Under Analysis

Evaluating retention levels in a hardening market.

by Stephen R. DiCenso

Very few companies are large enough or have sufficient risk appetite to fully retain all of their property/casualty commercial insurance risks. Moreover, the decision on what level of risk to retain is impacted by the state of the insurance market.

The signs of a firming insurance market—and likely soon to be hardening market—are upon us. Because market prices have been known to swing by upward of 50% in hard or soft markets, it's an ideal time for organizations to re-evaluate their total cost of risk.

Re-evaluating retentions will be based on a real world example that will:

- Estimate the expected annual retained losses (to assess average costs/savings).
- Estimate retained losses at higher confidence levels (to assess variability of results).
- Examine the impact of the market cycle on the insured (non-retained) costs.
- Review both per-occurrence and aggregate retentions (to assess risk tolerance).

For example, assume that a retailer is trying to finance its workers' compensation and general liability exposures in a cost-effective manner. The company has considered retaining losses as high as $2 million per occurrence; they regard losses—while infrequent—as too volatile to retain above that level.

While willing to retain as much as $2 million, due to the recent soft insurance market, the company has chosen a retention level of $100,000 per occurrence for workers' comp and general liability. With the onset of the hard market, what retention is optimal for the company?

Five different per-occurrence retentions will be considered: $100,000; $250,000; $500,000; $1 million and $2 million.

The retailer obtains quotes from its excess insurers to cover losses in excess of each retention level. Over time, market conditions for these quotes vary, from expected to soft (25% below expected) to hard (25% above expected). Estimated excess insurance premium quotes in the table in Figure 1 are thus based on the fluctuations in the market cycle.

Expected losses are modeled on a Monte Carlo simulation analysis. Excess premiums also include a loading for overhead and profit (varying based on risk level), and reflect market cycle premium adjustment factors based on publicly available market price indices.

The company then obtains actuarial estimates of its expected losses at each retention level, shown in Figure 2. These are the same regardless of the point in the insurance market pricing cycle.

These estimates are combined with the excess insurance quotes in Figure 1 to derive the total expected annual cost of risk (GL + WC) for each of the soft, expected and hard market cycles, as shown in Figure 3.

Key Points

- **The Big Picture:** The signs of a firming insurance market are appearing.
- **The Situation:** Because market prices can swing as much as 50% in hard or soft markets, it's an ideal time for companies to re-evaluate their total cost of risk.
- **Watch For:** Risk managers to use actuarial analysis to identify an optimal retention for their organizations that considers both expected costs and risk levels.

Figure 1
Excess Insurance Premium
($ thousand)

	Excess $100	Excess $250	Excess $500	Excess $1,000	Excess $2,000
Soft Market Premium	1,885	1,275	885	585	375
Expected Market Premium	2,355	1,590	1,105	735	465
Hard Market Premium	2,825	1,910	1,330	880	560

Figure 2
Expected Loss Level
($ thousand)

	$100 Retention	$250 Retention	$500 Retention	$1,000 Retention	$2,000 Retention
General Liability	651	857	995	1,105	1,187
Workers' Compensation	1,224	1,505	1,677	1,805	1,894
Total	1,875	2,362	2,672	2,910	3,081

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Figure 3
Total Expected Annual Cost of Risk
($ thousand)

	Excess $100	Excess $250	Excess $500	Excess $1,000	Excess $2,000
Soft Market	$3,760	$3,637	$3,557	$3,495	$3,456
Expected Market	$4,230	$3,952	$3,777	$3,645	$3,546
Hard Market	$4,700	$4,272	$4,002	$3,790	$3,641

In this example, the $2 million retention level consistently produces the lowest expected total cost of risk, no matter what point in the insurance market cycle.

Incomplete Outline

However, the picture is not really complete yet. The retained loss estimates in the table are average values. The problem with averages is that about half the time losses will be higher than the average—and about half the time they will be lower. Therefore, it is important to consider the variability of losses and to choose a retention level that is in line with the company's tolerance for risk.

The table in Figure 4 gives a more complete picture by showing the cost of risk not only at the expected, or average, level, but also under two additional scenarios:

- **The 75th percentile level** (that is, retained losses are expected to exceed this level about 25% of the time, or 25 times out of 100 years).
- **The 90th percentile level** (that is, retained losses are expected to exceed this level about 10% of the time, or 10 times out of 100 years).

Although the $2 million retention level consistently produced the lowest expected total cost of risk, no matter the market cycle, at higher percentiles (or confidence levels) of loss the results by retention level vary based on the market cycle.

At the 75th percentile level, the very high retentions ($1 million and $2 million) still look to be the best choices, being immaterially higher in the soft market and lower in the expected and hard markets. However, at the 90th percentile level, the $100,000 retention produces the lowest cost of risk in the soft market; the $250,000 retention produces the lowest cost of risk in the expected market; and the $250,000 to $500,000 retention levels produce the lowest costs of risk in the hard market.

Also, at the 90th percentile level, the $2 million retention produces generally the worst outcomes.

In general, lower per-occurrence retention will reduce the variability of losses. However, the market cycle definitely impacts the retention decision—the price for reducing the variability becomes too high as the market turns hard.

Sometimes, companies with relatively low tolerances for risk are willing to trade off a higher total cost at the expected level in return for a reduction in the variability of total cost. However, this may be a costly strategy when considering how much risk is truly being reduced. The table in Figure 5 compares the values in Figure 4 to the $100,000 retention level (that is, the percentage difference in costs between the selected retention and the $100,000 retention).

At an expected loss level, savings are generated at higher retentions relative to the $100,000 retention as the market hardens. Even when considering variability (like a 90th percentile loss level), relative savings are generated for all retention levels higher than $100,000, except for $2 million, under a hard market. In other words, total cost variability can be reduced at retention levels higher than $100,000 in a hard market.

Focusing again on the hard market, a $500,000 retention appears to be a balance point, as seen in Figure 5, where the savings "top out" at 4% for the $500,000 retention.

This can also be seen in the "box

Figure 4
Annual Cost of Risk at Higher Percentiles
($ thousand)

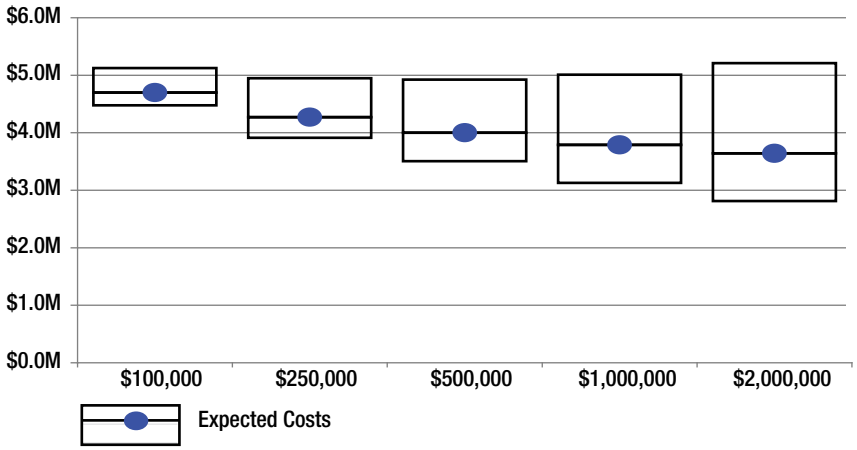
	$100 Retention	$250 Retention	$500 Retention	$1,000 Retention	$2,000 Retention
75th Percentile Loss Level					
Soft Market	3,966	3,965	3,998	4,038	4,097
Expected Market	4,436	4,280	4,218	4,188	4,187
Hard Market	4,906	4,600	4,443	4,333	4,282
90th Percentile Loss Level					
Soft Market	4,185	4,313	4,478	4,714	5,026
Expected Market	4,655	4,628	4,698	4,864	5,116
Hard Market	5,125	4,948	4,923	5,009	5,211

Figure 5
Savings / (Added Costs) vs. $100,000 Retention
($ thousand)

	$250 Retention	$500 Retention	$1,000 Retention	$2,000 Retention
Total Cost - Soft Market Premium				
Expected Loss Level	3%	5%	7%	8%
90th Percentile Loss Level	(3%)	(7%)	(13%)	(20%)
Total Cost - Expected Market Premium				
Expected Loss Level	7%	11%	14%	16%
90th Percentile Loss Level	1%	(1%)	(4%)	(10%)
Total Cost - Hard Market Premium				
Expected Loss Level	9%	15%	19%	23%
90th Percentile Loss Level	3%	4%	2%	(2%)

plot" chart in Figure 6. The lower line of the box represents the 25th percentile of costs, while the top line represents the 90th percentile of costs. The top line is the lowest cost level for the $500,000 retention.

Figure 6
Hard Market
(Projected Cost Ranges from 25th to 90th Percentile)



Notes: Based on 10,000 simulated years using @Risk with the following parameters:
GL Claim Frequency from a Poisson with a mean of 43.0.
WC Claim Frequency from a Poisson with a mean of 160.0.
GL Severity from a Log Normal distribution where μ = 8.1714 & σ = 2.0710.
WC Severity from a Log Normal distribution where = 7.0670 & σ = 2.1753.

Aggregate Retention

The underlying analysis also can help to prepare for negotiations for the price of aggregate coverage. Figure 7 shows the probability that the total cost of risk exceeds a certain risk tolerance level. (In this example, it was chosen as $5 million, which is a proxy for a fully loaded, first-dollar insurance premium.)

The probability of exceeding $5 million is most heavily influenced by the market cycle—it's almost a 1-in-5 chance (17.5%) that the company would exceed its long-term risk tolerance level of $5 million in a hard market at the $100,000 retention level. However, as one moves up to higher retentions, the probability of exceeding this risk tolerance becomes much more similar to the probabilities for the other phases of the market cycle.

In this example, as long as approximately a 10% probability (1-in-10 chance) of exceeding the risk tolerance is acceptable for the company, choosing a per-occurrence retention in the $250,000 to $500,000 range is potentially more financially advantageous, and there is no need for spending more to purchase an aggregate retention.

Other Considerations

The methodology described above will generate different results for different size companies. As one would expect, larger companies will see the ability to increase retention levels and smaller companies would see a balance point at lower retention levels.

In addition, there are some other factors that may influence a retention decision that have not been reflected in this methodology. Here are some additional considerations that should be incorporated when conducting a retention analysis:

- Cash flow is improved under a higher retention, leading to the opportunity to earn investment income on retained funds.
- Whether the retained risk is financed via a captive, a large deductible policy, or self-insurance will lead to different tax outcomes.
- This methodology included two lines of coverage. In general, the greater variety of risks that are retained, the lower the probability that a single-year adverse event will be material. Therefore, it is recommended to review the insurance program as a whole and not just one coverage at a time.
- The company should undertake a retention analysis to the extent that there are market dislocation factors and/or misinformation at work. In other words, the market may not evaluate a company's risks the same way the company does.

For example, the market may not give the company credit for risk management or safety programs, or it may view trends in actual loss experience differently. In turn, this may create a pocket where the market for a company seems hard, even if the industry as a whole is not.

Furthermore, there might be instances where the insurance market just does not want to take risk in a certain area below a certain limit. Thus, even if the market is soft, specific markets may be difficult for an individual company.

- The company's level of underlying risk may be higher or lower at varying times due to lines, classes and exposures written.
- There is a risk that the insurance carrier may ultimately not be able to pay claims. Selecting a lower retention results in an implicit contingent liability should the insurance company experience financial difficulty.
- Additional internal risk management

Figure 7
Likelihood of Total Costs Exceeding $5 Million
($ thousand)

	$100 Retention	$250 Retention	$500 Retention	$1,000 Retention	$2,000 Retention
Soft Market	0.1%	0.8%	2.8%	6.2%	10.2%
Expected Market	1.3%	2.8%	4.9%	8.0%	11.3%
Hard Market	17.5%	8.5%	8.3%	10.1%	12.4%

costs, if any, associated with managing higher retentions.

This real-world example serves to highlight the advantages, disadvantages and trade-offs associated with varying retention levels under different market conditions.

Risk managers understand that retentions may be allowed to rise in order to save costs during a hard market. With the use of an actuarial analysis, there is a means to identify an optimal retention for an organization that considers both expected costs and risk levels. BR

Pros and Cons of Lower vs. Higher Retention

Lower Retention		Higher Retention	
Pros	Cons	Pros	Cons
Lower risk of adverse loss experience	Reduced cash flow	Improved cash flow	Higher risk of adverse loss experience
May benefit from market soft-pricing	Increased impact of market cycles	Lessens impact of market pricing changes	Requires more internal expertise to manage
Fewer risk financing options available	Highest long-term average cost (paying for insurer's overhead and profit)	Lowest long-term average cost	More volatility in retained losses year-to-year
Less volatility in retained losses year-to-year	Greater reliance on insurer's financial viability	Flexibility in risk financing options and incentives to control costs	Allocation issues within company become more complex