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Chairperson's Corner

by Jim Toole

By the time this has been published, there is no telling what might have happened. This has, of course, always been the case, but the range of possibilities contained within one or two standard deviations from the mean has been broadened significantly, sickeningly.

I find myself in the incredible situation of being stranded in the United States, waiting to return home to my family in Mexico. In my previous column, I mentioned weathering international financial crises in Mexico and Asia; today we face a far greater crisis, and far

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Modeling Latin American Annuities

by Thomas E. Leonard

In the United States today, there is much talk about the effect of the "baby boomer" generation ranging from the effect on our Social Security system, the increased market for health-care products, as well as the effect that their withdrawals will have on the stock market. Yet overseas, there is a revolutionary change taking place that is much more fundamental than simply an aging population. As this article is being published, there are numerous countries that are seeing the first generation of their population retire with an explicitly described and funded social security benefit for each of those individuals.

In 1981, when Chile passed a radical social security pension reform, it was the beginning of a tidal wave of reform that has spread rapidly through the developing world in general and through Latin America in particular.

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Tired of fighting the increasing indebtedness of a pay-as-you-go pension system funded from general revenues, countries from Southeast Asia to Eastern Europe to South America have fully or partially privatized their social security retirement systems. The privatization of these countries' social security systems and the simultaneous opening of their economies have had a profound and permanent effect on the countries' populations. This has in turn resulted in a continuing series of developments including increased foreign investments, longer-duration local-currency assets, and wider retirement benefit coverage in terms of both number of beneficiaries and covered events.

As more European and U.S.-based insurers invest in these markets, it is important to understand the risks and rewards of the life annuity products that have been established to deliver retirement benefits in lieu of a public Social Security system. Of particular concern is the proper projection of these complex liabilities that may include up to eight or more joint lives and possibly multiple decrements. Let's face it, the joint life annuities for which we U.S.-based actuaries spent long hours memorizing commutation functions on the life contingencies exam are no longer sufficient in this increasingly global insurance world. Due to the longer timeframe that the marketplace in Latin American has had to develop, we will focus on the Latin American market for social security annuity products. However, the need for appropriate modeling of these annuities is not limited to these countries.

Although we highly recommend understanding the market and regulatory context under which these Latin American retirement systems operate, the focus of this article is to discuss the key features of Latin American annuities that make their modeling a challenge. As with any product, it is important that we, as actuaries, create models that adequately and appropriately portray the key characteristics of the product.

Chilean Social Security Annuities

We will start with a description of the Chilean annuity product and the nuances that make modeling these products particularly challenging. To summarize, these annuities are part of the Chilean social security system and are paid out upon death or disability of an active worker, or at his/her retirement.

Premiums

Depending on the annuity type, the single premium for these annuities is funded from several sources. The main sources of proceeds are derived from the individual's retirement fund (cuenta individual), the funds from cashing in government issued zero-coupon bonds (bonos de reconocimento), insurance proceeds (aporte adicional) from the policy taken out by his/her pension fund administrator (or AFP), and additional government contributions in specific retirement cases only.

The individual's fund is accumulated throughout his/her working life via mandatory percentage of salary contributions. The zero-coupon bonds were issued in some countries, including Chile, to irrevocably close out the old pension schemes. It is through these bonds that the workers were given credit for their past service under the old public pension scheme. The maturity value of the bond is akin to the balance many of us have received as our companies moved from D.B. to D.C. plans here in the U.S., accrued with interest until retirement. Finally, the insurance proceeds represent the difference between the amount available to an individual at death or disability (from their fund and zero-coupon bonds) and the amount of money needed to pay for the minimum government-mandated benefit. The government requires every AFP to purchase this life and disability coverage for all affiliates (primary insureds) in their AFP to ensure that they receive a minimum benefit. This government payment may occur if a retiring worker doesn't have enough capital to fund the minimum benefit. The amount is similar to the insurance proceeds described above, although in this case, paid by the government.

As single premium products, modeling premiums is relevant only for new business and is a process that involves decisions regarding the size and growth of a number of macroeconomic assumptions such as working population, incidence rates for death/disability, elective incidence rates for retirements and early retirements, and the proportion of eligible workers/beneficiaries opting to purchase an annuity. In most countries, it is allowable to maintain your account balance and receive payments from the AFP in what is called a *retiro programado*. In this case there is little protection due to the lack of an interest rate guarantee and resulting risk that a beneficiary does not have a benefit that is guaranteed for life. The incidence of workers choosing these must also be considered.

Beneficiaries

The most striking characteristic of the Chilean annuity system is the fact that there can be up to eight eligible annuitants included in the annuity reserve calculation at any given time. This is consistent with one objective of privatization in ensuring a wide coverage of beneficiaries based on economic dependence. In short, the covered beneficiaries may include the spouse, the children, other natural children and their mother (if applicable), as well as parents as a last resort. Each beneficiary then receives a benefit that is defined as a percentage of the base insured's full benefit. Children are generally covered depending on their student status and disability status.

The large number of potential beneficiaries is one of the key characteristics that make these annuities notable as well as challenging to model. In general, the large number of potential beneficiaries acts to stabilize the required annuity payments and force continued payments long after the first beneficiary loses eligibility due to death, attainment of a limiting age, etc. With respect to students, the age at which they are no longer eligible for benefits is important. One often finds that children are on the policy just long enough to prolong or maintain higher annuity payments until the end of the first 10-15 years of a projection, which contributes the most value to an appraisal.

Benefits

To further complicate the matter, the benefit percentages vary based on the age, student status, disability status, and the status of the other beneficiaries. For example, the amount of benefit paid to a child is dependent on whether or not the surviving parent is alive. This makes it imperative to have a comprehensive list of all beneficiaries—both currently eligible as well as potentially eligible. "Potentially eligible" means that if someone else dies they could potentially move up into an "active beneficiary" slot. It is not unusual to see inforce files with ten beneficiaries and more saved for one annuity along with all of the relevant information to that person. There may also be additional benefit payments (14 payments per year) as required by the government. There is no maximum amount of benefits payable in Chile as a percentage of the base insured's death. Therefore, each change in status brings a change in the amount of benefit being paid.

For existing business projections, there is no problem in calculating the beneficiaries' benefits since the primary insured's full monthly benefit is available on the inforce file. However, for new business projections, it is necessary to estimate the future business from annuities held at AFPs and rolling over from the accumulation stage to insurance companies. The calculation of the primary insured's full benefit amount is also a complicated matter that is dependent on the demographics of his/her family, the recent salary history, and the current minimum wage that leads to a government-mandated minimum. Once you have the monthly pension amount, you then need to make further annuity assumptions as to sales rate spreads, whether the expenses are explicitly or implicitly covered, etc.

For modeling purposes, the structure of the annuity is such that if one person loses eligibility through death, attainment of a set age, etc.; benefits paid to other beneficiaries may increase. This also acts as a benefit stabilizer, maintaining higher benefits for longer periods of time. With annuity benefits whose levels are "insulated " from deaths, this has other implications for the relevant importance of mortality versus investments.

Reserves

It is worth discussing the complex annuity reserves required for these products. In essence, there are two reserves that the Chilean government requires companies to hold. Both are based on a weighted average reserving rate. The two interest rates in the equation are an average government-defined bond rate based on recent issues and a minimum reserving rate of 3%. The weights applied to these two interest rates are based on the asset-liability matching of the company's retirement annuity liabilities and a certain set of the company's invested assets. One of the rates must be calculated and stored at issue, while the second rate must be constantly updated at each valuation. Any difference in these two reserves must then be held as allocated surplus on the company's balance sheet.

"The large number of potential beneficiaries is one of the key characteristics that make these annuities notable as well as challenging to model."

Pricing/Initial Loss

As stated above, the initial reserving rate is a weighted average between what can be viewed as a "new money rate" and 3%. Therefore, the initial reserving rate will generally be less than the sales rate used to calculate the net single premium. As a result, an initial loss will often occur.

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Modeling Latin American Annuities

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Conclusion

The complexity of these products makes their projection a delicate balance between the desire to model each and every aspect of these annuities and timing, budgetary, and modeling limitations. Due to their non-standard beneficiaries, amounts, and reserves, a significant amount of work is required to customize U.S. systems for use with these products. These complexities generally render the use of a standard U.S.-style, second-to-die annuity model distinctly inappropriate. The use of seriatim data is also often necessitated due to the unique benefit percentages and beneficiary counts for each annuity.

Columbian Social Security Annuities

To reference other annuity markets in Latin America, we have included a brief description of the annuity market in Columbia. This will give the reader a better idea how a "middle-age" privatized annuity market has developed over the last several years. We have only highlighted major differences with the Chilean model.

Premiums

There are generally explicit expense loads used in calculating the premiums. Price differentiation based on sales rates has not yet entered the market to the extent it has in Chile. The sales rate is generally set at or near the government mandated technical reserving rate.

Beneficiaries

The Columbian annuity product is a last-to-die, three-life annuity. Therefore, only three lives are used in the calculation of reserves. Consistent with Chile, additional eligible lives need to be carried on the inforce file in the event that one of the three current beneficiaries "leaves" the policy. Reasons for "leaving" the policy are generally death or reaching certain age limits in the case of children.

Benefits

A full benefit is paid until the last of the three beneficiaries dies. However, as is described above, newly ineligible beneficiaries may be replaced by others. Benefits are indexed annually for inflation.

Reserves

Reserves are based on a government-mandated technical reserving rate such that there isn't the complexity of using multiple reserve rates and weighted averages as in Chile. However, one must factor in prospective benefit increases due to inflation when calculating reserves in Columbia. This is not required in Chile due to their use of an inflation-adjusted currency (the *UF* or *Unidad de Fomento*) for financial transactions. Furthermore, there is a reserve for future maintenance expenses that must be modeled.

Profit-sharing

Columbia mandates the use of profit-sharing by companies, although the law does not specifically indicate how it must be done or mandate a methodology. As a result, this is defined on a company-specific basis. In our opinion, this is a policy characteristic that replaces the variable sales rate in terms of marketing and product profitability. However, due to the fact that it can take many shapes and forms, it is difficult for potential policyholders to distinguish which has the best benefit.

Conclusion

While theoretically simpler than Chile's complex reserving methods, the introduction of inflation into the model can quickly complicate any projection of Columbian annuities. Non-standard profit sharing also throws a wrinkle into the model depending on its level of complexity.

Mexican Social Security Annuities

The Mexican market is in its infancy and growing rapidly. Most of that growth is due to disability and retirement annuities as opposed to retirements or early retirements. We have only highlighted major differences with the Chilean and Columbian models.

Premiums

Premiums are calculated at the government defined technical reserving rate. To compensate for the fact that the companies can earn more money than this, a portion of this savings is "returned" to the policyholders in the form of additional benefits. This is a major competitive issue for Mexican annuity sellers.

Beneficiaries

The Mexican annuity is also a complex multi-life annuity similar to the Chilean annuity. There is no limit on the number of lives that can be used to calculate the reserves. However, since the benefit amount is capped at 100% of the primary insured's benefit, these additional beneficiaries can generally be treated like the additional, potentially eligible beneficiaries in Chile and Columbia.

Benefits

The Mexican annuity product has benefits defined separately for each beneficiary similar to the Chilean annuity. However, due to the maximum of 100% of the base insured's full benefit, the monthly amount paid is not equal to the sum of the benefit percentages for all of the beneficiaries. Benefits are indexed both annually as well as monthly.

As mentioned above, the inclusion and issuance of additional benefits for this product further complicates the annuity. Various types of additional benefits are seen in the market, including additional annuity payments, monthly indexing of inflation, additional paid-up life insurance policies, etc. The inclusion of additional benefits is the key competitive feature in Mexico, comparative to Chile's sales rate and Columbia's profit sharing.

Reserves

Reserves are based on a government mandated technical reserving rate, so that there isn't the complexity of using multiple reserve rates and weighted averages as in Chile. However, one must factor in retrospective inflation when calculating reserves in Mexico, something that is not done in Chile due to its use of an inflation-adjusted currency for financial transactions. The need to hold additional "contingency" reserves, some calculated in aggregate, further complicates the modeling of this product.

Conclusion

The complexity of this model is similar to Chile's, without the reserving issues of calculating the technical reserve rate, but with a few more issues of its own on other reserves and additional benefits.

Overall Conclusion

Modeling annuities emanating from the social security systems of Latin America and other parts of the world can be a challenging assignment for even the most seasoned actuary. Care needs to be taken in doing so, especially if a U.S. two-life annuity model is the starting basis as there are many reasons, highlighted above, that the cashflows for these US-style products will not be similar to these Social Security annuities. A thorough understanding of the products and their key characteristics is required. At the end of the day though, I have found very few products that are as stimulating and rewarding to model as these products. The fact that the products also are a key part of bolstering economic stability and comfort in old age for a multitude of people in overseas markets makes it all the more worthwhile too.

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International Country Start-Up Seminar/Case Study - Wrap-Up

The International Country Start-Up Seminar, held April 30 – May 1 at the Westin O'Hare in Rosemont, Illinois, was a unique learning experience as well as a great networking opportunity. This seminar, jointly sponsored by the International Section and Nontraditional Marketing, consisted of formal presentations and an interactive case study. Twenty participants attended, travelling from as far as France, South Africa, North Korea, and Hong Kong.

Jim Toole of Milliman & Robertson kicked off with his presentation on "Going Global." Jim explained why companies decide to expand internationally and provided a comprehensive overview of how to make it happen. Carl Khor of JC Penney Direct Marketing Service gave an overview of the regulatory approval process and gave the group many practical suggestions on how to deal with the regulatory process in various countries. Clifford Kunstler of Enterprise & Marketing in Europe shared his insights in launching insurance operations abroad, particularly with respect to marketing and the planning process. Theresa Resnick of Combined Insurance Company discussed the challenge of international business and related some of her experiences working with cultural differences. A lively discussion ensued at lunch, with participants sharing their own personal experiences. Steve Singer of MetLife closed the formal presentations with "Changing the Channels — MetLife's International Distribution Success Stories" and explained how bancassurance, direct auto and worksite marketing have played a role in his company's international strategy.

After the formal presentations, the case studies began. Lisa Kuklinski-Ramirez and Theresa Resnick, the seminar organizers, introduced the case studies. Participants had their choice of case studies involving expansion via nontraditional marketing in various regions — Latin American, Western Europe, Eastern Europe and Asia. Since many participants had expertise in international insurance markets, the case studies were a great learning experience for everyone. Some teams worked well into the night! The next morning, each team presented their case studies in the form of a capital request to their fellow seminar participants. The participants decided to allocate capital to the Eastern Europe team for their well-thought out presentation. In return for their efforts, each of the Eastern Europe team members received a prize package consisting of international goodies.

Thank you to all of the speakers and the participants for making this seminar a success!