The Reinsurance Business of the Future: Improving Capital Efficiency

By Bruce B. Thomas

Reinsurance supplies the insurance industry with capital: intellectual capital, informational capital, and most importantly, financial capital. Reinsurance increases the capital efficiency of the insurance industry by promoting best practices among insurers and supplying relatively cheap, temporary capital while helping insurers reduce the volatility of their loss experience.

Today, the greatest challenge and opportunity facing the reinsurance industry is to improve the capital efficiency of the insurance industry. Appreciating the opportunity reinsurers have requires an understanding of why capital is important to insurers, an assessment of how well the insurance industry uses capital, a consideration of the reasons why the insurance industry is an inefficient user of capital, and an understanding of how reinsurers can help improve capital efficiency.

Greater capital efficiency will be achieved through better and more efficient mechanisms for dispersing risk, both within and outside of the insurance and reinsurance industries. Many of these advancements will represent relatively small improvements to existing practices using technology more fully. Other improvements will represent entirely new business models that fundamentally change the way the reinsurance industry thinks about distribution, underwriting and risk aggregation.

Insurers Need Capital

Capital is critically important in the insurance industry because of the potential for under-pricing. Insurers price risk based on their knowledge of historical loss experience and their loss models. Although they cannot be certain what the risk of loss is for a given entity or type of occurrence, they can reduce the chance that their loss estimates will be significantly wrong by assembling many similar risks.[1] Despite their best efforts, loss estimation is fraught with peril in a world that is constantly changing.

Demographic and technological changes as well as changes in the legal, political, economic and physical environments tend to make losses more or less frequent and severe over time. The result is that the price of insurance is often higher or lower than the underlying economics would suggest it should be after all the costs are known. Nevertheless, the amount of mis-pricing is usually small enough so that it can be adjusted over time without any important repercussions.

Maintaining a stable relationship between price and cost is an essential part of any market, but it is particularly challenging in the insurance business where the price is fixed in advance and the costs may not be known for years to come. If the price is too high, customers will seek other means of managing risk. Conversely, if the price is too low, customers may be pleased in the short-run and disappointed over the longer-term as the

[1] Insurance works based on a statistical premise or theorem called the "law of large numbers." In essence, this premise states that the more independent exposures an insurer has, the more accurate will be its loss estimation.

insurer's capital base is diminished, and it becomes unable to honor its contractual commitments.

Capital gives policyholders confidence that an insurer will be able to pay claims despite periods of unusually high losses. This financial buffer also permits an insurer to stay in the market after a period of adversity and re-price its future coverage, at presumably higher and more adequate rates.

Insurers must have enough capital to pay claims and maintain their ability to write future business, but how much is enough? Just as policyholders and regulators lose confidence in an insurer's ability to pay claims if it does not have enough capital, investors have no reason to support a company that does not generate adequate returns. Thus, capital efficiency implies that a company has the right amount of capital to meet its business needs *and* that it earns an appropriate rate or return on its capital.

Assessing Capital Efficiency

There is significant evidence that the insurance industry has not been an efficient user of capital. The table below compares the property/casualty industry's pretax profits against 10-year Treasury bond yields and total returns on large company stocks[2] during the years 1985 through 2002. In theory, mutual companies are owned by their policyholders, so it makes more sense for them to lower prices than to pay large dividends. Since mutual companies tend to depress the industry's overall return on surplus, it is more useful to compare stock companies' performance against these benchmarks.

Risk/Reward Comparison
(For Years 1985 - 2002)

	10-Yr Treasury Yields	Property/Casualty Companies' Pre-tax Return on Surplus			Total Returns on Large Company Stocks
		All	Stock	Mutual	
Average	7.02%	6.02%	7.31%	4.02%	13.95%
Excess Return Over 10-Yr. T. Bonds		-1.00%	0.29%	-3.00%	6.93%
Standard Deviation	1.57%	5.92%	6.78%	5.68%	17.68%
Excess Standard Deviation Over 10-Yr. T. Bonds		4.35%	5.21%	4.11%	16.10%
Excess Return / Excess Standard Deviation/100		-0.23%	0.06%	-0.73%	0.43%

Sources:
(1) Conning Research & Consulting
(2) 10 Year Treasury yields - Federal Reserve Statistical Release.
(3) Best's Aggregates & Averages – US P/C 2002 Edition.

Over this period, the average pretax return on surplus for stock insurers was 7.31 percent or 0.29 percent more than 10-year Treasury bond yields. However, stock insurer returns were several times more volatile, or risky, as measured by standard deviation. For every one percent increase in standard deviation, stock insurers added only six basis points[3] of

[2] Large company stock total returns are based on the S&P Composite Index which currently includes 500 of the largest stocks in the U.S. in terms of stock market value. This index is a market-value-weighted benchmark.

[3] There are 100 basis points in 1.0%. Thus, six basis points is the same as .06%.

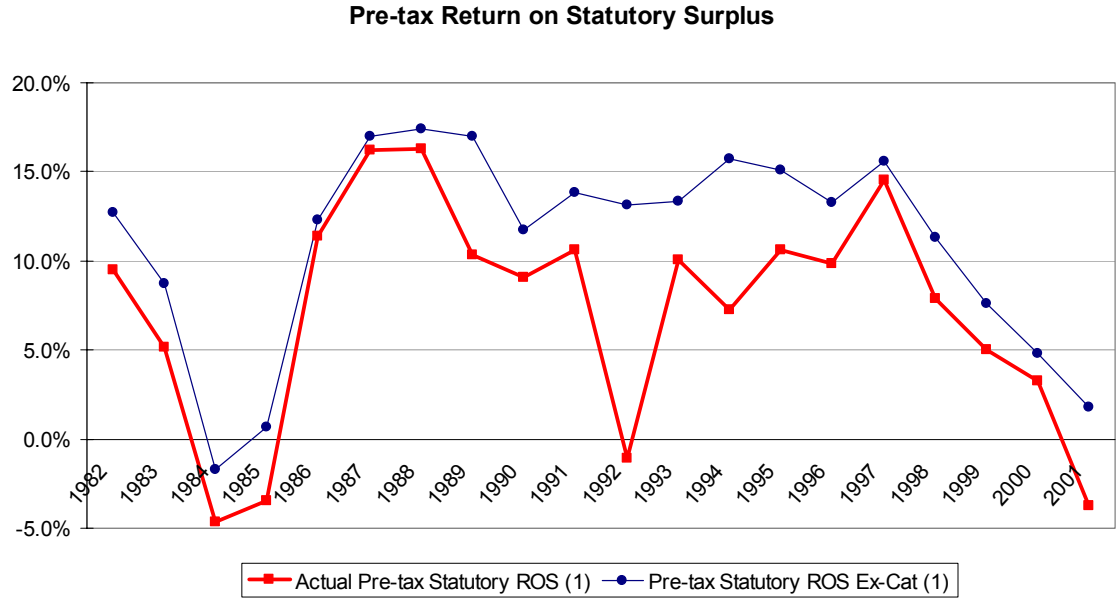
additional return over 10-year Treasury bond yields. While one would expect a higher return with increased risk, these returns are not high enough to justify the extra risk.

Large company stock returns also exhibited much more return volatility than Treasury bonds, but investors received average returns of 13.95 percent or 43 basis points of additional return for every extra percent of standard deviation. Risk adjusted, large company stock returns were almost eight times higher[4] than the pretax returns on surplus of stock insurers. There is nothing inherently wrong with greater return volatility, but investors should be compensated for taking on this additional risk.

There are three primary reasons why the insurance industry does not earn an adequate return on its capital. First, insurable losses can be quite volatile. Second, the regulatory, competitive and operational structures of the insurance industry often force companies to charge inadequate rates. Third, it is very expensive and time-consuming for insurers to raise capital, which makes them reluctant to relinquish it when they no longer have profitable opportunities. Each of these reasons warrants further analysis.

Loss Volatility

Since loss volatility is a prime reason for holding capital, one might expect that the insurance industry's capital inefficiency is a result of unexpected and extreme losses. But this is not the case. The chart below shows the pretax return on the property/casualty insurance industry's policyholders' surplus from 1983 through 2001, both with and without the effect of catastrophic loss experience. The standard deviation of pre-tax statutory returns on surplus was 6.0 percent including the effect of catastrophes and 5.3 percent after these losses were removed.



Sources:Best's Aggregates & Averages P/C US. 2002 Edition, Conning Research & Consulting Analysis.

[4] Six basis points of excess return for stock insurers versus 43 basis points of excess return for large company stocks.

The fact that catastrophes only marginally increase the volatility of the industry's profitability indicates that insurers have substantial control over their loss volatility.

One way that insurers can reduce loss volatility is to create portfolios of exposures that are diversified by geography, property-type, industry, size, regulatory regime, etc. They can diversify their exposures by growing in size and taking on more varied exposures or by using loss spreading mechanisms such as reinsurance.

The table below shows how loss volatility diminishes with increasing size. As expected, the volatility of loss experience of the largest companies in a given line of insurance is substantially higher than that of the same companies on a combined basis – as a group.[5] Furthermore, the loss volatility of a line of business for the industry as a whole is lower still.

Standard Deviation
Of Ultimate Paid Losses/Earned Premiums

	Average for Top 10 Group	Top 10 Group Composite	Industry	Top 10 Group As % of Industry
Commercial Liability	13%	11%	9%	39%
Workers' Compensation	17%	14%	13%	41%
Other Liability Occurrence	29%	21%	15%	42%
Other Liability Claims Made	28%	22%	21%	71%
Commercial Multiperil	12%	9%	8%	41%
Homeowners	11%	8%	7%	61%
Private Passenger Auto	5%	4%	4%	61%

Source: Conning Research & Consulting

Since the numbers above include the effect of reinsurance that companies have purchased, they demonstrate that there is still ample opportunity for companies to reduce their loss volatility by using various mechanisms to shift risk between companies *within* the industry.

Unfortunately, insurers are not able to take advantage of the full loss diversification potential that exists within the industry, because the benefits of additional risk reduction are not worth the extra cost. Currently reinsurers spend as much as 40 percent of the premiums they earn on underwriting, loss adjustment and other operating costs, which increases the cost of reinsurance. In effect, the lack of standardization in underwriting and loss adjustment results in very high transaction costs that limit the cost effectiveness of additional risk transfer.

[5] Using annual statement data, Conning estimated the ratio of ultimate paid losses to earned premiums for the most recent nine accident years for each company and computed a standard deviation for this range of ratios for individual companies, on a composite basis, and for the line of business in the industry as a whole. The resulting standard deviations indicate the potential for minimizing loss variation within the property/casualty industry.

Industry Structure

With so little of the insurance industry's loss volatility caused by catastrophes, it is apparent that much of the industry's loss volatility is caused by the regulatory, competitive, operational and capital structure of the industry itself. In effect, a large part of the problem is not loss volatility but pricing volatility.

Since state regulation of insurance is predominately concerned with ensuring that policyholders do not have to pay unreasonable rates for insurance, one can regard such regulation as a partial price ceiling[6] that may prevent insurers from earning reasonable returns on their capital. Worse still, state regulation can make it difficult and costly for insurers to leave unattractive markets, in effect, forcing them to accept inadequate returns.

Competition from mutual companies and state funds also makes it difficult for stock insurers to raise prices beyond a certain point. These entities are ostensibly more interested in serving policyholders and maintaining or increasing market share than in making profits. Given how competitive the insurance industry is, how much regulatory oversight it receives, how financially leveraged insurance companies are, and how undifferentiated most property/casualty products are, it is reasonable to conclude that large differences in pricing of similar products between insurers cannot persist over many years.

The cost structure of insurance companies also contributes to pricing instability. Insurers must keep their computer systems running and their highly specialized and experienced workers employed. While their costs are not fixed per se, it is much easier and more desirable for insurers to grow than to shrink, and they will seize any opportunity to increase the utilization of their productive capacity. In a mature business with little product differentiation, the easiest way of increasing volume is to reduce prices.

In competitive markets such as the U.S. insurance market, pricing or underwriting cycles are typically driven by changes in the supply of insurance, rather than the demand for it.[7] The supply of insurance is determined by how much capital the insurance industry has at a given point in time. If the insurance industry has too little capital, insurers raise prices dramatically, angering customers, upsetting regulators, and enticing new capital into the market. Alternatively, if the industry has too much capital, insurers destroy their excess capital by reducing prices in an attempt to preserve their market shares and productive capacity.

Capital Razing

Anything that impedes the flow of capital to and from the industry serves to distort pricing equilibrium. Most notably this includes regulatory constraints on insurers' ability to easily enter and exit markets, incentives that prevent insurers from relinquishing

[6] Most states confine their rate regulation activities to consumers and small businesses. In recent years, many states have exempted policies sold to large corporations from rate-making oversight.

[7] A Brief History of Underwriting Cycles, Stewart Economics, Inc., p.2.

capital when they have no profitable opportunities, and difficulties in accessing capital when insurance prices support suitable returns.

A significant lead time is usually required for companies to access the capital markets to ensure that they have fulfilled the mandates of the securities laws and to supply potential investors with information about the company, its markets, and its strategies. In addition to months of preparation, it is not unusual for companies to pay fees of as much as 7.0 percent of the proceeds of their common stock issuance. In many cases, these fees are roughly equivalent to one year's worth of income that an insurer would earn on the capital it raises.

Security Issuance Costs
For the Property-Casualty Industry
January 1, 1998 - June 9, 2003

	Gross Spread (%)		No. of Issues
Type of Security	Median	Average	Since 1/1/98
Common Stock	5.00	5.11	107
Straight Debt	3.15	2.97	194
Convertible Debt	2.50	2.55	8
Convertible Preferred	3.00	3.19	18
Non Convertible Preferred	3.15	3.09	25

Source: Thomson Financial SDC Platinum

Moreover, insurance companies are typically in the position of having to raise capital under the least favorable conditions, such as after a series of unprofitable years, when investors have every reason to be skeptical about their ability to earn profits. Try as they will to issue stock under favorable market conditions, they cannot know beforehand what price their stock will bring. Research shows that U.S. insurance companies issued stock at a price that was approximately 85.5 percent of their highest price during the preceding 52 weeks.[8]

Given the time and cost associated with raising new capital and the severe penalties that companies face for not having enough capital, it is no wonder that companies want to retain capital even if they cannot deploy it well. Returning capital to share and debt holders and raising it anew is too costly to contemplate. Besides, the insurance market is volatile, and lines that are highly unprofitable today may be very profitable next year.

Reinsurers' Role

[8] Conning Research & Consulting studied insurance companies domiciled in the U.S., Bermuda and the Cayman Islands that had follow-on stock offerings on U.S. exchanges from January 1, 1998 through May 30, 2003. Conning found that these issues on average were priced at 85.5 percent of the previous 52 week high price.

To remain vibrant, stock insurers must increase their income and reduce the amount of capital they use. Reinsurers can assist them do both of these things by helping them improve their risk management practices, create operating efficiencies and gain greater access to the capital markets.

Insurers cannot reduce the amount of capital that supports their businesses without fundamentally changing the nature of the risks that they assume and retain. However, they can limit their risks by using higher deductibles, reducing coverage amounts and introducing coinsurance. For example, many homeowner insurers have introduced catastrophe deductibles into their policy forms in recent years, shifting a portion of the loss experience back to their policyholders. Alternatively, they can exclude highly volatile losses from the coverage they write, such as they did by incorporating terrorism exclusions in their policies after September 11, 2001.

For each of these actions, reinsurers can help supply advice and knowledge. Reinsurers help instill and reinforce best practices in the insurance industry as new and better approaches to underwriting and claim practices are found. Because they factor underwriting, policy structure, claim practices and loss experience into their pricing considerations, reinsurers also play an important role in setting standards and allocating capital to those insurers who can most profitably employ it.

Reinsurance is particularly useful for increasing capital efficiency because it provides insurers with a means of achieving more stable underwriting results while giving them ready access to capital. Since this form of capital expires with the term of the reinsurance contract, it exits the insurance market as soon as insurers believe there are no profitable opportunities to employ it.

But reinsurers should not assume that they can only play a meaningful role if they use their financial capital. They can utilize their intellectual capital to advantage too. Reinsurers can help insurers reduce their loss volatility by employing other types of loss spreading mechanisms that permit third parties to finance the risk. Where they do not fund the risk directly, reinsurers can play a valuable role helping insurers and investors structure these transactions to create more diversified portfolios of exposures.

The fact is that certain types of risk can be more efficiently financed by investors on a direct basis. Nevertheless, investors need help from reinsurers to make this happen. In these instances, reinsurers need to change their mindsets and recognize that they can get paid for their expertise and knowledge as well as for their financial capital.

The Challenge Ahead

Over the last 15 years, the insurance industry has witnessed several large events that have destabilized the insurance and reinsurance industries and caused severe pricing volatility.[9] Whether natural or man-made, these large loss events have demonstrated the limits of the risk aggregation model that insurance and reinsurance are based on.

[9] A.M. Best Co. Inc. has reported that over the period of 1993 through 2002 there were 218 property/casualty insurer insolvencies. While the majority of these companies were small single-state or

The law of large numbers is predicated on the idea that losses from insured exposures are independent and that having more exposures will improve loss estimates. This principle enables insurers to write policy limits that are several hundred times higher than their capital. However, this principle only describes the normal experiences of the world. As such, it works most of the time, but fails miserably for very large unexpected loss events.

As losses from Hurricane Andrew, the Northridge Earthquake, the terrorist attacks of September 11 and the Summer 2003 power outage demonstrate, the more extreme the catastrophe, the more correlated individual exposures become. As a result, insurance and reinsurance are not very good mechanisms for pricing and funding the most extreme events.

Insurance and reinsurance work well for quantifiable uncertainty or "risk" but they are not very useful for dealing with the unknown. Leverage makes good sense when we are confident in our knowledge, but it is imprudent to use leverage in any other context. Since extreme loss events will always be just beyond our knowledge, insuring megacatastrophes without adequate pricing or funding mechanisms is a recipe for disaster.

Absent real knowledge, insured loss estimates are often biased toward recent history. When loss experience is better than expected, as it is most of the time for high severity events, people tend to change their loss estimates. Although they expect insurance to cover losses from large catastrophes, policyholders and regulators are reluctant to allow insurers to price for this risk or to build adequate reserves to pay for unusual loss experience.

By establishing a more liquid and transparent market for insurance risk through the capital markets, such conflicts over pricing and reserves might become irrelevant. Insurers and reinsurers might be able to escape the complexities of defending their catastrophe models by pointing instead to a publicly quoted price for catastrophe risk. With better pricing and funding mechanisms, they could also avoid the requirement of holding large amounts of capital.

The Journey Out and In

The reinsurance industry has traditionally played an important role in allocating capital to the most profitable opportunities within the insurance industry and in helping insurers diversify their loss experience. However, the loss volatility for the industry as a whole cannot be altered by shifting risks between companies within the industry, as noted above. To reduce the industry's loss volatility, risk must be shifted outside of the industry by transferring it directly to investors.

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regional insurers, many of them held important positions in the markets where they did business. Although the failure of large, diversified insurers is rare, it is not unusual for such companies to withdraw from lines of business or market segments where they are not able to earn competitive rates of return.

This approach has been tried in various ways over the past 10 years without major success. The options and futures traded by the Chicago Board of Trade and the Bermuda Commodities Exchange as well as various types of bonds with embedded catastrophe risk exemplify these attempts.

Each of these innovations has been greeted with trepidation by insurers and reinsurers. Furthermore, these efforts have not been widely accepted by the investment community because they require knowledge and expertise that investors do not generally possess. Insurance risk may help diversify investment portfolios, but investors fear they may be in a market where they are at an informational disadvantage. Investors are not interested in illiquid securities or markets where they are outsiders in an insider's game.

There are other issues, too. Transaction costs are often higher than in traditional deals due to legal and regulatory uncertainties and greater disclosure requirements. Insurers and reinsurers are also concerned about the potential for basis risk.[10]

Nevertheless, the basic direction of these transactions is right. Some parts of insurance risk must be transferred outside of the insurance and reinsurance industries to reduce earnings volatility and to increase capital efficiency. If reinsurers are going to be the gateway to the capital markets for the insurance industry, they will need to find ways to open up this passage.

Back to the Future

Like its past, the future of reinsurance will be about finding ways to improve capital efficiency. This will involve developing and exploiting new means of spreading risk while accessing and allocating capital in more cost-effective ways.

Achieving capital efficiency requires an emphasis on managing both capital *and* risk. Reinsurers play a central role in coordinating these efforts. Reinsurers can help chaperone insurance industry capital by setting guidelines about which types of risk are, and are not, insurable, and which types of risk should be ceded to other markets where they can be priced or funded more efficiently.

However, risk management is much more than just deciding which risks to take and which to pass on. It is also about managing the risks one has. In this regard, the reinsurance industry must play a much more active role in setting standards that will help minimize losses. Insurers can influence loss outcomes, and the knowledge that reinsurers obtain about best underwriting and loss adjustment practices must be shared and promoted.

Capital efficiency is as much about human capital as it is about financial capital. Absent expertise and knowledge, capital is easily wasted. Absent ingenuity and a willingness to innovate, new ways of doing business are ignored.

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[10] *Basis* is the difference between the portfolio loss and the hedge recovery. *Basis risk* is the risk of a mismatch between the pay-off from a contract and the loss on the underlying portfolio it was designed to hedge.

In addition to finding better ways of managing risks, reinsurers must find the will and the means of improving their operational efficiency. Reducing transaction and infrastructure costs will dramatically change the cost/benefit analysis that insurers perform when making decisions about reinsurance purchases and will make them opt for more reinsurance and greater risk diversification. Better spread of risk will mean less earnings volatility, less need for capital and greater earnings for the insurance and reinsurance industries.

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