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## A Jump-Start for Improving Risk Management:

### A Case Study of ALM Development in the Korean Insurance Industry

By James E. Backus and Ki-Hong Joo

**A**t this time of economic distress, companies throughout the world are intensely focused on upgrading their risk management capabilities, as are their home country regulators. This article explores one example of how a part of this transformation was accomplished for several major Korean insurers.

#### PROJECT HISTORY

The authors became involved in this process by being in the right place at the right time. Our employer, Transamerica Reinsurance, had taken the decision to significantly expand its international operations, and our business unit had recently reviewed and affirmed the value of its consultative services in developing new reinsurance sales and wished to emphasize that value in our future sales activities. At about the same time, the devaluation of the Thai baht had prompted a significant sell-off of Asian currencies, leading to higher interest rates and substantial insurer disintermediation. Samsung Life, the largest life insurer in South Korea, recognized that U.S. insurers had gone through similar conditions in the late 1970s, and began contacting U.S. organizations for the purposes of obtaining an ALM model. Finally, one of our team members was a Korean national who had recently worked at Samsung Life's New York office. Following from this confluence of good luck, we began talks with Samsung about their needs in this area.

Samsung's initial goal was to purchase an ALM model that is capable of modeling their insurance products and investments. While the major actuarial consulting organizations had proprietary ALM models, none persuaded Samsung that they could either create a new model

from scratch or fit their existing model to Samsung's requirements without substantial costs and several years. We at Transamerica were straightforward in our advice as well, noting the substantial costs and time needed for developing an ALM model for them, but we were willing to work with them by providing advice they could use in developing their own model. We proceeded on that basis.

We agreed to provide a series of two-week intensive seminars in ALM concepts, starting in Seoul in August, 1998. The authors were joined at various times by other Transamerica professionals, including Marsha Wallace of the Los Angeles home office and Qing Wang of the Reinsurance Division in Charlotte, who each brought a deep understanding of risk management techniques and their own unique perspectives. Samsung provided a team of roughly two dozen professionals, with about half coming from Samsung Life Insurance Company and half from the Samsung Research Institute, the strategic planning arm of the Samsung *chaebol*. Samsung's life insurance team included experienced representatives from the actuarial, investment and underwriting departments, while the research team included staff with operational and analytical backgrounds that included a broad range of financial institutions.

We started by demonstrating how book value accounting typically fails to identify embedded risks such as ALM risk and optionality. We then proceeded to review the generally accepted theoretical framework for financial economics, including DCF valuation, Miller-Modigliano capital structure irrelevance, Markowitz efficient portfolio selection, Sharpe ratios, duration and convexity matching, arbitrage-free modeling,



One of the early seminar teams. L-R: Yi Yu Mun, Kim Won Kuk, Joo Ki Hong, Oh Ji Young, Marsha Wallace, Kim Kwang Bin, Jim Backus

and risk-neutral pricing, all of which are equally applicable in both the United States and Korea. Finally we addressed practical implementation issues. These included the analysis and selection of appropriate assumptions, consideration of Korean accounting requirements, and development of simulation models for pricing, EVA, DST, and ALM risk. The modeling activities consumed the overwhelming majority of resources and represented, along with appropriate governance policies, the ultimate deliverable.

Our project with Samsung was finished in 2001. After completing this initial project, we were able to work in a similar manner with Kyobo Life in 2001, Korea Life in 2002, and NACF in 2002 and 2003. The main point of the workshops continued to be providing these companies with the same risk management capabilities used by U.S. insurers for managing interest rate and related risks. However, we also looked forward to learning a bit more about the Korean insurance market. The issues we addressed were primarily those needed to implement U.S. practices in Korea, but it was also necessary to review a number of gaps in U.S. practices that needed to be addressed in order to fit the Korean insurance industry.

### **SOME UNEXPECTED CHALLENGES WE FACED**

There were a number of aspects of the organization that U.S. practitioners may take for granted that were not present in the Korean market. In order to achieve the project's "number one goal" of developing and implementing an ALM model, we needed to first convince the companies that changes in these other areas were needed, even when they didn't seem to directly address the company's risk management goals.

*Pricing methodology:* We planned to explain how the company's pricing models would need to be modified in order to accommodate the needs of risk management, ALM and related measures such as EVA. However, at the time, embedded margins in the companies' reserves were large and the typical process for introducing a new product was to demonstrate that individually, each of the mortality, interest rate and expense assumptions was more conservative than the statutory requirement, rather than developing a specific pricing model. Thus we instead introduced pricing models using PVDE and modified those as needed.

*Performance measurement:* Performance evaluation was focused on comparing the actual levels of investment income to the level provided in the reserves. Changes in the investment climate occur too quickly for this approach. We discussed the shortcomings of this approach and recommended comparing investment income instead to performance benchmarks taking current market conditions into account.

*Accounting and reporting:* Each of the local companies had adopted a functional business organization, with underwriting, marketing, and investment managers reporting at the executive levels. Profitability reports were prepared for regional sales offices by taking pro rata allocations of investment income and home office expenses. As a result, it was not possible within the given structure to determine the profitability of individual products or product lines. We described the necessary accounting changes needed to be able to determine product line profitability.

**CONTINUED ON PAGE 22**

A Jump-Start ... | from Page 21

*Segmentation and investment income allocation:* Related to the above, each of the companies organized their investment departments by type of investment (equities, bonds, real estate, etc.), and when we recommended realigning the investment functions with the products they supported there was some resistance based on expectations that doing so would increase costs, even without segmentation, because, for example, there would need to be a portfolio manager for each combination of investment type and product line, where there was currently just one for each investment type (bonds, equities, real estate, etc.). There was even greater resistance when we discussed segmenting the general account due to the significant support needed from the accounting function.

*Limited investment choices:* The main asset categories available to the Korean companies were bonds, equities, real estate, and consumer and business loans. The most liquid government bonds were only available in maturities up to five years, and while longer corporate bonds were available, their supplies were very limited. Conversely, there were many insurance products covering the whole of an individual's lifespan, and so getting a reasonable duration match between the liabilities and the supporting bonds was difficult. We identified two ways to work around this: (a) by buying equities that had a demonstrably large price sensitivity to long term interest rates, or (b) by entering private contracts with companies involved in producing industrial assets with very long lives, whose future profitability would be sensitive to changes in interest rates.

*Capital requirements:* At the time, the companies were required to hold nominal amounts of capital that did not depend on their business mix or risks, and (as implied earlier) capital requirements were not considered in evaluat-

ing new products. We explained how capital requirements have evolved historically in the United States and how they affect pricing. This included a review of how rating agencies work and how they influence the optimal amount of capital for a company. One of the conceptual challenges in these discussions was explaining the relationship between reserves, required capital, segmentation, earnings, and distributable earnings/free cash flow.

#### GAPS IN U.S. PRACTICE

Although many U.S. companies probably have addressed these issues, at the time they presented challenges to us in explaining U.S. risk management practices.

*Products that never produce a loss at issue:* While it is commonly recognized that PVDE rather than IRR is the most appropriate measure of product profitability, IRR continues to be used as a filter on many new product introductions. This approach breaks down when combined initial reserve and capital requirements are less than the initial net premium. In such circumstances, traditional analysis would suggest that the company write as much new business as possible. This is not always a useful answer.

*Goals other than profit maximization for shareholders:* One assumption underlying the standard analytical framework is that a company's goal is to maximize shareholder value. In the Korean market, several of the larger insurers were held by *chaebol* with many different business interests, including for example in Samsung's case both electronics and shipbuilding. In some cases, the goals of the owners are not necessarily to maximize the insurer's value but to maximize the *chaebol's* value. While this may also be present in the United States, the

“The dominant local firm recognized risk management as a crucial strategic requirement and went about developing its own capabilities; other local companies then followed suit taking advantage of any learning generated by the front-runner.”

analytical framework doesn't address this issue particularly well.

*Strategic use of both sides of the balance sheet:* Our initial attempt to address asset allocation was based on the U.S. expectation that the investment department would invest whatever funds the insurance operations provided. When the insurer has other sources of business income, such as consumer finance, the funds available for investment will also be affected by those other activities, and for strategic reasons the company may wish to continue lending to consumers even when additional such loans increase the ALM risk of the combined business. Conversely, the company also will need to be able to respond to a decrease in demand for consumer loans without increasing its ALM risks.

## THE RESULTS

At the completion of our work each of the four companies had developed its own ALM model in Excel. The primary disadvantage of Excel, being subject to accidental changes, was offset by the transparency of the calculations, the widespread availability of already-trained users, and what we might call the “open license” affect (allowing each user to see all of the formulas and being able to share recommendations for improvement). Each of the companies developed a graph showing how the risk and expected profitability of its major product lines was influenced by its asset mix. Each could show how these graphs changed in response to changes in assumptions regarding policyholder premium and lapse behavior, investment market conditions, crediting rate strategy and dividend policies. Based on these graphs, each was able to recommend an approach to general account segmentation, with an appropriate investment strategy for each segment. As part of the

conclusion, each company also provided recommendations for short-term portfolio changes that would reduce the company's ALM risk without waiting for the segmentation and other infrastructure changes.

An important but unstated goal was also achieved: the development of a knowledgeable risk management staff. This was an outstanding success. It would be difficult to track down everyone who was involved in the project, but many of the people have expanded their roles in risk management activities. For example, the photograph on page 21 shows, several key people from Samsung Life near the end of the project, including Mr. Yi Yu-Mun, now the chief actuary for Samsung Life, Mr. Kim Won-Kuk, now manager of the risk management team for Hungkuk Life, Mr. Kim Kwang-Bin, now manager of the risk management team for Mirae Asset Life, and Ms. Oh Ji-Young, now a risk management consultant. Many of the participants from Kyobo Life, Korea Life and NACF have followed similar career paths.

## SUBSEQUENT CHANGES

Much has changed in Korea since 2003.

*Variable products:* Variable annuities have been introduced, including both guaranteed death and living benefits. (It's interesting to note that this means the necessary technology for general account segmentation is available.)

*Capital requirements:* Korean regulators have introduced capital requirements. There is now a two-year grace period for companies to move from the existing EU-style capital requirements to a basis similar to that of the U.S.

CONTINUED ON PAGE 24

A Jump-Start ... | from Page 23

*Accounting practices:* Companies must change from US GAAP to IFRS by 2012, which will also require mark-to-market information for substantially all business.

*Governance:* All Korean insurers must have a qualified risk management team and appropriate risk management practices.

We believe that Samsung Life, Kyobo Life, Korea Life and NACF were better positioned to manage these changes as a result of our work.

#### RELEVANCE TO TODAY'S ENVIRONMENT

These memories have started to fade, and many of the techniques involved and the contacts developed are no longer on the front lines (or at least not on the *same* front lines). However, the overall course of the project may be a useful guide generally for companies or regulators intending to tighten up their risk management practices. Here are some areas relating not to the technical aspects of risk management but to the management of the process:

*Senior management commitment:* Projects such as this, which combine elements of execution, strategic planning and corporate governance, often fail due to lack of commitment at senior levels. Samsung Life, for example, had assigned a staff of about two dozen professionals, a larger group than many U.S. life insurers of comparable size would have involved in their own ALM analyses. This high level of commitment may have been the most important factor in the success of the project.

*Follow the industry leader:* Our opinion is that rolling out best practice to new markets is most often done when an established international

organization enters those markets. Certainly global firms, such as Aegon, Axa, ING or Swiss Re, bring their risk management policies with them when entering a new market, typically by acquiring a local firm and developing the necessary procedures to integrate their acquisition into their own particular organizational culture. This approach has much to recommend it, such as starting from a well-defined set of requirements and having an existing pool of expertise to draw upon. This project followed a different approach: the dominant local firm recognized risk management as a crucial strategic requirement and went about developing its own capabilities; other local companies then followed suit taking advantage of any learning generated by the front-runner.

*Principles-based training:* Samsung was clear from the beginning that they wanted to understand the details of the analyses. This was probably an area where Excel had an advantage over the major actuarial models—it was transparent and already familiar to the team. Regardless of the modeling platform used, it is important that the process be performed by persons knowledgeable about the technical underpinnings.

*Free market capitalism and democracy:* No, we can't take any credit for this, but as regulations are being rewritten in response to current market turmoil, they should be limited to the essentials necessary to have an orderly and secure insurance market. At the time of partition, North Korea had more factories and better farmland compared to its poor cousin in the South. Now, 60 years later, the roles couldn't have reversed any more dramatically. □