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A Seminar in Beijing: Applications of Derivatives for Life Insurance Company Risk Management

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In North America, Europe and Japan, derivatives have been a risk management tool for life insurance companies for a long time. In particular, the past decade saw an explosive growth of hedging in variable annuities and indexed annuities using derivatives. Corresponding to the growing number of applications for derivatives, there has also been a rapid evolution of regulatory, tax, audit, and reporting requirements. The process thus far has not been a smooth ride by any means, but insurance companies did learn some important lessons along the way.

Half way across the globe, China's economy is growing fast. Its economy is officially the second largest in nominal terms after the U.S., and some would even argue it is the largest on a purchasing power parity basis. China is also expanding its derivatives market to go with its burgeoning economy. The CSI 300 futures were the first financial derivatives launched on April 16, 2010 in the Chinese market. Since then, the Chinese derivative market has been growing at the so-called "China speed."

CSI 300 futures are seeing large increases in average daily volume (ADV) and open interest, and 30-day ADV in notional now exceeds that of S&P 500 & Eurostoxx 50 futures combined. On high volume days in early Dec. 2014, CSI 300 futures were trading more than two million contracts per day, and the notional dollars traded in this single contract exceeded that in every other equity index futures contract combined globally. On average, daily volumes for Chinese equity index futures are much larger than western markets though open interest is lower. 2015 also witnessed the launch of equity options based on the SSE 502 and other financial and commodity derivatives.

Given this background, there is keen interest in the Chinese life insurance community to learn from what the developed economies have done and eventually grow its own ability to use derivatives for risk management purposes. The regulatory body, China Insurance Regulatory Commission (CIRC) recently asked the Chicago Mercantile Exchange (CME) to host a seminar on this topic. The seminar was held on April 28 in Beijing, where delegates from Milliman spoke along with local Chinese fund managers.

The seminar was a great success with more than 50 regulators, fund managers, and insurance company representatives in the audience. The speakers also represented the wide area of expertise needed in derivative usage, including actuarial, portfolio management, and trading. The speakers were also able to visit many Chinese companies before and after the seminar.

I left China with several deep impressions about this vibrant market.

Quantitative investment is very popular in Chinese fund management companies. With the rapid growth of China's economy, mutual fund management techniques are also becoming increasingly sophisticated. Using advanced financial mathematics as investment guidance is gradually winning over methods that rely purely on analysts' subjective opinions. A typical Chinese quantitative investment team is very much like the quant teams in the U.S. whose members are generally math-whizzes with an affection for partial differential equations.

The methods being used in China are similar to what are used in the West as well. The Chinese quantitative analysts are very well versed in dynamic derivative replication, volatility

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The Chinese derivatives market is dominated by individual investors.

projection, CPPI, etc. In fact, some of the funds being offered already incorporate synthetic options for downside protections.

However, all is not always smooth when East meets West. There are many challenges facing the application of derivatives for risk management purposes. To begin with, many of the underpinning assumptions for modern financial mathematics are not met in the current day Chinese market. For example, the general investor seems to exhibit risk-seeking as opposed to risk-averse behavior, and markets are not as efficient as the theoretical ideal calls for due to regulations. To apply what has been taken for granted in the West, the young Chinese quants have to resort to many, often "messy," adjustments.

There are also quite some differences in terms of the market's composition. One key characteristic of the Chinese derivatives market is that it is dominated by individual investors, whereas the derivatives market in the U.S. is dominated by institutional investors. Also, a market rally in the U.S. is usually preceded by a period of low volatility, whereas in China, a period of extraordinary high volatility is often a harbinger of a huge bull market which is unfolding in China today.

What have I learned from my brief trip to China? I have gained some ground zero experience for the roaring Chinese economy leading to its tremendous growth in the derivatives market. We, as investment actuaries, can indeed play a huge role in that market to manage life insurance company risks using derivatives. However, I feel the road to that success is bound to be rocky as we adapt the western quantitative investment theories and practices to the unique realities in China. ■

ENDNOTES

1 The CSI 300 is a capitalization-weighted stock market index designed to replicate the performance of 300 stocks traded in the Shanghai and Shenzhen stock exchanges. The index is compiled by the China Securities Index Company, Ltd.

2 The SSE Composite Index (Chinese: 上海证券交易所综合股价指, 简称上证综指) is a stock market index of all stocks (A shares and B shares) that are traded at the Shanghai Stock Exchange. The SSE 50 Index selects the 50 largest stocks of good liquidity and representativeness from the Shanghai security market by scientific and objective methods. The objective is to reflect the complete picture of those good quality large enterprises, which are most influential in the Shanghai security market. The index is compiled by the China Securities Index Company, Ltd.

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