

**CORPORATE HEDGING IN THE INSURANCE INDUSTRY: THE USE  
OF FINANCIAL DERIVATIVES BY US INSURERS**

**DISCUSSION BY GARY G VENTER<sup>1</sup> AND MORTON N LANE<sup>2</sup>**

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## **CORPORATE HEDGING IN THE INSURANCE INDUSTRY. . .**

### **DISCUSSION BY GARY G. VENTER AND MORTON LANE**

The use of financial derivatives is widespread yet controversial, so it is timely that these authors provide an analysis of what kind of insurers tend to use which instruments, and also some insights into why they use them. It is an important paper both in cataloguing what is done and in trying to explain the relationships found. Towards the latter it puts forward several hypotheses, but in many cases further work is needed to develop alternative hypotheses and test against them.

Financial risk management is presented as arising from the role of insurers as financial intermediaries, which the authors see as having value due to market imperfections and incompleteness. They did not mention the significant role of tax incentives, but this may be because they feel taxation *is* a market imperfection.

Asset-liability mismatch is portrayed as the principal area of financial risk facing insurers. The authors define this as managing the relationship between the duration and convexity of assets and the duration and convexity of liabilities. However, duration and convexity can be regarded as giving the first two moments of the portfolio yield curves, and just managing them is not enough to guarantee financial performance. The shape of the entire yield curve can change, leading to complex financial risk. Direct hedging may be able to provide better total interest rate risk management than can traditional asset-liability strategies - not just cheaper or more flexible methods for dealing with duration and convexity. In the property-casualty arena, with shorter liability durations, yield risk analysis is further complicated by the significance of the additional expected yield from investing longer, as well as the impact of cash flow from expected growth - all of which should provide interest in derivative use.

The authors also draw a distinction between the use of derivatives for hedging vs. their use for income enhancement. While riskier strategies may increase expected income, their effects on actual income are not known. Thus it seems that a more precise distinction would be between using derivatives to decrease risk vs. using them to enhance *expected* yield, perhaps by accepting increased risk. For instance, writing covered calls is included in the income enhancement camp, but this could also be a strategy to reduce variability of asset positions already held by giving up some of their upside potential. What is readily measurable is purchasing options vs. writing them, but this distinction is not very useful for analyzing risk taking or risk reduction unless the underlying positions are known.

A considerable part of this paper is descriptive information from Annual Statement Schedule DB. It may be interesting to note that insurers tend to write more calls and buy more puts, at least in notational amounts, during a year, but more of the calls purchased are still open at year end. Notional amounts over \$400 billion were traded by insurers in 1994. Some of the data is confusing, however. For instance, in Table 1 it is difficult to reconcile the data split by stock and mutual to the totals above it, particularly for the inter-company groups.

The intellectual core of the paper, however, is in the probit analysis of factors involved in the use of derivatives, and the hypotheses regarding those factors.

Some of these factors are discussed below.

### Size

Larger insurers are hypothesized to be more likely to use derivatives, and this is indeed found. This is expected on the basis that they are more likely to be able to afford a derivative trading staff. A counter hypothesis is that larger insurers will be more diversified and thus less in need of hedging. However, when it comes to interest rate risks, being more diversified in products sold or even investments

does not necessarily reduce risk. Size here is measured by assets, and it is possible that other measures of size would also be significant, even though correlated.

### **Organizational Form**

Stock companies are hypothesized to need more hedging than mutual companies, but only a very weakly significant relationship is found. Hedging has historically been viewed as not beneficial to shareholders, as they can diversify more efficiently than the firms can hedge. However some more recent counter arguments to this are cited - mostly along the lines that hedging can actually increase firm income in some cases. An example of this reasoning that the authors do not mention is that hedging can increase the value of the insurance contract, by reducing the probability of insurer default, and thus increase company income through improved market access and higher rates. It can also lower the cost of capital thereby reducing debt service costs and increasing the present value of future earnings.

The weakness of the relationship found may be due to mutual companies using derivative transactions as proxies for capital, which they have reduced capacity to raise otherwise.

### **Line of Business**

For property-casualty companies, having commercial liability reserves seems to decrease the probability of derivative activity, while having large auto physical damage reserves seems to increase the probability of writing options. Commercial liability has a long payout pattern for a property-casualty line, and this is hypothesized as leading to less need for hedging by providing a duration match for the long term bonds that dominate property-casualty insurer portfolios. This is somewhat questionable, however, in that these reserves are also subject to inflationary pressures that might accompany higher interest rates. It could be the

imperfect correlation between inflation and interest rates that leads to the reduced hedging observed.

Large reserves in short tailed lines sounds like an oxymoron, and the relationship to increased derivative activity may be just an additional size effect. However, if these indicate a lack of long tailed reserves, this may provide reason to hedge long bonds, as the authors hypothesize. Yet this should be picked up by the long-tail reserve dummy. This area seems to need further study.

For life-health companies, having large individual or group life reserves seems to be significant in predicting the use of swaps, forwards, and collars. The authors hypothesize for individual life this may be due to imbedded options within the life contracts, but this does not appear to explain the parallel result for group life, which is, if anything, even stronger. Issuing GIC's seems to lead to less use of derivatives, hypothesized to be due to their shorter term. However, hedging activity might be expected by issuers of GIC's, to help guarantee performance.

### **Other Investments**

Investing in stocks and real estate is found to be associated with derivative use by property-casualty companies. If the derivatives are used for income enhancement, the use of these vehicles may represent a different, more risk taking company attitude towards investment than the bond only strategy, which has been regarded as more conservative. It was in fact more conservative in statement accounting before bonds had to be marked to market. On the other hand, the derivatives may be used for hedging, which would leave open the possibility that insurers who invest in stocks and real estate are not less risk averse than other insurers.

Life companies who invest in CMO's use more swaps and futures, which does make sense as a hedging activity. However it would be informative to see how this varies with different types of CMS's. Investing in longer maturity government bonds seems to increase the use of derivatives for both life and property-casualty insurers.

It may be interesting to relate hedging activity with trading volume, as much of the hedging may be for short term purposes relating to turnover. For instance, if an investor were anticipating buying bonds and thought rates were going to fall, then it might buy futures temporarily to lock in the rate.

### Reinsurance

For life companies, buying reinsurance is significantly positively related to writing options, while for property-casualty companies it is significantly negatively related. The reasons for this are really a topic for further research, especially as to the types of options being written. The authors speculate that life companies may be writing bond options as part of their asset-liability management process, and that this reduced volatility may reduce the need for reinsurance. They present as an alternative that these life companies are taking on volatility through options and simultaneously reducing other types of volatility with reinsurance.

For property-casualty companies, the authors see writing options as potentially a risk-taking income enhancement strategy similar to keeping insurance risk net - companies who like one would like the other. It would be interesting to test this over time as reinsurance gets cheaper or more expensive to see if buying more reinsurance is accompanied by more or less options writing.

## **HEDGING INSURANCE RISK**

While the emphasis of the paper is on hedging financial risk, the significant relationships found to reinsurance suggest that derivatives are also used in the context of hedging insurance risk.

Some of these questions about where to hedge -through options or reinsurance - are being confronted for the first time in other contexts. Catastrophe PCS options traded at the Chicago Board of Trade can be viewed as investment or synthetic reinsurance. And it is a question that will confront insurers and reinsurers as they evaluate whether or not they will invest in catastrophe bonds such as those promoted by the California Earthquake Authority. Property-casualty companies will be able to take that risk on the liability side of the balance sheet through traditional underwriting. Or they can take that risk on the asset side of their balance sheet through their investment portfolio by buying catastrophe bonds. One may have greater liquidity; the other may have greater leverage. With more deals coming in the future, as the increased interest by insurers in such transactions suggests will happen, there may be stronger links between investments that are derivative-like in character and the liabilities or the reinsurance activities of the portfolio.

This paper presents some important groundwork for determining who might and might not be attracted to these areas of endeavor.