefits, for reasons similar to those for universal life secondary guarantees.

Indexed Credits

Indexed annuities and indexed universal life contracts can provide an equity-based return in lieu of an interest credit to the account balance. If the policyholder elects to receive an indexed credit, the account balance receives a return based on some equity index (e.g., an S&P 500 index return). The contract may provide for only a percentage of the return on the index, may cap the return and may provide a floor. For example, the policyholder may receive 80% of the index gain up to 10%, but not less than 0%. For the current index period, the insurer will typically hedge the indexed credit in put and call options that match the terms of the indexed credits. Essentially, the fixed interest credits that would be credited to a fixed annuity or universal life contract are used

to purchase the puts and calls to match the indexed credits. Because the indexed credits typically represent an embedded derivative and are measured at fair value with changes in fair value reported in net income, there is generally no accounting mismatch between the indexed credit provision and the derivatives used to hedge the risk during the current index period.

The insurer retains flexibility in setting the percentage return and the cap upon renewal, which reduces the risk of adverse market conditions at renewal. Many contracts also permit the insurer to refrain from offering an index option upon renewal, which further reduces the risk. Because of these provisions, there is typically little or no hedging of the indexed credit risks beyond the current index period, although the renewal index credits are considered part of the indexed credit embedded derivative measured at fair value.

Inflation Risks

There are a number of inflation risks an insurer may want to hedge against. For example, some insurance contracts have benefits that increase with the general rate of inflation. Such contracts are especially common in countries that have experienced persistently high inflation and exist in the United States as well. Also, some health insurance contracts, such as long-term care, provide benefits that increase in accordance with a measure of inflation related to the particular health benefits being provided.

For U.S. dollar-denominated contracts, one instrument that can theoretically be used to hedge inflation risk is the Treasury Inflation-Protected Security, or TIPS bond, but it presents several problems as a hedging instrument. The mechanism to adjust for inflation in a TIPS bond generally functions inconsistently with the way insurance benefits adjust for inflation. Also, one cannot get inflation protection without the underlying bond, which may not be a good match for the characteristics of the liability. And the rate of inflation that impacts a TIPS bond would not be consistent with the rate of inflation used in certain health insurance contracts, in which the inflation rate used is specific to the cost of the health benefits being provided. Also, inflation-adjusted bonds do not exist in all jurisdictions.

As a result, a preferable approach to hedging inflation risk is to purchase derivative contracts that are well matched to the inflation benefit in the insurance contracts being hedged. However, such derivative contracts are reported at fair value through net income, which is inconsistent with the accounting for most insurance contracts being hedged.

Foreign Exchange Risks

There are several reasons an insurer would want to hedge foreign exchange risk in insurance contracts. In some jurisdictions it is common to issue contracts that are denominated in a currency other than the functional currency. For example, in Japan, it is common to issue insurance contracts denominated, not only in Japanese yen, but also in U.S. dollars, euros, British pounds, and Australian dollars. This generates a foreign exchange risk that an insurer may want to hedge using derivatives. This may not result in an accounting mismatch, however, if the conversion of the liability values to the functional currency is done at fair value.

In some cases, a single contract may contain multiple currencies. For example, a contract may pay death benefits in one currency but surrender benefits in a different currency. Any derivatives used to hedge these risks would be reported at fair value through net income, which would create an accounting mismatch with the underlying insurance contracts being hedged.

Another form of foreign exchange hedging occurs when an entity invests in one currency to back a liability in a different currency. For example, an entity may invest in U.S. dollar assets to back a Japanese yen liability, perhaps because the available U.S. dollar assets earn a higher return. Then the entity uses hedging instruments to convert the asset returns to the liability currency. These cross-currency hedge relationships are generally formed on a one-for-one basis (one hedged asset and one derivative), so they generally do not create a problem in qualifying for hedge accounting treatment. These hedging relationships can be qualified as either fair value hedges or cash flow hedges, depending on whether they are hedging to a fixed or to a floating interest rate.

Dynamic Hedging Programs

Although most of our hedging comments apply primarily to static hedges, in many cases insurers also utilize dynamic hedging programs, in which the hedging instruments are purchased or sold on a regular basis to match changes in the underlying insurance portfolio. The basis could be daily or even more frequently. Such programs are particularly common for hedging variable annuity guarantees. Existing hedge accounting guidance does not address such programs. A lack of specific accounting guidance addressing dynamic hedging programs is not a significant issue for guaranteed benefits on variable annuities and indexed contracts that are defined as market risk benefits, since those benefits are reported at fair value. But for many of the other situations described above, a lack of accounting guidance permitting hedge accounting treatment for dynamic hedging programs either limits the ability of insurers to use such programs, or generates accounting mismatches when such programs are used.

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