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Actuarial Review of Insurer Insolvencies and Future Preventions—Phase 1

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Editor's Note: *For the feature article of this issue of* Risk Management, *we're pleased to bring you an adapted excerpt from the research report* Actuarial Review of Insurer Insolvencies and Future Preventions, *jointly sponsored by the Canadian Institute of Actuaries (CIA), the Casualty Actuarial Society (CAS) and the Society of Actuaries (SOA). This research studies insolvencies and impairments occurring between 1998 and 2015 across property and casualty, life and annuity, and health insurance in the United States and Canada. The study looks at the decisions made by the management teams, regulators and policyholders over the life cycle of the insolvency. There are four phases in this research project. The core section of the Phase I study—Section 2: Risk Factor Analysis—is published here. For the research background, all figures and the full report, visit the SOA website:* https://www.soa.org/research-reports/2018/actuarial-review-insurer-insolvencies/.

RISK FACTOR ANALYSIS

Some insurer insolvencies point to one primary causal driver, such as fraud. A majority of the insolvencies evolved from multiple risk factors. Further, the underlying causes can be interrelated or unrelated to one another. These dynamics add complexity to any study of insolvency risk drivers.

Many prior studies of insolvency isolate and attempt to quantify the impact of individual risk drivers. When factors are interrelated, this becomes a challenging and potentially highly judgmental exercise. We have reviewed individual risk factors and commented on potential impact from a qualitative perspective, but we have not attempted to quantify the impact on insolvency as a whole.

We focused on risk factors that can be used as leading rather than lagging indicators. This was accomplished by analyzing many of the risk factors over a five-year period prior to the insolvency.

U.S. insolvencies peaked in the early 1990s. Property and casualty (P&C) insolvencies far outnumber life and health. Health insolvencies increased in 2015 (and this has continued in 2016 and 2017). Health cooperatives in particular have had a significant incidence of failure in the U.S.

The Canadian regulatory system is more centralized than the U.S., leading to the question of whether this centralization has potentially contributed to lower insolvency rates. However, though U.S. insurer insolvency rates are higher than Canada's, the U.S. system has shown decreases in insolvency rates over time (Figures 1 and 2). The U.S. has also developed centralized tools over time, such as risk-based capital (RBC) and the Own Risk and Solvency Assessment, which give regulators additional monitoring opportunities.

Health insolvencies increased in 2015. Health cooperatives in particular have had a significant incidence of failure in the U.S.

Risk factors identified as significant in this research share a number of commonalities with previous Canadian research. Key P&C insolvency drivers identified in Canadian industry research include the following:

- Pricing inadequacy/reserve deficiencies (also noted as significant for the U.S.);
- Number of years in operation; and
- Rapid growth (also noted as significant for the U.S.).

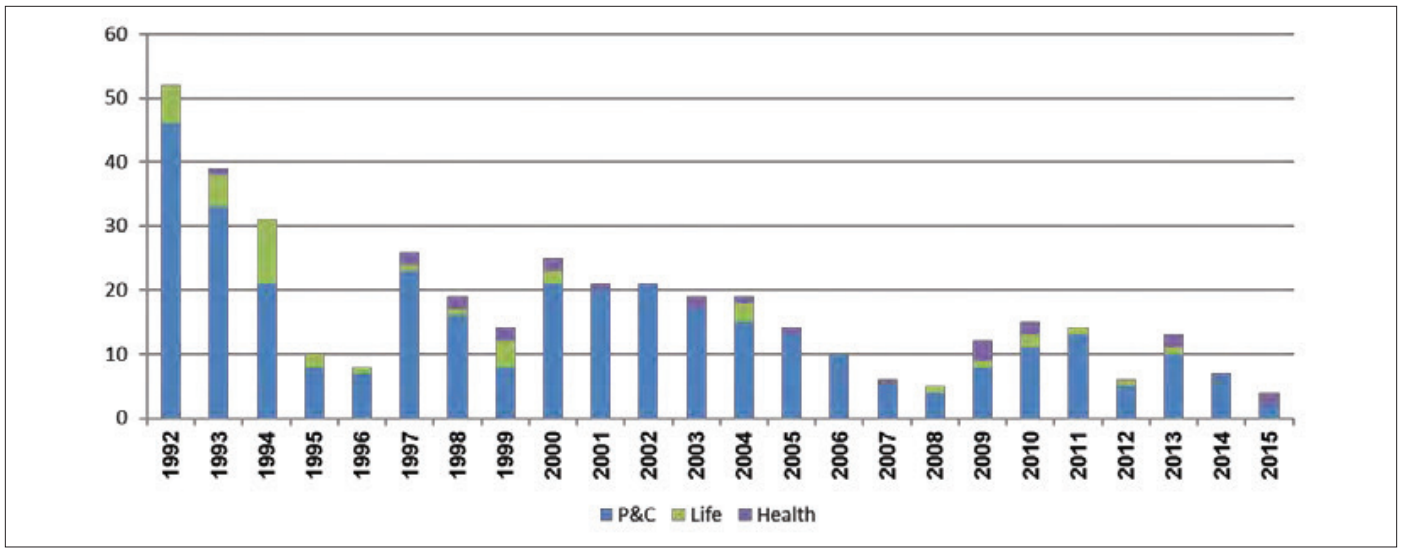
Other key factors noted in this research for the U.S. include the following:

- Liquidity;
- Investment risk; and
- Capital position (measured by risk-based capital (RBC) ratio).

Research and Literature Review

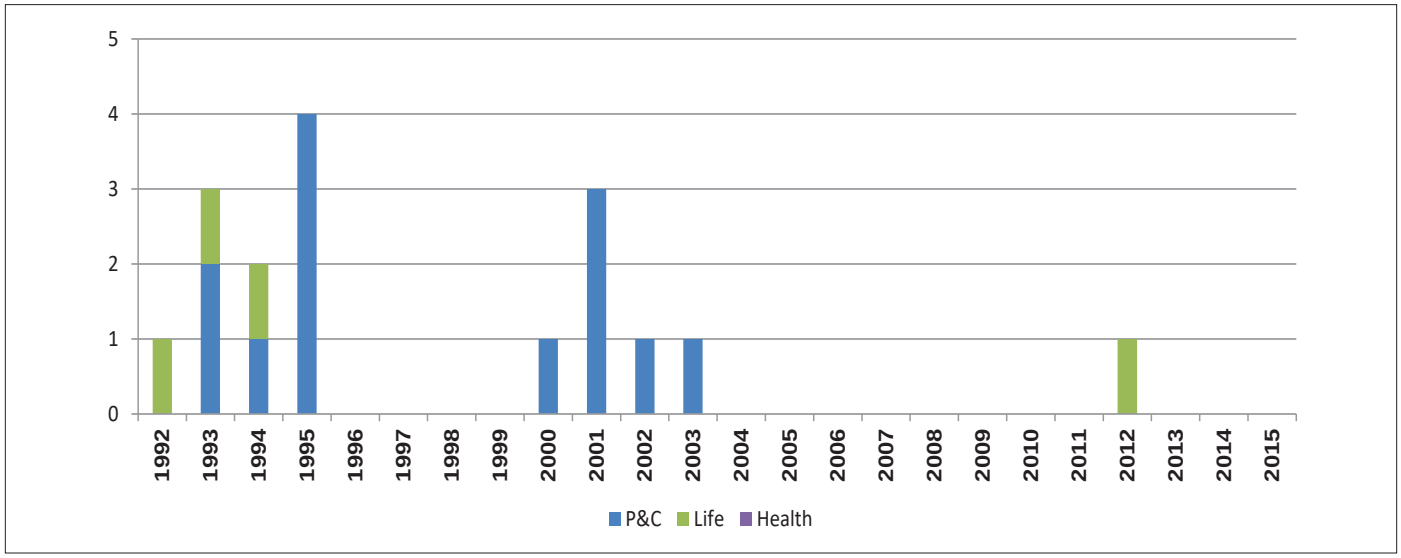
As a foundation for this study, we reviewed numerous prior works published by various U.S. and Canadian organizations and industry experts. A listing of sources considered in this research is included in the References (see full report).

Figure 1
Historical Number of U.S. Insolvencies by Year by Product Type



Sources: National Conference of Insurance Guaranty Funds (NCIGF) and the National Organization of Life & Health Insurance Guaranty Associations (NOLHGA).

Figure 2
Historical Number of Canadian Insolvencies by Year by Product Type



Sources: Assuris and Property and Casualty Insurance Compensation Corporation (PACICC).

This research differs from most prior insurance industry studies in that it includes representation from P&C, life and health companies in the analysis of underlying risk drivers.

Many of the risk factors for insolvency that were highlighted in prior works served as a starting point for the risk factors used in this study. However, the researchers made certain judgments in the measurement of particular risk factors, such as liquidity and profitability. These judgments were made in consultation with the Project Oversight Group.

Risk Factor Analysis: Findings and Observations

The risk factors we analyzed can be categorized as financial and demographic. Financial risk factors include premium growth, profitability, liquidity, investment mix, leverage and RBC ratio. Demographic risk factors include company size, years in operation, geographic concentration and product concentration.

Overall, our analysis suggested that the financial risk factors were useful indicators for insolvency. The financial risk factors in the insolvent sample analyzed generally show a greater proportion in higher risk brackets when compared to the industry. The demographic risk factors analyzed showed a less significant relationship between risk levels within the insolvent sample and the industry.

We found some commonality across financial risk factor strength by cohort. For example, the P&C personal lines had similar financial indicators. Health cooperatives appeared to show higher risk overall, confirming their unique operating model. Life and annuity proved to be differentiated in both leverage and years in operation risk factors. P&C commercial liability had indications that were more challenging to interpret (*Figure 3*).

Consistent with our U.S. review, Canadian studies by the Property and Casualty Insurance Compensation Corporation (PACICC) showed growth and profitability (pricing) as leading factors in insolvency. They also highlighted foreign parent as a significant factor, which was less evident in our review of U.S. companies.

Premium Growth

Significant premium growth in short time frames may be problematic for any insurer. Industry studies from the PACICC found that rapid growth was a primary cause of 17 percent and a contributing cause to 43 percent of P&C insolvencies in Canada.

Our review of premium growth as a risk factor among cohorts within the insolvent sample shows a varied risk mix (*Figure 4*).

Figure 3
Summary of Strongest Risk Factors by Cohort

		P&C Personal Auto	P&C Homeowners	P&C Workers Compensation	P&C Commercial Liability	Life & Annuity	Health incl. LTC	Health Cooperatives
Financial	Premium Growth	X	X	X	X	X	X	X
	Profitability		X	X	X		X	X
	Liquidity	X	X	X		X	X	X
	Investment	X	X	X	X	X		
	Leverage			X		X	X	
	Risk-Based Capital	X	X		X	X	X	X
Demographic	Company Size (S/M/L)	X				X		
	Number Of Years In Operation		X					X
	Geographic Concentration			X				X
	Product Concentration		X	X	X			

The homeowners and health cooperative cohorts have the largest proportion of high-growth companies within the insolvent companies.

A review of premium growth in the insolvent sample relative to the industry sample shows a higher risk mix in the insolvent sample, with the exception of commercial liability (*Figure 5*). This suggests that growth is a strong indicator of insolvency risk.

Profitability

There are specific examples of insolvencies that appear to result primarily from price inadequacy. For purposes of this study, we defined profitability as the cumulative five-year operating loss as a percentage of the initial (positive) adjusted capital (as measured by RBC) during the insurer's last five complete years of operation.

A review of profitability as a risk factor among cohorts within the insolvent sample shows personal auto and the health-related cohorts as the most susceptible to profitability issues.

A review of profitability in the insolvent sample relative to the industry sample shows a higher risk mix in the insolvent sample, with the exception of personal auto and life/annuity. This suggests that profitability is a strong indicator of insolvency risk (*Figure 6*).

A PACICC study by Suela Dibra and Darrell Leadbetter ("Why Insurers Fail," 2011) examines profitability using a different metric: reserves as a percentage of premium. This too pointed at price inadequacy as an insolvency driver (*Figure 7*).

Liquidity

For purposes of this study, we considered negative operating cash flow as indicative of liquidity risk. We ranked companies by the number of years within the last five during which negative operating cash flow occurred.

A review of liquidity in the insolvent sample to the industry sample shows a higher risk mix in the insolvent sample, with the exception of commercial liability. This suggests that liquidity challenges may be a significant indicator of insolvency risk (*Figure 8*).

The "Why Insurers Fail" Canadian study did not note liquidity as a significant risk factor. It is important to note that this study focused on P&C companies only and did not define liquidity in the same manner as used in this study.

The results suggest that in general for P&C, life and health companies, the occurrence of multiple years of negative operating cash flow is potentially a significant indicator of insolvency risk.

Investment

We defined investment risk based on the proportion of invested assets held in bonds and short-term investments (relatively "safe" instruments) as compared to total assets.

A review of investment in the insolvent sample to the industry sample shows a higher risk mix in the insolvent sample, with the exception of the health insurance cohorts. This suggests that investment mix may be a strong risk indicator for insolvency (*Figure 9*).

PACICC Canadian studies have also found higher concentrations of investments in relatively high-risk categories associated with insolvency risk (*Figure 10*).

Risk-Based Capital Ratio

The introduction of RBC requirements in the U.S. in 1994 sought to provide added measures to curb insolvency, by providing a metric to help identify weakly capitalized companies. While RBC is not an all-encompassing tool for solvency monitoring, it is notable that the rates of insurer insolvency in the U.S. declined significantly following the adoption of RBC.

A review of RBC ratio in the insolvent sample relative to the industry sample shows a higher risk mix in the insolvent sample. This suggests that RBC continues to be a strong indicator of potential insolvency risk (*Figure 11*).

There are potential challenges to using RBC as a predominant leading indicator for insolvency risk, however. To illustrate this challenge, we note the following with respect to the workers' compensation insolvencies:

- 31 percent of insolvent workers' compensation (WC) insurers had RBC ratios greater than 200 percent across a five-year history;
- 50 percent of insolvent WC insurers had a negative RBC ratio in the last year sampled;
- Of those with negative RBC, the years preceding showed a 20 percent–30 percent RBC decrease; and
- Most insolvent WC insurers had significant year-over-year volatility in RBC ratio in at least one annual period.

Further, the range of RBC values varies significantly across products and lines, making the potential risk range considerably wide. (See *Figures 12 and 13* for examples with WC and life and annuity industry RBC ratios.)

Product Concentration

We defined product concentration as the percentage of direct premium written in the largest line of business for those companies in the insolvent sample (*Figures 14–17*).

As expected, high product concentration risk is observed for health cooperatives. It can also be observed that product diversification does not appear to stand out as a key risk factor for the other cohorts, suggesting that such diversification is not necessarily correlated to less insolvency risk; other factors such as company management's experience, economic conditions and other factors may be more important in this context.

We did not compare the insolvent companies to broader industry counterparts for this risk factor, as the industry cohorts were defined on the basis of product concentration.

Years in Operation

Industry studies from the PACICC found that

> nearly 1/3 of Canadian P&C insurance companies that entered the market since 1980, exited involuntarily. The average age of these failed companies at the time of insolvency was 7.9 years.
>
> Analysis of the age distribution of 164 involuntarily-exited insurance companies incorporated since 1980 in the US and Canada suggests that the greatest risk of insolvency for a P&C insurance company is during the first six years, and 69.5% failed within the first ten years of operation.

A review of years in operation as a risk factor among cohorts within the insolvent sample shows mixed results, suggesting that years in operation may not be as significant a risk factor for U.S. insolvencies as is the case for Canadian insurers.

Company Size

Company size was based on the largest net written premium amount observed in the last five full years of company operations for the insolvent sample. We did not categorize small companies as indicative of higher risk from an insolvency perspective. It can be seen in the comparison to the broader industry results that company size does not appear to clearly indicate relative insolvency risk, as there is no observable pattern of small or large companies predominating the insolvent cohorts relative to their industry counterparts. Company size may therefore be less predictive of future insolvency as compared to other financial risk factors discussed previously.

Geographic Concentration

Geographic concentration was defined by the proportion of direct written premium for the insolvent company in its predominant state, as of the latest available point in time from statutory financial filings. It does not appear that geographic concentration distinguishes insolvent companies from the industry as a whole, and therefore this risk factor may be less predictive of insolvency risk.

Additional Analysis

Another dynamic of the risk factors that may merit future research is their volatility over time. In the example of leverage, we observed larger year-over-year variation in the insolvent sample relative to the industry samples by cohort. Lack of stability in the financial risk factors previously discussed could present another leading indicator to consider (*Figures 18 and 19*). ■

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