



SOCIETY OF ACTUARIES

Article from:

International Section News

June 1999 – Issue No. 19

Ambassador Program Update: Country Web Pages Take Shape

continued from page 7

Web Pages are flexible, allowing hot buttons to addresses that present unique differences important for the region. In the case of New Zealand, being a small country, there is a Web site that searches only New Zealand Web sites so the user can easily surf the Land of the Long White Cloud.

The Pages

We are proud of what we have accomplished so far. By the end of this year, we hope to have more than 15 active Country Web Pages from our 26 Ambassadors. But we need your help to do more. We are currently recruiting Ambassadors for a number of countries including



England, France, Germany, Ireland, Mexico, The Netherlands, Pakistan, South Korea, Switzerland and Scotland. If you are interested in learning more about the Country Web Pages or the Ambassador program, please contact Jeanette Selin at jselin@soa.org or Jim Toole at Jim.Toole@milliman.com.

I think it's right on target. The objective of the project was to provide country-specific pointers to insurance and statistical related sites. It is an easy site for starting a search and gives some personal addresses for further contact that could be useful. I am sure most Ambassadors would welcome the chance to give guidance to any visitor to the site if requested. I look forward to the feedback from members and direct contact from anyone using the site. Come and surf New Zealand!

Jim Toole, FSA, is a consulting actuary at Milliman & Robertson, Inc. in Denver. He can be reached at jim.toole@milliman.com. He is also a member of the International Section Council.

Valuation of Cross-Border Insurance Ventures

by Ken Mungan

Editor's Note: This article is reprinted with permission from the winter 1999 edition of "Woodrow Milliman Insurance International."

Insurance companies around the world are expanding to achieve a global presence. To become international firms, insurers are establishing cross-border subsidiaries and forming partnerships with foreign firms. As the pace of this activity quickens, insurers need a financial framework for evaluating potential ventures and for monitoring the performance of existing ventures. Moreover, any useful framework must account for the unique features of the insurance industry. Namely, evaluation techniques should account for the long-term, predictable nature of insurance company liabilities.

In this article, I will show how blending two well-known financial techniques can help insurers evaluate cross-border transactions. An analysis of a cross-border insurance transaction should use both actuarial projections and the no-arbitrage approach used to price securities. When each technique is used in its appropriate context, one can form a clear understanding of the value of a cross border transaction.

Actuarial projections are commonly used to analyze the expected earnings, which will be generated by an insurance enterprise. These projections account for the fact that insurance company customers are willing to pay for the valuable services provided by the company. For example, customers value the advice offered for financial planning, the financial security offered by insurance products, and access to the financial markets. Actuarial projections account for the value which the company realizes through its expertise in the financial markets, its long time horizon, and its ability to benefit from risk sharing and pooling. A purely domestic transaction,

such as a merger or block acquisition, will rely heavily on actuarial projections.

Security pricing techniques that rely on the no-arbitrage approach are used in a different context. These techniques are used in the realm of sophisticated financial competitors who constantly analyze security prices. These competitors will exploit any possible advantage by simultaneously trading multiple financial instruments. In this world, opportunities for riskless profit quickly vanish. This process of eliminating arbitrage opportunities is used to price financial instruments.

Actuarial projections and security pricing techniques can be used together to value cross-border insurance transactions. For an insurer evaluating a transaction in a foreign country, actuarial projections can be used to project annual earnings in the foreign currency. Security pricing techniques can then be used to translate those earnings to the insurers home currency. Finally, this stream of translated earnings can be discounted at an appropriate hurdle rate. This rate should account for the risk of the investment and be appropriate for the economic conditions of the insurer's home country.

To understand this process, I will outline each of the major steps. First, actuarial projections will be produced to evaluate the transaction in the foreign currency. To create the projections, one starts with a set of assumptions. Liability assumptions such as mortality, morbidity, and reserving basis will determine the liability cash flows and the development of the reserves. Also, one needs assumptions that will determine asset performance. Asset assumptions include an interest rate scenario, fixed income asset spreads, an investment strategy for the new venture, and the cost of expected asset defaults for this strategy. With the assumptions in place, it is possible to project the year-by-year distributable earnings for the venture. Distributable

earnings include the net income and any required capital that is released. At this point, we have a stream of distributable earnings denominated in a foreign currency. The main question for an insurer evaluating a cross-border transaction is, "What should be done with this stream of distributable earnings to produce a final valuation?"

In my work on cross-border transactions, I have seen these foreign currency distributable earnings discounted at an interest rate appropriate for the insurer's home country. The present value is then converted to the insurer's home currency at the current spot exchange rate. However, this approach may lead to inappropriate results depending on the circumstances of a particular situation. The economic conditions in the two countries are not the same. This difference should be accounted for in determining a valuation.

To understand this, let's consider a simple example. Consider a U.S. insurance company evaluating a potential partnership with a Japanese insurer. Through a process of collaboration and negotiation, the two parties have agreed on a set of baseline assumptions for a 20 year actuarial projection of the profits of the partnership. Assume that the results of the projection show annual distributable earnings starting at 6 billion yen after 1 year and rising to 12 billion yen per year by year 20. At this point the U.S. insurer needs to use the yen-denominated stream of distributable earnings to determine a valuation of the partnership.

It is tempting to jump directly to a valuation by discounting these earnings and translating the present value to dollars at the current exchange rate. For example, the U.S. insurance executive might believe that 12% would be an appropriate discount rate if this were a purely domestic transaction of similar risk. Assume that the current spot exchange rate is 120 yen to the dollar. The present value of the distributable earnings at 12% is 59.02 billion yen. Translating this to dollars at the current exchange rate produces a valuation of 491.8 million dollars.

The problem with this analysis lies in applying a 12% discount rate which is appropriate for the U.S. environment to a stream of Japanese yen. This rate was

determined as an appropriate rate for a U.S. transaction of similar risk. However, this is not a U.S. transaction. The problems created by this technique are due to the extremely different interest rate environments in the two countries.

Luckily, we can overcome these problems very easily. Rather than discounting a stream of yen-based distributable earnings, we can translate these distributable earnings to dollars and take the present value of the dollar-based values. To do this, we can look to the capital markets to determine the appropriate exchange rates. At this point, security pricing techniques are used to determine the exchange rates.

Let's continue working with our simplified example. The following chart shows the projected distributable earnings for years 1, 5, 10, 15, and 20 in millions of yen.

Year	Distributable Earnings (Millions of Yen)
1	6.000
5	7.263
10	8.842
15	10.421
20	12.00

To translate the 6 billion yen earned 1 year from now to dollars, we can use the exchange rate currently available for such a transaction in the derivatives markets. This rate is called the 1-year-forward exchange rate. This is the rate available to exchange yen for dollars one year from today.

Here is a sample of forward exchange rates available at the beginning of December 1998.

Years Forward	Yen / Dollar Exchange Rate
0	119.98
1	114.45
5	95.91
10	75.88
15	55.86
20	35.73

119.98 is the spot exchange rate. This is the rate available for an immediate exchange of yen for dollars. However, if you would like to lock in a rate today for an exchange of currency in the future, 119.98 is not the appropriate rate. For example, if you would like to lock in a rate to translate the 6 billion yen earned 1

year from now, 114.45 is the appropriate rate. Similarly, if you would like to lock in a rate to translate the 7.263 billion yen earned five years from now, the appropriate exchange rate is 95.91.

Maturity - Years	US (%)	Japan (%)
1	4.41	0.22
2	4.35	0.39
5	4.32	0.83
10	4.58	1.21

The most obvious question is, "Why are the forward exchange rates so much lower than the spot exchange rate of 119.98?" This is due to the dramatically different interest rate environments in the United States and Japan. To see this, examine the following table of government bond interest rates at the beginning of December 1998.

As you can see, Japanese interest rates are at extremely low levels. Assume you could lock in today's exchange rate of 119.98 for an exchange of currency to take place in 10 years. If this were the case, no one would buy the 10-year Japanese government bond. Anyone who needed an assured supply of yen 10 years from now would buy the 10-year U.S. government bond. When the bond matures, they would use the locked in rate of 119.98 to change the dollars to yen.

The forward exchange rates outlined in the table above are the only rates that allow the foreign currency markets and the U.S. and Japanese government bond markets to remain in balance. Any other rates would present an opportunity for riskless profit.

With this insight, we can create a table (see page 10) of distributable earnings denominated in U.S. dollars.

The column shows distributable earnings in U.S. dollars. It is this stream of earnings which should be discounted at the 12% rate. This 12% rate was determined as an appropriate discount rate, which would be used for a venture of similar risk in the U.S. This results in a valuation of the partnership of 769.6 million dollars. This is substantially different from the 491.8 million-dollar valuation produced previously.

It is very important to understand that the forward exchange rates serve only as

(continued on page 10, column 1)

Valuation of Cross Border Insurance Ventures

continued from page 9

Year	Distributable Earnings (Millions of Yen)	Forward Exchange Rate	Distributable Earnings (Millions of Dollars)
1	6.00	114.45	52.42
5	7.263	95.91	75.73
10	8.842	75.88	116.53
15	10.421	55.86	186.56
20	12.000	35.73	335.85

a tool to determine the correct valuation. The U.S. insurer does not actually need to enter into forward exchange contracts to accept the valuation. The U.S. dollar valuation of the partnership, which is calculated using the currently available forward exchange rates to produce the expected present value, is the same whether or not the U.S. insurer actually uses forward exchange contracts.

At the start of the venture, the forward exchange contracts have a market value of zero. They are simply agreements in which two parties agree to lock in an exchange rate today for a transaction in the future. If the U.S. insurer has a right to the distributable earnings from the partnership, the insurer cannot change the value of these earnings by including some derivative contracts which have a market value of zero.

Once a final projection is completed and the valuation is determined, the U.S. insurer needs to decide whether or not to actually use the forward contracts. If these contracts are obtained, the insurer will lock into the valuation amount regardless of deviations in the future between today's projected exchange rates and the rates that later actually materialize. Conversely, if the forward exchange contracts are not obtained, the actual value realized by the insurer from the partnership will differ from the original estimate due to future differences between the actual and expected exchange rates.

In a recent survey of 400 large U.S. companies, one-third engage in some form of foreign currency hedging. The motivation for this hedging is to reduce volatility in earnings and cash flows. Insurers have an additional motivation to hedge. Given the long term nature of their liabilities, they can enter into forward contracts with a very long maturity. The exchange rates available in these

“In a recent survey of 400 large U.S. companies, one-third engage in some form of foreign currency hedging.”

contracts can be very different from one's intuitive expectation for actual exchange rates.

For example, in the forward rate chart above, the yen /dollar rate for a transaction 20 years in the future is 35.73. This rate is very different from the current exchange rate, and it is driven by large differences in rates in the U.S. and Japanese government bond markets. Let's consider the motivations for the hypothetical partnership in our example. The U.S. insurer may be entering into the partnership because management believes the long-term outlook for Japan is good. They may believe that economic conditions in Japan will stabilize and that the economic health of

Japan and the U.S. will be approximately equal in the long term. There may be a long-term expectation for the exchange rate to fluctuate in the 100 to 130 yen / dollar range.

If this were the case, the U.S. insurer would expect to benefit from entering into the forward contracts. If the U.S. insurer expected declining interest rates, they may see no benefit from entering into the forward contracts. In general, an insurance company should make its decision to use forward contracts in light of its overall risk management program and philosophy towards currency risk. However, the important point to stress is that the valuation of the partnership is not affected by the insurer's decision to use forward contracts.

Cross-border insurance ventures have outstanding potential to add value for insurance firms. They are an excellent hedge against adverse conditions in an insurer's home country. Also, they create access to new distribution outlets to support continued growth. Given the potential of these transactions, it is important to have an appropriate framework to produce a valuation. The approach of combining a baseline actuarial projection, forward exchange rates, and an appropriate domestic discount rate serves this purpose.

Ken Mungan, ASA, is an Associate Actuary with Milliman & Robertson, specializing in asset-liability management and international mergers and acquisitions.

