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Property and Casualty Insurance Compensation Corporation
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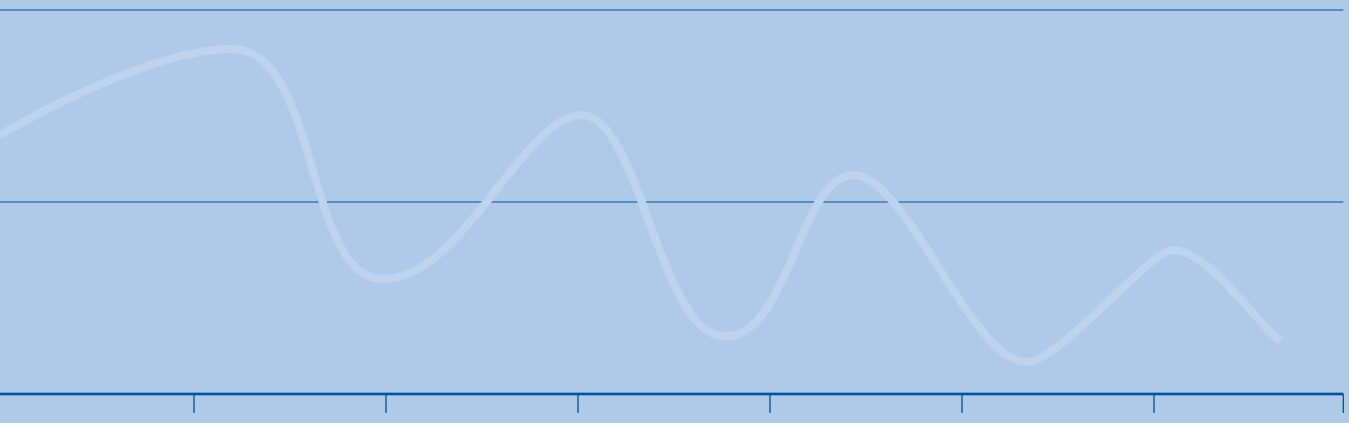
Why insurers fail

The dynamics of property and casualty insurance insolvency in Canada



By

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"We are never more in danger
than when we think ourselves most secure..."

WILLIAM COWPER (1731 – 1800)

Contents

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Executive summary

The incidence and cause of insolvency varies across time and jurisdictions. However there is an international consensus that inadequate pricing and deficient loss reserves are the leading causes of property and casualty (P&C) insurer insolvency. Other factors that contribute to insurer insolvency appear to depend on the specific risk exposures that may be experienced.

The costs of insurance insolvency in Canada have been substantially lower than most countries. However, the insolvency of insurance companies has been on the rise over the past few decades. There are a number of factors behind this trend. Economic considerations include an insurance cycle that has been more volatile in recent years. Catastrophe exposures are increasing. Historically, property and casualty insurance company insolvency has occurred in waves that coincide with periods of low industry profitability.

Within this context, PACICC has conducted the first comprehensive study of the causes of insolvency in the property and casualty insurance industry in Canada. This study identifies some of the main characteristics of the 35 insolvencies that occurred during the 45 year period between 1960 and 2005.

The analysis in this paper reviews the insolvency related data to determine the relative importance of factors contributing to insurer insolvency. The main conclusions are:

- the incidence of insolvency in the 1990s was higher than that of the 1980s, which was in turn higher than preceding decades
- inadequate pricing and deficient loss reserves are the leading causes of failure for Canadian insurance companies
- the incidence of insurer insolvency varies with industry profitability and the underwriting cycle
- new insurers are more likely to fail than established insurers, and insurer survival rates for new entrants tend to stabilize after a decade of operation.

Introduction

Since the Property and Casualty Insurance Compensation Corporation (PACICC) was established in 1989, it has secured funding from members for the failure of a property and casualty (P&C) insurance company in twelve of the seventeen years of its operation. For member insurers, the likelihood of an insolvency assessment in any given year is significant. While the frequency has been high, the size of those assessments has been low, an average of 0.03 percent of industry premium, but it has been increasing at nearly three times the rate of inflation.[1]

For consumers, insurance is a key risk management strategy so it is important to minimize the disruption of an insurance company insolvency. Insurer insolvency exposes claimants and policyholders to an unexpected financial loss and may potentially be associated with considerable personal and economic cost. Further, the insurance industry is built on policyholder confidence that insurance contracts will be fulfilled and eligible claims paid. Insurer insolvency may therefore lead to reduced confidence in financial institutions. Supporting this, data from the Office of the Superintendent of Bankruptcy and the Organization for Economic Cooperation and Development show a strong negative relationship between consumer confidence and measures of business insolvency.

Fortunately, the solvency supervisory system for insurance in Canada is sound and among international jurisdictions, the Canadian risk of insurer insolvency is low to moderate. Nevertheless, while P&C insurance insolvencies are relatively rare, they do occur. PACICC was founded in 1989 with a mission to protect eligible policyholders from undue financial loss in the event that a member insurer becomes insolvent. Since it was established, PACICC has participated in the winding-up and liquidation of 12 companies doing business in Canada.

Insolvency is a term that in various contexts can have different meanings. For this report, an insolvency is an involuntary exit from the market precipitated by a winding-up order issued by the appropriate supervisory authority. Insurance companies may be wound-up when they become an insolvency risk or a liquidity risk. An insolvency risk occurs when assets become insufficient for an insurance company to meet its contractual and other financial obligations.[2] An insurer experiences a liquidity risk when it has sufficient assets to cover its obligations but there is a high level of risk that those assets could disappear. Historically all liquidity risks have been branch companies, which are run out of their foreign home office. Only OSFI may supervise branch companies. Troubled insurance companies that exited the market through mergers (so called "near misses") or run-off are not included in this analysis.[3] Throughout this paper, the term involuntary market exit is used, encompassing both insolvency and liquidity risks.

[1] The liabilities of wound-up insurers during recent years (2000 – 2005) were twice that of the liabilities of the first five years of operation (1989 – 1994). According to the Bank of Canada, inflation increased by 36.9% between 1990 and 2005.

[2] Given the complex and long term nature on many lines of business, even accurately measuring the assets or liabilities of an insurance company may be challenging. Therefore an insurance company may be deemed insolvent if the estimated assets are insufficient to meet the company's obligations with a very high level of confidence (for example 95% to 99%).

[3] An estimated 42 companies, with approximately $1 billion in liabilities, are in run-off in Canada. BarNiv and Hathorn (1997) found that distressed mergers comprised 20% to 46% of merged insurers.

A historical overview of insurer insolvency in Canada

The involuntary exit of insurance companies is not random or completely unpredictable. While some causes of involuntary exit have remained consistent, others have exhibited changing patterns over time. Improvements in solvency supervision and the winding-up of insurance companies can be achieved through better understanding of the causes of insolvency. Within this context, PACICC has conducted the first comprehensive study of the causes of involuntary market exit in the P&C insurance industry in Canada. This study identifies some of the main characteristics of the 35 involuntary market exits that occurred during the 45 year period between 1960 and 2005.

Characteristics of insolvent companies

Size	68% had less than $10 million in capital
Ownership	31% were subsidiaries or branches of a failed parent company
Type of license	two-thirds were federally supervised
Age	28% of insolvent Canadian insurers operated for less than 10 years
Growth	68 % experienced unusual growth in premiums
Underwriting	70% occurred in property and auto lines

Second last year data on capital and net premiums written were used for size and underwriting categories

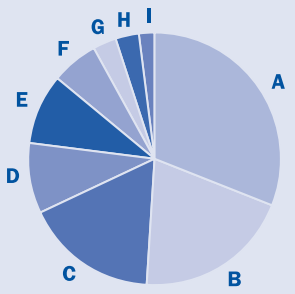
Foreign-owned insurance companies are important participants in Canada's P&C insurance market, accounting for approximately two-thirds of net premiums earned. For consumers, competition, access to foreign capital and the diversification of risk generate benefits in the form of lower prices, innovation and financially sound companies. However, it does mean that on some occasions, when a foreign parent exits the market involuntarily, the Canadian operations may also fail or in the case of branches present a liquidity risk to Canadian policyholders.

It can be important to distinguish between Canadian (whether foreign or Canadian owned) and branch companies. Canadian insurers fail as a result of their operation and exposure to the Canadian economic/underwriting environment while branch companies may fail because the home office company in a foreign jurisdiction has failed due to the economic/underwriting environment in a foreign jurisdiction.

The following exhibit presents a summary of the main (proximate) cause of involuntary exit identified for the 35 involuntary exits that occurred between 1960 and 2005.

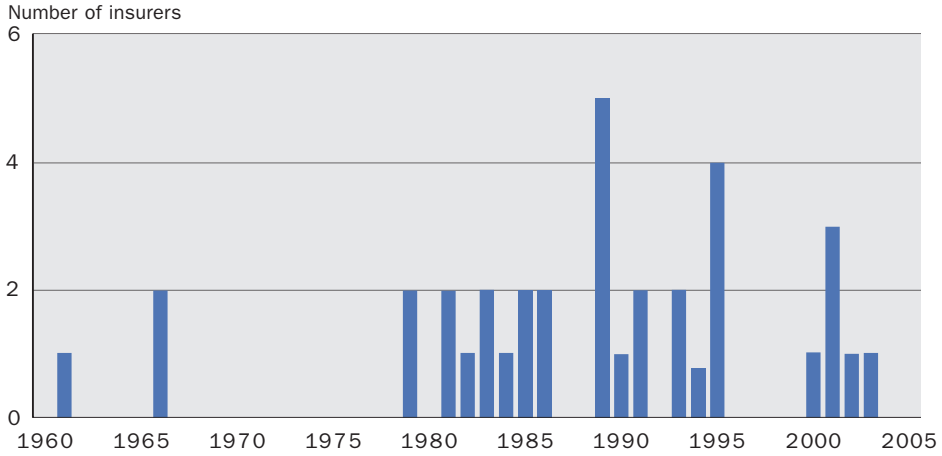
Exhibit 1 – Proximate causes of involuntary exit (1960 – 2005)

A	Inadequate pricing or deficient loss reserves (DLR)	31%
B	Foreign parent (other)	20%
C	Rapid growth	17%
D	Foreign parent (DLR)	9%
E	Alleged fraud	9%
F	Overstated assets	6%
G	Reinsurance	3%
H	Affiliate	3%
I	Catastrophe losses	3%



Since 1960 the Canadian P&C insurance industry encountered three waves of involuntary exits, which coincided with periods of poor profitability. Two waves of involuntary exit took place after 1990, with 57% of all exits since 1960 occurring in the past fifteen years. In addition, there has been a shift in the nature of involuntary exits. The number of such institutions under federal supervision has declined.

Exhibit 2 – Involuntary exits in Canada



Source: PACICC

In addition, all but one of the institutions supervised by the federal government wound-up since 1990 were liquidity risks rather than an insolvency risk, reflecting the mandate of the Office of the Superintendent of Financial Institutions (OSFI) to protect Canadian policyholders in instances where the foreign parent insurer failed. The number of company involuntary exits supervised by provincial regulators nearly doubled from four in the thirty year period before 1990 to seven in the fifteen year period after 1990.

Exhibit 2 shows the annual number of P&C involuntary exits for the 45-year period from 1960 to 2005. The first wave of involuntary exits came in the early 1980s, which coincides both with reduced profitability in the insurance industry and a recessionary period for Canadian economy. Subsequent waves of involuntary exit similarly coincided with poor profitability and a worsening insurance cycle.

Literature review

There is an extensive literature on firm survival. Generally this literature focuses on the manufacturing sectors. The theoretical frameworks provide insights for the P&C insurance industry. In addition, there is a body of insurance industry specific literature that seeks to identify risk factors for insurance company involuntary exit.

Theoretical models

Although to our knowledge there are no theoretical models specific to insurance company survival, there are two frameworks for firm survival and exit. The first framework is a dynamic equilibrium model for a competitive industry that endogenously characterizes the process for the entry and exit of individual firms. The second, a hazard model approach, estimates a firm's probability of survival based on certain firm attributes.

Dynamic equilibrium model

An example of the dynamic equilibrium model framework is that developed by Hugo A. Hopenhayn (1992)[4]. In this framework, the industry is composed of a continuum of firms which produce a homogeneous product. The firms behave competitively by taking the output price (p) and input price (w) as given. The output of a firm is a function of a productivity shock, and labour. In this context, productivity is a measure of how well a firm produces the good or service. In a manufacturing context this may be related to traditional measures of output per period of time, but may have other dimensions. In the insurance industry for example, a shock may be an innovation in underwriting techniques (positive) or an increase in the frequency of natural disasters (negative).

The firm pays a fixed cost c_f when operating in the market. To enter the market, a new firm must pay an entry cost $c_e>0$. Prior to paying this entry cost a new entrant has not yet learned its input or output prices, as these functions are not fully known prior to entry. In some regards this is analogous to an insurer which is required to meet certain capital requirements (entry cost) before becoming licensed, and who is also without a claims history will have greater uncertainty in its costs.

Model parameters

fixed operating cost	c_f
entry cost	c_e
productivity:	ψ
output prices/premium	p
input price/costs	w
product demand	N (industry) n (firm)
reservation value	xt
profit	π (ψ,p,w)
output prices	q (ψ,p,w)
input prices	n (ψ,p,w)
firm production	q = f (ψ,n)
market exit	(ψ < x)
equilibrium reservation value	x*

In this model, profits, output and inputs are functions of productivity, output prices and input prices. Let π (ψ, p, w), q (ψ, p, w), and n (ψ, p, w) be the profit, output supply, and input demand functions. The only source of uncertainty in the model is firm specific shocks. This is analogous to the industry as a whole exhibiting predictable patterns but with heterogeneity among individual firms (for example, in terms of claims costs).

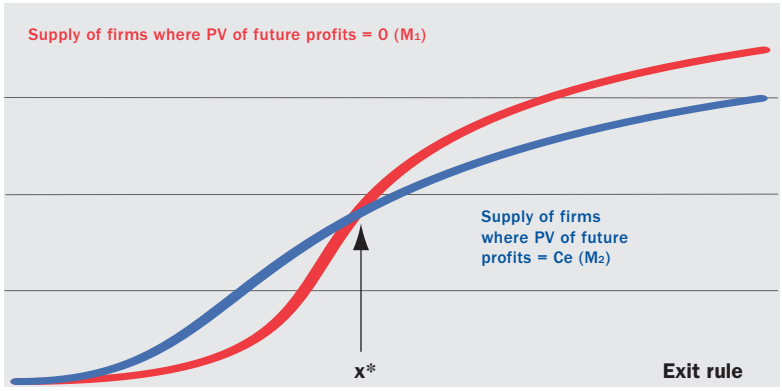
[4] Only a brief outline of the model is presented here. The model is fully outlined in Hopenhayn (1992). Variations of this model exist within the literature. Jovanovic (1982) pioneered innovative work on firm selection and survival and forms the basis from which Hopenhayn (1992) and others further developed.

Following each shock, firms and potential new entrants evaluate the environment and the value of the firm. An exit decision by a firm is determined by the firm's reservation value. This reservation value is a function of the firm's expected discounted value and represents the point where the firm is indifferent to operating or exiting the market. When a firm's productivity (ultimately affecting its value) falls below the reservation value, the firm exits the market.

New firms will enter the market until their expected discounted profits equal the cost of entry. A competitive equilibrium for the industry is attained when there are no further incentives to enter or exit the market. New firms will enter the market until expected discounted profits net of the entry cost is zero. In a competitive equilibrium setting, prices are market clearing and the exit rule is chosen optimally[5]. Figure 1 illustrates the existence of a stationary equilibrium

The model generates a number of specific predictions.[6] Of particular interest is the effect that changes in some of the parameters of the industry have on the equilbrium. Any change in these parameters would create an incentive/disincentive to enter or exit the market.

Figure 1



Source: PACICC, based on H. Hopenhayn, 1992. "Entry, Exit and frm Dynamics in Long run Equillibrium" Econometrica, Volume 60, Number 5

One implication of the model is that the rate of survival will be higher for older firms and so will average size, profits and value of firms. This implies that exit (including both voluntary/solvent and involuntary exits) rates will be lower for older firms (this is more formally outlined in the corollary of Proposition 4, Hopenhayn (1992)).

Changes in the cost of entry increases the profit that a firm must earn in order to stay in the market. In Figure 1, an increase in the cost of entry (for example due to additional regulation) shifts the M_2 curve downwards, lowering the reservation value. As a result, more firms satisfy the exit condition in the current period. Therefore the model predicts that higher costs of entry will reduce the number of firms as lower productivity firms exit the market. In subsequent periods, the industry experiences lower firm turnover, including reduced involuntary exit. Existing firms earn higher profits and are protected from new entrants by the higher entry costs.

[5] In Hopenhayn (1992), m(x, M) is an invariant measure (which is well defined, jointly continuous, decreasing in x and increasing in M) for the exit rule x and entry mass M. Then a stationary equilibrium for the industry as a whole is given by (x, M, m). For a fixed exit rule, $M_1(x)$ is the entry rule such that for $m(x, M_1(x))$, x is chosen optimally. $M_2(x)$ is the mass of entrants required for expected discounted profits of entrants to equal the cost of entry.

[6] While not considered in the discussion, the density of firms near the exit point (and also the productivity distribution of firms) will have some bearing on the magnitude of results discussed. If the density of firms around the exit point is low, there may be little meaningful impact at the industry level.

Decreasing the cost of entry, for example lowering capital requirements, has the opposite effect. More firms are able to stay in or enter the market. For consumers this means increased choice and competition. However, lower productivity firms are more vulnerable to shocks, for example, adverse development or interest rate volatility. For lower costs of entry the model predicts higher firm turnover rates as companies exit and enter the market more frequently.

The predictions of the model are more ambigous for industry-wide shocks. In general, a large negative shock, for example through increased frequency and severity of natural disasters, in the short run will result in fewer firms as the industry adapts to the new environment. However, the model has no long-run predictions for turnover or involuntary exit rates following a negative industry wide shock.

Risk-based effects were not explicitly incorporated into the original discussion of the model. However, extending the model conceptually suggests that the introduction of firm specific risk-based effects would create an environment where the cost of entry is re-established in each period and moves with the risk profile of the firm. In general this suggests low productivity firms will either operate in low risk areas of the market or exit. Participation in higher risk areas of the market would require higher levels of productivity (expertise). Overall, turnover and involuntary exit rates are reduced. In general, the model would appear to imply that risk-based approaches to insurance supervision, such as the Minimum Capital Test (MCT) and the Branch Adequacy of Assets Test (BAAT) would act to reduce the incidence of involuntary exit.

Harzard model approaches

The second framework for the study of firm survival and failure, the hazard model approach, estimates a firm's probability of survival based on certain attributes. There are a number of noteworthy findings from this literature, including the role of management and age on firm survival.

Several studies, building on research by Dunne, Roberts and Samuelson (1988) found that diversified firms survive longer and grow faster than new entrants, but also that diversifying firms with experience in related fields perform better than less experienced entrants. Examples of this literature include Mitchell (1991), Carroll et al. (1996), and Klepper and Simons (2000).

A number of studies find that a strong reservoir of support is important for firm survival. For example, Klepper and Sleeper (2001) and Walsh, Kirchhoff and Boylan (1996) find that subsidiary companies survive longer than new stand alone companies. Further Klepper and Thompson (2002) demonstrate that the quality of a subsidiary's parent company is an important factor for survival. Eisenhardt and Schoonhoven (1990) report that firm performance is increasing in the industry experience of their management. Similarly, Thompson (2005) found that new entrants learn by doing, with results improving over time and that the prior experience of management is an important factor in firm survival rates.

Generally, this research literature has consistently found that:

- pre-entry experience has large and persistent effects on firm survival
- new entrants learn by doing, with improved results over time
- firms with more experienced managers have a higher survival rate
- survival rate is increasing with respect to age.

These research findings concerning firm survival or involuntary market exit are drawn from the manufacturing industry, but offer a number of lessons for the insurance industry. The lessons from both the dynamic equilibrium and hazard model frameworks are complementary and add to our overall understanding of the dynamics of insolvency. In general, the dynamic equilibrium model framework highlights the effect that environmental factors on firm entry and exit. The hazard model framework takes a stationary equilibrium and analyzes factors that move the market to a new equilibrium.

Empirical analysis

The incidence of involuntary exit has varied across time and jurisdictions. There exists a wealth of research concerning the insolvency issue in the P&C insurance industry internationally. The majority of these studies look at both internal and external environments to determine the main causes of insolvency. One of the most recent studies concerning the sources of P&C insurance involuntary exit is the A.M. Best's insolvency report (2004). This report examines 871 insurance companies identified as being financially impaired. The primary internal causes identified from the study were deficient loss reserves and inadequate pricing (which accounted for 37% of failures) and rapid growth (which accounted for an additional 22% of financial impairments).

The second most common cause of impairment, rapid growth, occurred most frequently during soft market conditions with weak industry profits. The study found that diminished capital strength drove insurers into aggressive expansion strategies, including business/lines where underwriting experience was lacking. Other significant causes of financial impairment identified by the A.M. Best study were fraud, overstatement of assets and catastrophe losses. It appeared that alleged fraud increased up to the early 1990s and declined afterwards as supervisory authorities introduced a number of reporting and corporate governance reforms and enhanced their supervision of the industry. Of particular interest is A.M. Best's opinion that "… all primary causes of financial impairments in this study were related to some form of mismanagement" (A.M. Best Insolvency Report, 2004).

A study by Financial Services Authority (FSA) in United Kingdom analyzed recent experiences of failed insurance companies across life and non-life sectors covering fifteen countries of the European Union. The FSA analysis is based upon the Sharma (2002) report. From 270 involuntary exits a sample of 21 cases was selected covering each of the main risks identified by the group members (in total 50 generic risks were identified). The FSA utilized a methodology linking all risks an insurance company faces into causal chains. A detailed cause and effect risk map for each case study was developed. This helped identify both the relative importance of a risk and also its ultimate impact (McDonnell, 2002).

The rationale underlying the risk map is that involuntary exit is not the outcome of a single factor but rather is the result of a wide range of different and interrelated causes. The risk map is composed of two types of underlying causes – internal and external (trigger cause). Each of two main groups of causes adversely affects policyholders through the causal chains. The FSA study concluded that over 60% of the companies showed poor underwriting or reserving as a contributing factor. Second in the list is asset risk stemming from investments whose value was likely to be adversely affected by the same occurrences leading to large claims, thus exposing the firm to a 'double gearing' effect. Other causes identified were management/governance, external causes and reinsurance risk. All the case studies had significant underlying management or governance issues.

There have also been research studies concerning involuntary exits in the Asian P&C insurance markets. Involuntary exits in most Asian insurance markets are unusual, as historically insurance supervisors in those markets have sought to prevent insurance company failures. Nonetheless, a number of research studies concerning the insolvency of insurers in the Asian P&C insurance market were identified.

A study by Chen and Wong (2004) that focuses on the insurance market in Singapore, Japan, Malaysia, and Taiwan uses financial ratios to classify the insurers as financially stable and unstable. A logit model was used to detect the impact that firm specific characteristics have on insurers' financial health. The authors found that firm size (measured by the total admitted assets), investment performance, liquidity and profitability ratios were positively related to financial health, while growth of surplus was negatively related to the insurer's financial health for Singapore. On the other hand, for all four countries included in this study, the authors found a negative correlation between combined ratio and the financial health. Lee & Urrutia (1996) found similar results when they tested the explanatory power of firm-specific characteristics on the financial impairment of insurers in the United States. Findings from the Asian market study differ slightly from the A.M. Best and FSA studies. Certain factors such as premium growth appeared to have an insignificant effect on insurer financial health for the Asian market, while for the U.S. market it represented the second most important cause of involuntary exit.

All three studies noted the impact that the external environment has on an insurer's financial health. All three studies show an adverse effect of interest rates and inflation on insurance companies' performance. During rising stock markets, or inflationary periods, insurers can earn a satisfactory overall operating profit but at the same time claims costs rise faster than under-priced policies. Consistent with the A.M. Best study, Browne and Hoyt (1995) also found that unanticipated changes in inflation and interest rate levels were not significant predictors for involuntary exit in the U.S. industry.

The costs of insolvency

Involuntary insurance exits in Canada may be rare but they do occur. When an insurer becomes an insolvency or liquidity risk, policyholders face potential financial losses as they may lose their unearned premium and their claims may not be paid in full or on a timely basis.

In addition to the claims-related costs of guarantee funds, A.M. Best (2004) notes that the full costs associated with involuntary exit are difficult to measure, since in addition to claims costs and unearned premiums, they include costs incurred by the regulatory authorities, agents, accountants and reinsurers. Additional costs also include the lost wages, commissions, taxes and other expenditures of liquidated insurers.

While not the full cost, the simplest measure of the costs of involuntary exit are the insolvent insurer's claims and unearned premium payments borne by the surviving insurance companies in the industry. As the national guarantee fund, PACICC was established in 1989 to protect policyholders from undue financial loss in the event that a member insurance company exited the market involuntarily. In the event of an involuntary exit, PACICC assesses member companies for the resources required to pay loss claims and unearned premiums, up to its limits, on eligible policies. Claimants and policyholders of the insolvent insurer exchange their status as a creditor (up to the limit of their compensation from PACICC – if their claim exceeds PACICC limits, they may continue to be a creditor to the estate for the excess amounts) to the estate in return for receiving claims or unearned premium payments. This reduces the potential financial loss as policyholders and claimants receive compensation in a timely manner rather than waiting for periodic dividends issue from the estate, a process that can take more than a decade for certain claims to be settled.

PACICC has successfully funded the involuntary exit of 12 P&C insurance companies doing business in Canada, paying or setting aside resources for the payment of $150 million in respect of claims by policyholders and claimants of the insolvent insurers.

Exhibit 3 – International comparison of involuntary exit costs (2000 – 2005)

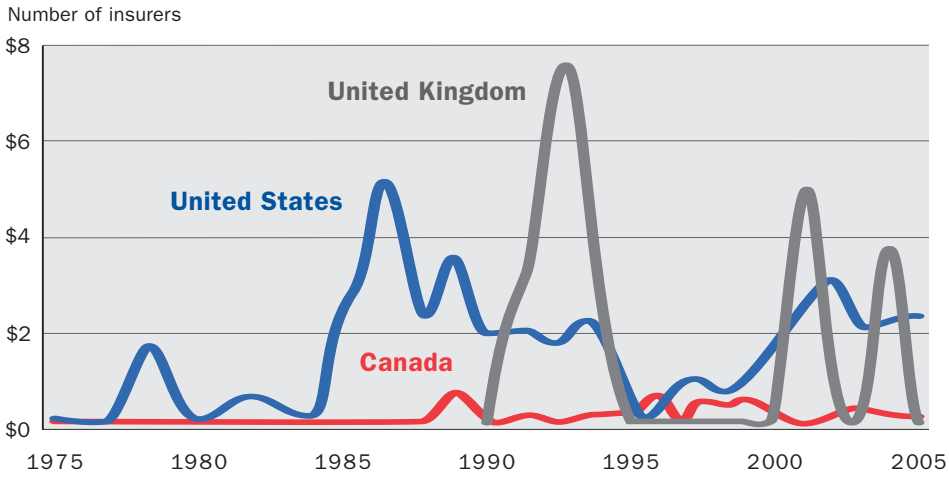
	Canada	United States	United Kingdom
Value of assessments ($ CDN)	$22,391,284*	$6,333,294,590†	$574,264,417
Number of insolvencies	6	201	4
Cost of insolvency per $1,000 net premium written	0.13	2.44	1.47
Guarantee fund	PACICC	State guarantee funds	Financial Services Compensation Scheme

* In two instances PACICC was able to secure loan agreements with the estate of an insolvent insurer that reduced the guarantee fund's assessment requirements by $53 million. PACICC's cost of insolvency per $1,000 NPW would have increased to 0.43 if these assessments had been made.

† Net assessments, which is payment costs (of $9.4 billion CDN) less recoveries from past liquidations that can be used for current failures

By comparable international standards, the costs of involuntary exit in Canada have been substantially lower than elsewhere. An important difference in paying the costs of an insolvency is the treatment of the dividends that a guarantee fund receives as a creditor of an estate. In the United States and the United Kingdom dividends from liquidated estates are used to reduce current or future assessment needs. In comparison, PACICC is required to return liquidation dividends to the solvent members of the industry. Previous assessments for prior involuntary exits are not used in Canada to pay for current or future insolvencies. As a result, the guarantee fund liquidation costs in Canada net of liquidation dividends are actually lower than the gross costs shown in Exhibit 4.

Exhibit 4 – P&C guarantee fund liqidation costs



Source: PACICC with data from NCIGF, III, FSCS, OECD

Assessments for the payment of claims have typically trended with the frequency of insolvency, generally lagging by a year. The delay in assessment is a result of two factors: the court-appointed liquidator requiring time to assess the financial status of the estate and the need for PACICC to properly identify the assessment base. Where there is broader availability of data, an assessment may occur within the first few months following a wind-up. Where data are less available it may take twelve to sixteen months to complete the assessment process.[7]

[7] To assess its member companies, PACICC currently uses publicly available data, supplemented by special requests of superintendents of insurance

External factors influencing insolvency

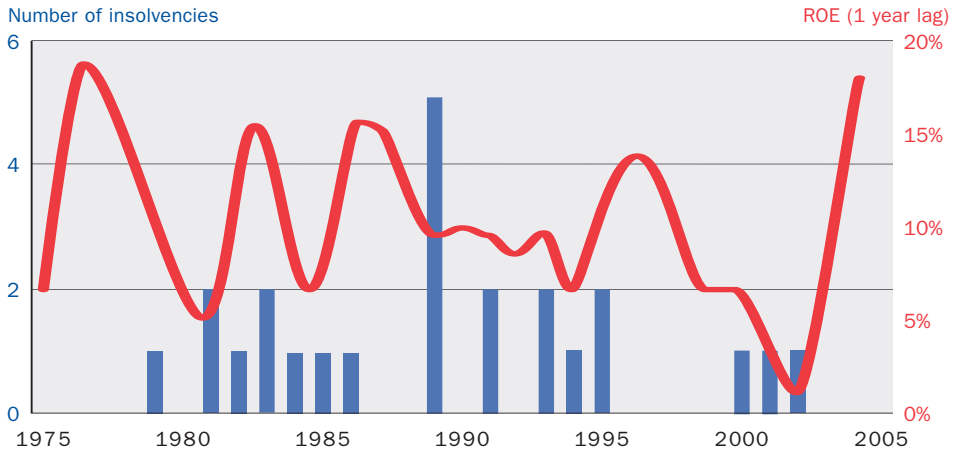
A challenging operating environment may exacerbate financial problems in an already vulnerable company – one that may otherwise have been able to survive in a more favourable environment. In particular, volatility in the operating environment, experienced through sudden, unexpected changes in economic conditions can trigger an involuntary market exit. While the external environment is unlikely to be the primary cause of involuntary exit, it may exacerbate vulnerabilities and reduce earnings and increase a company's probability of exiting.

A recent study by Cummins and Phillips (2005) found that P&C insurers are more sensitive to financial distress than all other industries. Insurers have a number of potential exposures to external shocks including the domestic underwriting cycle, increased frequency and severity of extreme weather events, general economic and financial market volatility and international developments (shocks to the reinsurance system, mobility of capital etc) as a result of the growing international nature of the industry. As a result, international insurers are becoming more sophisticated in identifying their true cost of capital and allocating it accordingly. While this has not been manifested by any failures during the recent cycle, insurers are increasingly looking at the true cost of capital when making capital allocations.[8]

Underwriting cycle and profitability

The involuntary exit of insurers is closely linked to profitability and the insurance cycle. Public confidence in insurance companies is built on the expectation that insurance contracts will be fulfilled and eligible claims paid. Capital is the foundation of this confidence, allowing insurers to absorb unexpected losses. Capital provides protection for policy-holders in the event of unexpected or catastrophic losses.

Exhibit 5 – Insurance cycle and Canadian insurer insolvency



For some companies, periods of poor profitability increase the risk of insolvency as already limited capital may be further eroded by claims development. In the United States, the A.M. Best (2004) study suggests a high correlation (60%) between the underwriting cycle and insolvency. In Canada, this correlation is not as strong, about half that of the United States. In part, this is due to the larger importance that foreign companies play in the Canadian marketplace, as nearly one-third of insolvencies in Canada have been the result of a foreign parent failing.

[8] In most cases an unprofitable subsidiary is placed into solvent run-off but in a few cases international groups have been known to let subsidiaries fail. As noted previously, an estimated 42 companies, with approximately $1 billion in liabilities, are in run-off in Canada

As Exhibit 5 illustrates, the involuntary exit of Canadian insurance companies (excluding those insolvencies that occurred as a result of a foreign parent's failure) is closely linked with the underwriting cycle and profitability. Involuntary exits increase during periods of poor profitability and decline during periods of improved profitability.

In the mid 1980s and early 1990s the P&C insurance industry experienced two waves of involuntary exits. The first wave coincided with the market softening between 1977 and 1980.

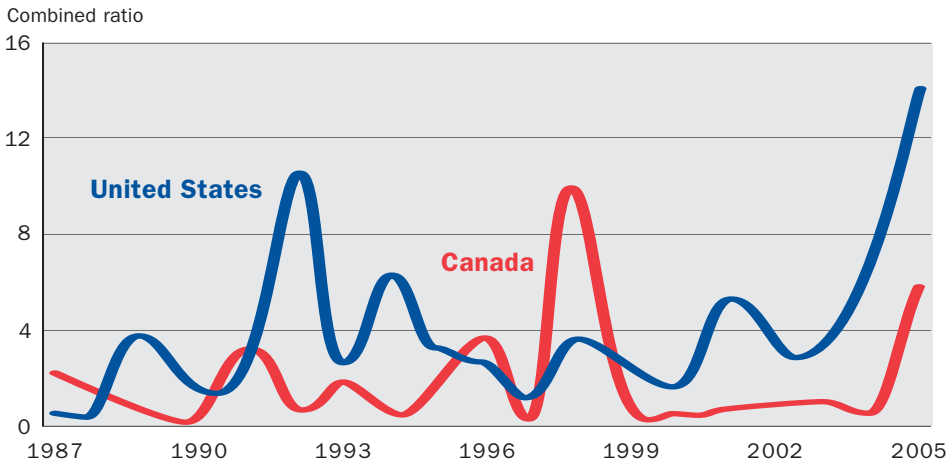
The second wave followed the beginning of the longest (1988 - 1995) soft market in Canadian insurance history. During this period, 16 companies failed – almost half of the total throughout the 45 year span between 1960 and 2005. The latest wave of involuntary exits commenced during 2000, which also coincided with a soft market and a recessionary period.

Of particular interest is the pattern of change in the Canadian insurance cycle as the length and severity – as measured by the distance from peak to trough – appears to have increased.

Catastrophe losses

Severe weather and industrial disasters are some of the key catastrophe risks that can contribute to P&C insurance solvency. Historically, catastrophe losses have had a modest impact on the financial health of insurance companies as Canadian exposure to large severe weather events such as hurricanes, is modest. During the period between 1987 and 2005, the impact of insured catastrophe losses in Canada, has been on average approximately half that of the United States. Exhibit 6 compares the impact of catastrophe losses on the industry combined ratio.[9]

Exhibit 6 – Increase in the combined ratio due to catastrophe losses



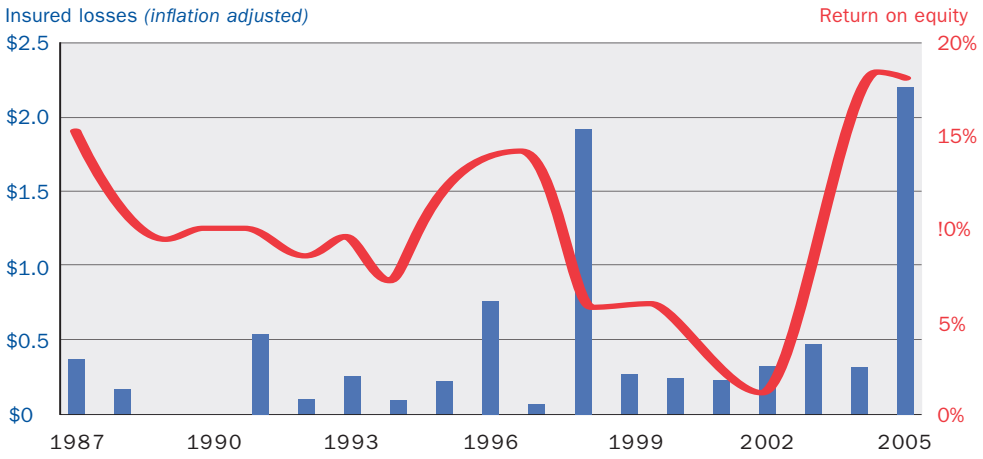
Source: PACICC with data from IBC and III

A.M. Best (2004) found that 8.2% (21 companies) of financial impairments in the United States between 1992 and 2002 were the result of a catastrophic loss. This was an increase of nearly 40% compared with the previous two decades, moving catastrophic loss from the eighth largest cause of insurer impairment to the fourth. According to A.M. Best data, during that decade, six of the ten largest U.S. catastrophes occurred (measured in inflation-adjusted terms). Hurricane Andrew (1992) alone, with associated claims costs of $29.5 billion dollars (CDN) caused 11 insurance companies to fail.

[9] Catastrophe points represent the number of points that catastrophe losses contribute to the combined ratio.

There is a moderately strong negative correlation between the financial health of the U.S. industry (as measured by return on equity) and the size of catastrophe losses between 1988 and 2004. In fact, the correlation coefficient is -33%. However, this relationship masks some significant changes that have occurred since Hurricane Andrew. The correlation coefficient between catastrophe losses and financial health was much stronger for the period 1988 to 1996 (-88%) than since 1996 (-4%). The results are similar when compared against insolvency rates.

Exhibit 7 – Canadian catastrophe loss and financial health



Source: PACICC with data from IBC

Although insured losses from natural disasters in Canada have demonstrated an upward trend during the past decade, they remain relatively low compared to total industry claims costs. Excluding the large losses of 1998 and 2005, catastrophe losses contribute only 1.2 points, on average, to the combined ratio. Data on insured losses and industry profitability (ROE) show insignificant correlation between the two (-0.03%) with one year lag. The large catastrophe losses incurred in 1998 and 2005 both fortuitously occurred in strong earnings environments, permitting the industry to absorb the losses without involuntary exit. Overall, of the 35 companies analyzed in our study, only one company (3%) exited the market due to disaster losses. Nevertheless, natural disasters have contributed to a small number of companies exiting the market through voluntary run-off.

Economic and financial market factors

In recent decades, the economic business cycle and the underwriting cycle in Canada have often overlapped. Frequently the downside of the cycles further weakened already vulnerable companies and resulted in a number of companies exiting the market in an involuntary market exits (1980, 1990, and 2000 recessions).

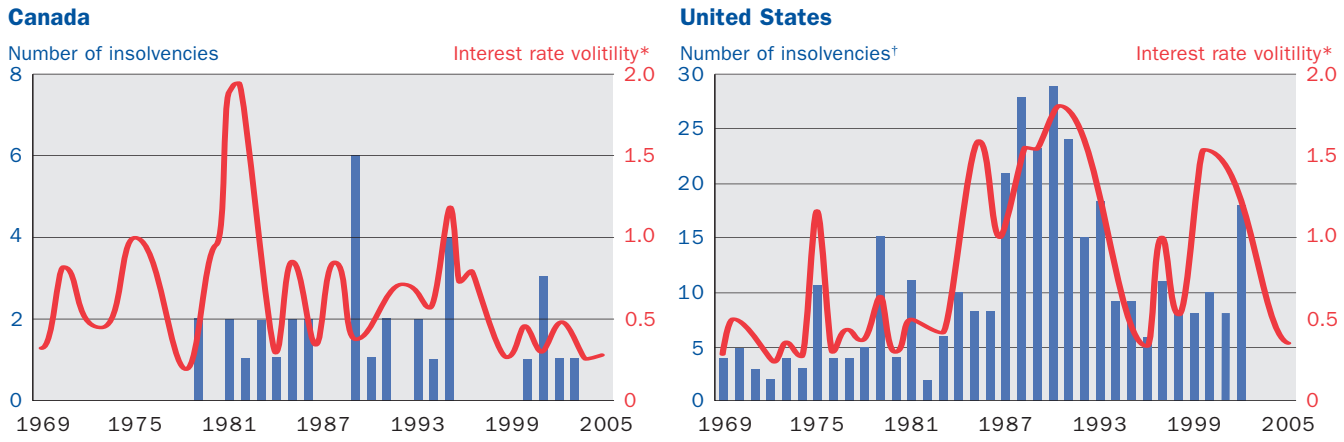
The key risk associated with economic and financial market factors is not the level of the financial variables, for example interest rates, but their volatility. Research by PACICC and A.M. Best (2004) found little correlation between interest rate levels and financial impairment. However, a volatile financial environment, even in a period of relatively low interest rate levels, increases the risk of involuntary exit for vulnerable companies. At the extremes, two rules generally hold: volatility increases risk of financial impairment; while a stable environment tends to reduce risk.

Overall, solvency risk is heightened when elevated economic volatility coincides with a softening in the underwriting cycle. This occurred in the mid 1980s and early 1990s, periods with a high level of involuntary exits in both Canada and the United States.

According to data from Statistics Canada, the P&C insurance industry experienced an underwriting loss every year during the twenty-four year period between 1978 and 2003. During this period insurance companies generally charged policyholders a premium level that was a cumulative $17 billion less than actuarially necessary to pay claims and expenses.[10] Insurance companies invested the premiums to earn sufficient investment income from the premiums to compensate for the underwriting loss. The greater the reliance on investment income for financial health, the greater exposure to economic and financial market risks.

Interest rate changes are generally gradual. Bond portfolios turn over steadily and an increase in market interest rates is usually accompanied by an increase in the book valuation rate for assets, which lowers interest rate risk. Interest rate risk is more likely to be significant where there is

Exhibit 8 – Interest rate volitility and involuntary exit



*Standard deviation of Government of Canada 3-5 year bonds and treasury yields lagged 1 year.

†Insolvencies with overstated assets and unknown cause.

Source: PACICC, with data from Statisitics Canada, A.M. Best and Federal Reserve

increased rate volatility, and historically the involuntary exit rate for insurers is at least partially correlated with volatility in interest rates. Generally underrated, interest rate risk appears to have been a contributing factor in approximately 40% of P&C insurer failures in the United States – and many in Canada.

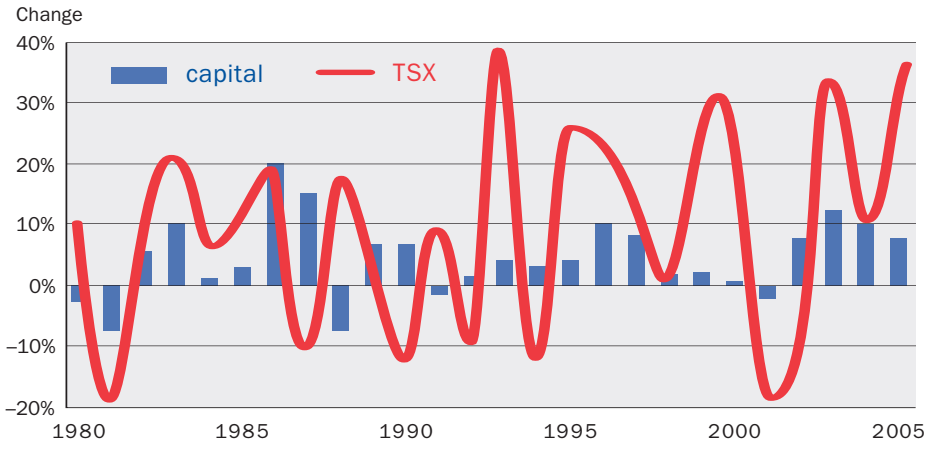
As illustrated in Exhibit 9, the aggregate impact of equity prices on insurance company capital, is limited. With the effects of inflation removed, changes in equity prices did not generate large changes in capital. The exceptions of the early 1980s may reflect a greater investment in equity markets than existed in later periods. Decreases in equity prices exhibit only a weak relationship to involuntary exit. During the failures of the 1980s, equity markets were largely doing well, with annual returns exceeding 10% during the period when the insolvencies occurred.

[10] In current dollars. In 2006 consistant dollars, the figure would be $26.4 billion.

Similarly in the mid-1990s, the peak year of involuntary exit coincided with equity prices increasing by 23.7%. While the failures of 2001 and 2002 coincided with a bear market, none of these exiting companies were significantly invested in equity markets.

A.M. Best found that the rate of financial impairment and changes in capital exhibited strong relationships with equity markets. The weaker relationship in Canada is due to the limited exposure that Canadian insurance companies have historically had to equity markets, as their portfolios have largely consisted of fixed income securities. Between 1990 and 2005 (the period for which data exist), Canadian insurance industry on average invested only 12.1% of their assets in equities.[11]

Exhibit 9 – Year-end changes in TSX and inflation-adjusted capital



Source: PACICC, with data from TSX and IBC

International exposures

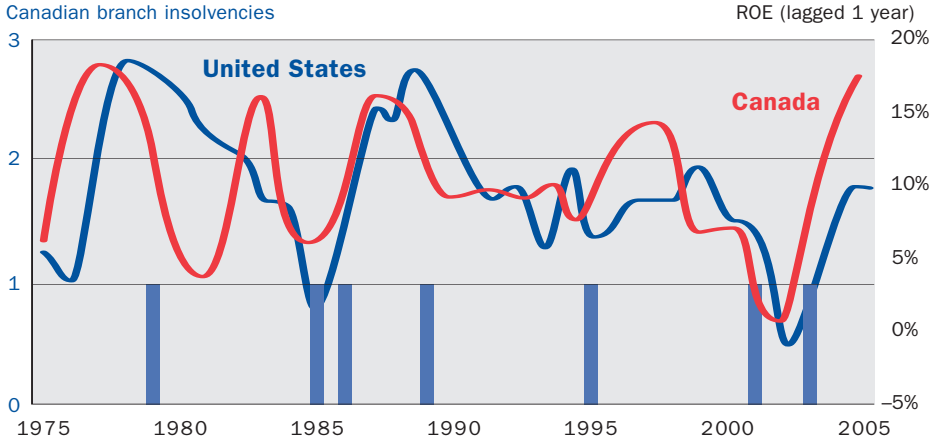
Canada's insurance market is one of the most international and dynamic in the world. Nearly two-thirds of the Canadian P&C insurance industry is foreign-owned. Overall, the international nature of the insurance industry benefits insurance consumers by increasing competition, permitting greater risk diversification, and allowing access to international sources of capital to underwrite Canadian risks.

Research is mixed on whether being foreign-owned is correlated with firm survival. Bernard and Sjöholm (2003), Esteve Pérez et al. (2004), and Alvarez and Görg (2005) – using data from Indonesian, Spanish, and Chilean manufacturing industries, respectively – found that multinationals are more likely to exit. A possible explanation of this as being related to the opportunities available to multinationals, which can relatively easily shift production from one country to another in the presence of adverse changes in one country. However, in contrast to the others, Kimura and Fujii (2003) did not find any statistically significant evidence in Japan that firms owned by foreigners are more likely to exit. While financial services such as P&C insurance are not substantively similar to manufacturing industries, 64% of insurers in run-off are foreign owned companies.

[11] In recent years, the U.S. industry's exposure to equities has been about twice that of Canadian insurers. For example, in 2005, equities comprised less than 9% of insurer assets in Canada. In the U.S., equities represented 16.3% of insurer assets. In addition, it should be noted that branch companies typically invest less in equities than Canadian companies but total investment in equities for both has been declining in recent years.

Nearly one-third of P&C insurance involuntary exits in Canada were attributable to the failure of a foreign parent. Of these, 60% were from the United States and 30% were British companies. A.M. Best (2004) did not identify foreign parent company risk as a source of failure in the United States.

Exhibit 10 – U.S. underwriting cycle and branch failure



Source: PACICC, with data from III and IBC

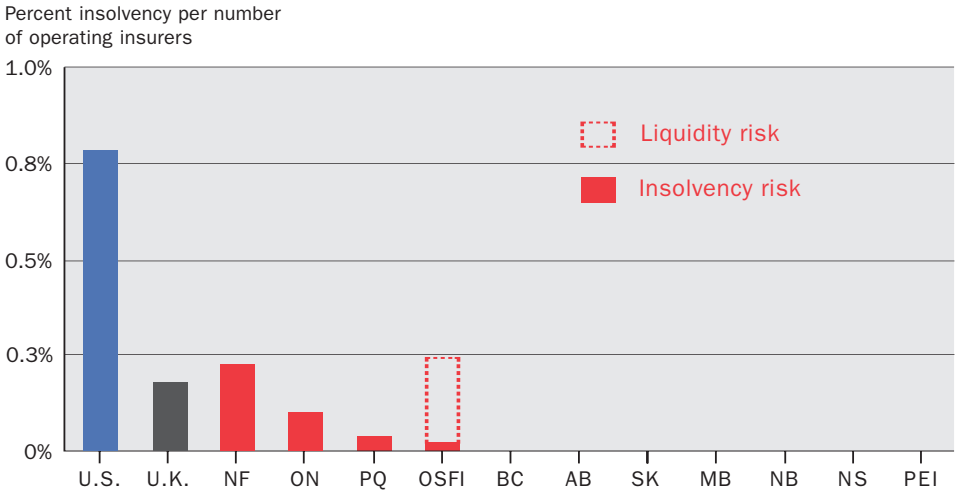
As shown in Exhibit 10, the winding-up of branch companies in Canada is closely correlated with upward trends in U.S. financial impairments (1995 is an exception).

Insolvency analysis by supervisory jurisdiction

Individual insurers are supervised for solvency purposes by the jurisdiction in which they are incorporated. Companies incorporated under the federal *Insurance Companies Act* are regulated by the Office of the Superintendent of Financial Institutions. Insurers incorporated under the various provincial insurance statutes are regulated by provincial superintendents of insurance. Currently there are approximately 158 provincially-regulated and 194 federally-regulated insurance companies writing $6.8 billion and $27.5 billion in premiums, respectively.

Provincial and federal supervisory authorities, through the Canadian Council of Insurance Regulators (CCIR), have been working to harmonize licensing and solvency standards. Appendix D compares the current minimum capital standards by supervisory jurisdiction. Comparing P&C insurer insolvency by supervisory jurisdiction through counts of involuntarily exiting companies can be misleading. A more relevant measure of comparison is frequency, which is defined as the number of involuntary exits as a proportion of the total number of insurers operating in the jurisdiction.

Exhibit 11 – P&C insolvency frequency by supervisory jurisdiction (1990 – 2005)



Source: PACICC

Frequency, on the basis of supervised institutions, shows Newfoundland to have the highest frequency of P&C insurance company insolvency in Canada. When only insolvency risks are considered (removing liquidity risks from the frequency calculation) the federal frequency falls by 88%. Since 1990, OSFI experienced only one insurer insolvency risk, but has wound-up a number of branch companies that represented liquidity risks when a foreign parent failed.[12]

The average frequency of involuntary exit (0.25%) for Canada is less than a third of that for the U.S. insurance industry and higher than the United Kingdom. However, when liquidity risks are excluded and only insolvency risks are compared, the Canadian frequency is less than one-quarter of that of the United States and similar to that of the United Kingdom.

[12] As branch companies involuntarily exit for reasons to do with their home jurisdiction rather than the Canadian market liquidity risks are represented separately by the un-shaded box.

Insolvency and company characteristics

External factors may contribute to an involuntary exit of an insurance company but they are never the exclusive cause of an involuntary exit. Effectively, every insurance company in the market (geographic or product) is exposed to catastrophes, volatility in interest rates or changes in equity prices. Therefore, the key question is, what characteristics distinguish companies that exit involuntarily from those that survive? PACICC has identified four characteristics that play a role in most insolvencies:

- governance and internal controls
- new entrants
- growth
- firm size.

In general, two or more of these characteristics can be observed in every involuntary exit reviewed.

Governance and internal controls

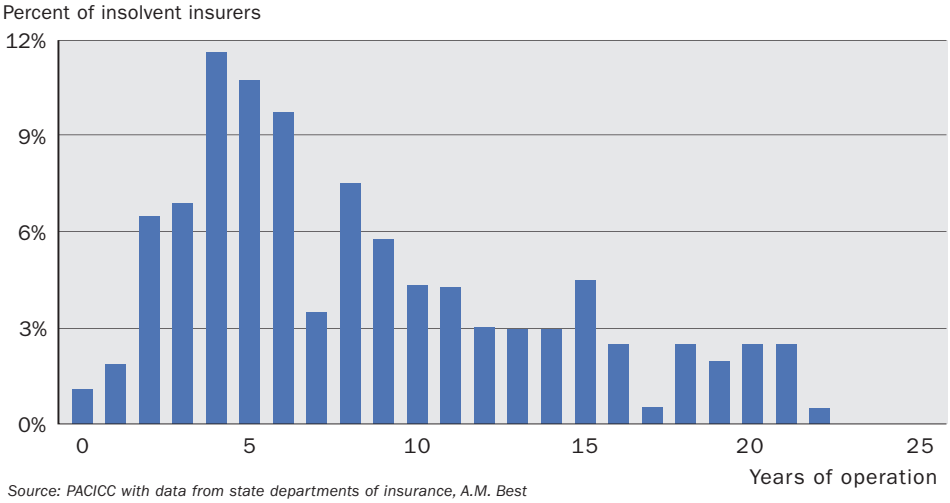
Both A.M. Best (2004) and McDonnell (2002) in their studies of U.S. and European insurance company involuntary exits found that management and governance issues appeared to lead to decisions or failed processes that caused companies to fail. Further a number of studies suggest that management styles and internal processes persist strongly over time (Nelson and Winter, 1982; Nelson, 1991; Dosi et al., 2000). Risks that are persistently poorly managed create an environment where an insurance company is more vulnerable to adverse external events. The A.M. Best (2004) and McDonnell (2002) findings are largely consistent with the firm survival research that links quality of management with firm survival. For the majority of the insolvencies in Canada (61%), the cause of involuntary exit can ultimately be traced to a strategic risk decision by management.

Internal controls and financial reporting are an important aspect for the accountability and operational efficiency of an insurance company. Internal controls and processes may break down for a number of reasons, but company solvency risk is further increased when they are purposefully circumvented. Alleged fraud was involved in three (9%) of the identified involuntary exits in the entire period covered in the study (1960-2005). It was also identified as a contributing factor to other insolvencies. Most of these failed companies were newly licensed and operating for less than three years.

New entrants

The research literature has consistently shown that the likelihood of firm survival tends to increase with the age of the firm. While the literature is largely confined to manufacturing industries, this finding holds across different sectors, time periods and even countries. The literature generally notes that new entrants face strong competition from companies already entrenched in the market and may have inexperienced management teams.

Exhibit 12 – Age distribution of insolvent insurance companies
(incorporated since 1980 – Cdn. & U.S. data)



Source: PACICC with data from state departments of insurance, A.M. Best

Nearly one-third (29.4%) 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 United States and Canada suggests that the greatest risk of insolvency for a P&C insurance company is during the first six years after start up. From the sample of involuntarily exiting insurers, 39% failed within the first five years, and 69.5% failed within the first ten years of operation.

Using data on involuntary exits and new entrants obtained from the annual reports of provincial and federal insurance Superintendents, PACICC has estimated the survival probability using the Kaplan-Meier method for P&C insurers.[13] As shown in Exhibit 13, survival probability for new entrants levels off after ten-to-fifteen years of operation.

Growth

Rapid growth, the third leading cause of involuntary exit in Canada, was involved in six (18%) of the identified involuntary exits. Rapid growth was identified as a contributing factor to exit for 23% of the failed companies. Excluding companies that exited the market as the result of the failure of a foreign parent, two-thirds of insurers exhibited rapid growth prior to exiting the market involuntarily.

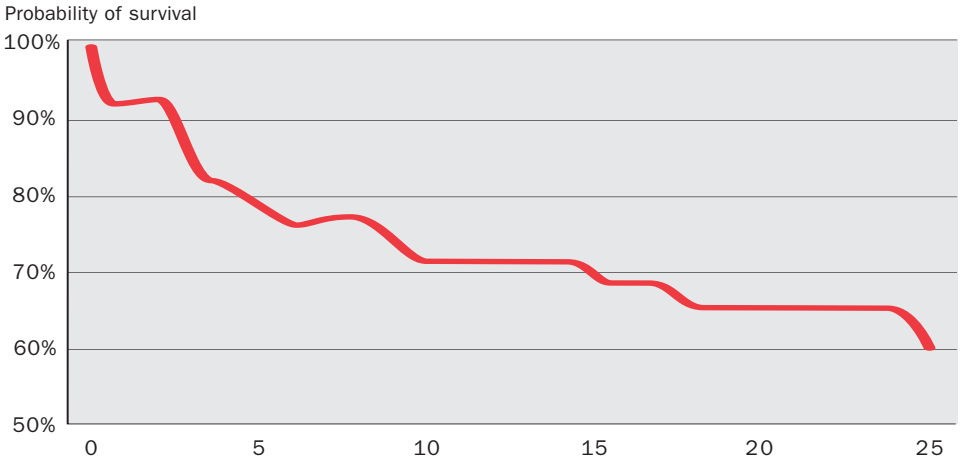
In many cases failing companies tended to grow rapidly in the last few years of business. The population of involuntarily-exiting companies, where rapid growth was not identified as either a proximate or contributing cause (~ one third of the population), grew rapidly, on average, for 1.6 years prior to being wound-up. The subgroup of companies where rapid growth was identified as either a main or a contributing factor, on average, grew rapidly for 2 years prior to being wound-up. In these periods prior to wind-up, financial ratios began to deviate from previous company and industry patterns.

[13] This is a conditional probability (the probability of being a survivor (not insolvent) at the end of the interval on condition that the insurer was a survivor at the beginning of the interval). Survival to any time point is calculated as the product of the conditional probabilities of surviving each time interval. Firms that exit in a solvent fashion are considered survivors.

For an insurance company, rapid growth is usually accompanied by deteriorating loss reserves. Rapid growth was the most frequent contributing cause (67%) for companies with deficient loss reserves as the main cause of involuntary exit. Furthermore, two-thirds of the companies with rapid growth as their main cause had deficient loss reserves contribute to involuntary exit.

The incentive to embark on long-term, aggressive expansion strategies tends to increase during periods associated with diminishing capital strength. Companies may also enter new areas of business where they lack expertise. Moreover, during periods of rising short-term interest rates, some insurers may grow rapidly in the hope that investment income from the increased premium writings will offset underwriting losses.

Exhibit 13 – New P&C insurance company survival rates (involuntary exits)



Source: PACICC with data from Provincial and Federal superintendents of insurance

Firm size

Involuntary exits in Canada have typically been small insurers writing significantly less than one percent of total industry premium. In the firm survival literature a key empirical regularity is that survival is highly dependent on firm size and age (Thompson, 2005 & Dunne et al, 1988). The literature exploring these relationships has found that age and firm size are positively correlated, suggesting that firm size is largely a proxy for age (Thompson, 2005).

Cummins and Phillips (2005) estimated the risk premium associated with P&C insurers and found evidence that larger insurers are less sensitive to financial distress than smaller insurers. This is the expected result if larger firms are also more diversified and have better access to capital. However, the impact of the size factor was much smaller than other risk factors. Further, the firm size betas estimated by the authors were smaller for P&C insurers than for firms in other industries, suggesting that the size effect is less pronounced in the P&C industry than for other industries.

While some larger and older insurers do exit the market involuntarily, the risk of exit appears to be substantially higher for newer and smaller insurance companies.

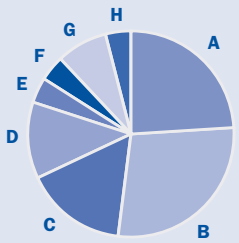
Causes of insolvency

Exhibit 14 identifies the primary or proximate causes of involuntary exit for the 34 Canadian insurance companies that were wound up between 1960 and 2005. However, there is rarely a single cause of involuntary exit. Insurance company failures are generally caused by multiple factors. The primary or proximate cause is defined as the factor that led to a winding-up order being issued. In most cases, the proximate cause was merely the final challenge following a set of other contributing causes that led to the insurer's failure.

Exhibit 14

Primary causes of P&C insolvency from 1960 to 1994

A	Foreign parent (home office)	24%
B	Inadequate pricing/deficient loss reserves	28%
C	Rapid growth	16%
D	Alleged fraud	12%
E	Reinsurance	4%
F	Affiliate	4%
G	Overstated assets	8%
H	Catistrophe losses	4%



Primary causes of P&C insolvency from 1995 to 2005

A	Foreign parent (home office)	40%
B	Inadequate pricing/deficient loss reserves	40%
C	Rapid growth	20%

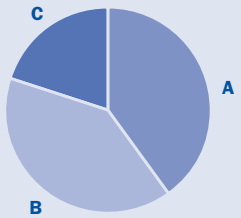


Exhibit 14 identifies the primary causes for insurer involuntary exit prior to and after 1995. The reason for segmenting at 1995 is based on significant changes in corporate governance, and the introduction of early warning tests such as MAT (Minimum Asset Test) that occurred around that time.

Prior to 1995, deficient loss reserves were identified as the leading cause of involuntary exits, accounting for nearly one-third of such exits. The failure of a foreign parent (home office) accounted for one-quarter of the involuntary exits experienced by the industry. Rapid growth and alleged fraud together accounted for another quarter of all involuntary exits. Fourth on the list of main causes pre-1995 is overstated assets, accounting for 8% of involuntary exits.

Since 1960, and similar to A.M. Best's findings, inadequate pricing and deficient loss reserves are an important cause of insurer involuntary exit in Canada. The adequate pricing of risk and reserving for future claims is the core function of an insurance company. In an analytical framework this means that the premiums collected should match expected losses. In this framework, assuming that insurers are rational decision makers in that they utilize all available information in their pricing decisions, then an insurer would set prices using data that is one period old[14]. The following function describes the pricing of insurance:

$$P_t = E(L_{t-1}) + E(\Pi^u_t)$$

[14] When there is some uncertainty in the losses (for example losses in period t-1 are not an accurate predictor of losses today, uncertainty in the data) a stochastic error term is included in the simple model.

where $E(L_{t-1})$ is the expected loss (claims) experience, II^{u}_{t} is the expected underwriting result (profit/loss). In a competitive market, without a systemic error which introduces mis-pricing throughout the system, we would expect this function to hold.[15] Insurance premiums earned in period t are set aside as reserves to pay claims from period t (which may be fully realized in later periods such as t+1). In subsequent periods as claims become realized, if insufficient reserves were set aside, an insurer must deplete capital – the margin between solvency and insolvency – to increase reserves. A company with insufficient capital must use current revenues to support current claims and a portion of past claims. Persistent and consistent underpricing and inadequate reserving may ultimately lead to insolvency. Every insurer identified as failing due to under reserving, failed when the underwriting cycle worsened and the industry entered a period of low profitability.

When combined with rapid growth, which is often future deficient loss reserves, inadequate pricing and deficient loss reserves account for nearly half of all insolvencies prior to 1995 and more than half (55%) following 1995. A.M. Best notes that insurers that embark on aggressive expansion strategies, particularly in new lines of business, typically experience deterioration in loss reserves and diminished capital.

Reinsurance is identified as a cause of impairment when a company's reinsurer is unable to fulfill its obligations to the insurer. Although reinsurance was found to be a main cause of insolvency only for one insurer, it was a contributing factor for 26% of the involuntary exit population during the period of 1960 to 2005.

International comparison of causes of insolvency

Several studies have been undertaken to identify the primary causes of involuntary exit in different jurisdictions. Exhibit 15 summarizes key conclusions and information pertaining to these studies.

Except for the study concerning Asia, all the studies surveyed impaired P&C insurance companies. The study by Chen & Wong (Asian study) uses a logit regression analysis instead to identify the main factors that impact an insurer's financial health.

Exhibit 15 shows that inadequate pricing and deficient loss reserves are the leading cause of involuntary exit in all jurisdictions. Deficient loss reserves accounted for 54% of P&C insurance failures in the United States, 33% for Canada and 36% for EU countries. The study by Chen & Wong found that inadequate pricing and deficient loss reserves had a significant negative impact on insurer profitability.

[15] Cummins (2002) outlines a simple model for insurance pricing that demonstrates this. Note that the result does not hold when there is systemic error. Mis-pricing could occur where there is incorrect or lagged information on loss costs. Some accounting conventions, rate regulation or inappropriate estimation techniques could introduce systemic mis-pricing.

Exhibit 15

Leading causes of insolvency

Jurisdictions	First	Second	Third	Methodology	Number of companies	Source
Canada	Inadequate pricing/deficient loss reserves	Foreign parent (home office)	Rapid growth	Survey	35	PACICC (2007)
United States	Inadequate pricing/deficient loss reserves	Fraud	Significant change in business	Survey	871	A.M. Best (2004)
EU	Inadequate pricing/deficient loss reserves	Asset risk	failed systems	Survey	140	FSA (2002)
Asia*	Inadequate pricing/deficient loss reserves	Asset risk	Concentration/bus.	Regression	159	Chen & Wong (2004)

**Countries included in this study are Japan, Singapore, Malaysia and Taiwan.*

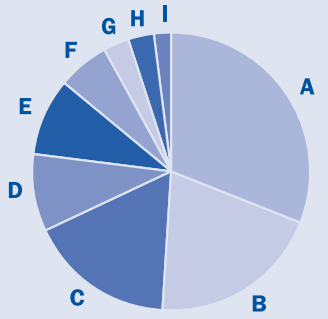
Unlike the other jurisdictions, the failure of a foreign parent (home office) was found to be one of the top three leading causes of involuntary exit in Canada. The studies of both EU and Asia identified asset risk as a leading cause of impairment. In these cases insurers were not appropriately considering the correlation between the risk profiles of their assets and liabilities. The cross national comparison highlights the importance of adequate pricing and appropriate reserving in the P&C insurance industry.

Discussion

During the period between 2000 and 2005, failures cost insurers in the United States $5.7 billion (US). A record number of Canadian insurers were also vulnerable over this period with six companies being wound-up. In a competitive property and casualty insurance industry, it is inevitable that some insurers will encounter financial difficulties and in exceptional circumstances, some will become insolvent. Insolvency is an involuntary exit of the market precipitated by a winding-up order initiated by the appropriate supervisory authority. Insurance companies may be wound-up when they become either an insolvency risk or a liquidity risk. An insolvency risk occurs when assets become insufficient for an insurance company to meet its contractual and other financial obligations. An insurer experiences liquidity risk when it has sufficient assets to cover its obligations but there is a high level of risk that those assets could disappear. Typically liquidity risks are branch companies where the home office is experiencing financial impairment.

Exhibit 1 – Proximate causes of involuntary exit in Canada (1960 – 2005)

A	Inadequate pricing or deficient loss reserves (DLR)	31%
B	Foreign parent (other)	20%
C	Rapid growth	17%
D	Foreign parent (DLR)	9%
E	Alleged fraud	9%
F	Overstated assets	6%
G	Reinsurance	3%
H	Affiliate	3%
I	Catastrophe losses	3%



Within this context, PACICC conducted the first comprehensive study of the causes of insolvency in the property and casualty insurance industry in Canada. There is rarely a single cause of involuntary exit. Insurance company failures are generally the result of multiple factors. The primary or proximate cause of exit is defined as the factor that led to a winding-up order being issued. Exhibit 1 summarizes the main (proximate) cause of involuntary exit identified for the 35 involuntary exits reviewed.

Exhibit 16 – Contributing causes of involuntary exit in Canada (1960 – 2005)*

Inadequate pricing or deficient loss reserves (DLR)	77%
Rapid growth	43%
Foreign parent/home office	32%
Reinsurance	29%
Overstated assets	15%
Alleged fraud	12%
Canadian affiliate	9%

* Percentages do not add to 100% because each case may have multiple contributing causes. Should be read as % of total involuntary exits that occurred experienced the factor.

In most cases, the proximate cause was merely the final challenge following a set of other contributing causes that led to the insurer's failure. Exhibit 16 presents a summary of the contributing causes of involuntary exit. The high level analysis presented in this report and observations drawn from risk maps of individual insolvencies offer a number of lessons and observations. These observations are outlined and grouped into relevant categories, are presented below.

Governance/management

Whether it was inexperience, underwriting mis-judgement, capital management decisions or fraud, in the end strategic choices and risk appetites were at the root of all causes of insolvency. From the Canadian experience with insolvency the following observations can be made:

- experience matters, and greater experience of senior management reduces the incidence of insolvency
- strong internal controls and financial reporting reduce insolvency risk, as 35% of involuntary exits demonstrated clear breakdowns in internal controls
- up to two years prior to the wind-up of a company, management in many cases undertook strategies that could be described as "gambling for survival".

Operational risk

In the Canadian experience, insurers that involuntarily exited often had a substantial concentration of risk. Risk concentration may occur in the form of geographic and/or product concentration. While diversification does not prevent involuntary exit, there appears to be some evidence that it does increase the survival rate of companies. Further, when expanding into new lines, sticking to related lines reduces the risk of exit. Several involuntary exits were in the process of reinventing themselves and expanding into new lines of business in which the company had limited experience.

Underwriting

At the macro level, insurer involuntary exit was found to be related to industry profitability and the underwriting cycle. As illustrated in Exhibit 5, during the period 1975 to 2005, insolvency (involuntary exits after excluding liquidity risks) occurred disproportionately in years where return on equity was less than 10%. Over the period, insolvency was 3.2 times more likely to occur when industry return on equity was below 10% than when it was higher [16].

The relationship between profitability and insolvency appears to have become more evident in Canada since 1990. Since then, insurance company insolvency has been limited to years of poor profitability. Unfortunately there is insufficient data to test whether there was a structural change in the environment as a result of the introduction of rate regulation, reforms in financial reporting, governance and capital requirements implemented since 1990, or whether the result is coincidental.[17]

[16] Historically, the number of insolvencies declines by half with an industry ROE (lagged by one year) of 12% and does not decline again until industry ROE (lagged one year) exceeds 15%.

[17] There were 10 P&C insurance insolvencies (excluding liquidity risks) in Canada after 1990 and when involuntary exits resulting from fraud, catastrophe loss or reinsurance failure are removed, the pre-1990 period looks much more like that after 1990, where insolvency was 5.6 times more likely to occur in years of poor profitability.

Among insurer-specific factors, the leading cause of involuntary exit in Canada is inadequate pricing and deficient loss reserves, accounting for 31% of the impairments. This is consistent with international experience. In addition, sudden rapid growth was evident (67%) for a majority of failed companies (even if it did not directly contribute to the involuntary exit) and was particularly prevalent for companies where deficient loss reserves were a proximate cause of involuntary exit. In general, sudden growth in unpaid claims liabilities was the primary driver of involuntary exit. In 77% of involuntary exits, the failed insurer experienced sudden growth in unpaid claims liabilities. In the majority (88.9%) of cases where asset risk (reinsurance, overstated assets) was a contributing factor, this was triggered by liability-related problems (for example, the insurer could no longer afford or was unable to get reinsurance because of its liability risk).

It should be noted that there is great diversity among companies in terms of solvency in any environment, but underwriting profitability is an important predictor of insolvency. In this context the following observations can be made:

- adequate pricing and accurate loss reserve estimation are critical for reducing the likelihood of involuntary exit
- rapid growth may be associated with under-pricing.

Capital

A number of complex theoretical models of firm performance offer insight into factors that influence entry and exit into an industry. In particular they suggest that risk-based supervision should reduce solvency risk. To date, the limited data available from the adoption of a risk-based framework for federally regulated insurers seems to support this.

Reinsurance was not a major source of insolvency but it was a contributing factor in 26% of failures. Reinsurance allows insurers to transfer risks that exceed their underwriting capacity or share risks which they choose not to bear alone. The purchase of reinsurance may reduce the volatility of insurer underwriting results, provide capital relief and provide specific expertise and services for an insurer. Acting as a risk transfer mechanism for large losses, reinsurance has been an important part of the insurance industry for nearly 160 years, contributing directly to the stability of the Canadian insurance markets.

However, reinsurance assets are risky in that they can deteriorate quickly, cannot be readily sold and must be actively managed. In the majority of cases the issue appears to have been one of reinsurance management by the failed insurer, rather than reinsurance failure. In some cases there were complex inter-group arrangements, in others there was over-reliance on reinsurance assets that became more difficult to obtain when the reinsurance market hardened.

PACICC's analysis of the Canadian insolvency experience has identified the following general observations:

- in most cases, capital deteriorated rapidly in the final year of operation
- in Canada, as contributors to insolvency risk, liability risks have historically been far more important than asset risks.

Macro-economic environment

Volatility in financial markets, specifically in interest rates, also had modest solvency implications. The interest rate volatility in the early 1980s and mid-1990s (in combination with the insurance cycle) appear to have contributed to the relatively high rates of insurer involuntary exit during those periods. Catastrophe losses were not found to be a source of involuntary exit in Canada. This result may be more fortuitous than real, as large catastrophes losses have occurred in years of strong profitability. Since catastrophe losses do not time themselves to the insurance cycle, it is possible that they may be linked to involuntary exit in the future.

Among the three waves of Canadian insurer involuntary exit, the insurance cycle and interest rate volatility were identified as catalysts for involuntary exit. The periods with the greatest frequency and severity of Canadian insurer involuntary exit involved more than one catalyst. When interest rate volatility and the insurance cycle did not coincide, the estimated frequency and severity of involuntary exit was substantially reduced.

Period of involuntary exit	Catalyst
1980 – 1985	Insurance cycle, interest rate volatility
1991 – 1995	Insurance cycle, interest rate volatility
2000 – 2002	Insurance cycle

Monitoring and Supervision

Supervisory authorities work to maintain efficient, fair, safe and stable insurance markets for the benefit and protection of policyholders. PACICC's review of the Canadian insolvency experience has identified a number of general observations relevant to solvency supervision:

- financial risk ratios generally begin to fluctuate up to two years prior to involuntary exit and winding-up (note: because financial risk ratios also fluctuate for companies that do not become insolvent, supervisors need the capacity to properly identify and monitor solvency risk).
- no single indicator, in itself, is a reliable predictor of insolvency
- start-up companies are at greater risk of insolvency
- supervisors need to have a good understanding of reinsurance arrangements
- companies writing in new lines of business, outside of their area of expertise, are at greater risk
- public data availability increases market discipline and helps identify areas of potential concern, placing pressure on companies to address problems earlier.

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Appendix A – Methodology

The risk map approach of McDonnell (2002) and the EU (2002) was used in this study. The risk map utilizes a framework that illustrates the sources of risk (failed processes, risk decisions, external factors, management) and the links between them. The process of mapping and analyzing the data allowed us to develop a broader understanding of why a particular institution was wound-up.

Financial data for ten years (where available) prior to the winding-up was used for all insurance companies in the sample. Risks and behaviour were inferred by analyzing data on premium growth, capital levels, assets and liabilities, liquidity, investment performance and reinsurance arrangements. Financial data was supplemented with qualitative data from other sources such as court documents, PACICC's own files and supervisory bulletins. In addition to firm specific risks, we performed statistical analysis on the macro-economic environment, analyzing the relationship between interest rate volatility, the underwriting cycle and catastrophe losses.

Insurance companies generally fail as the result of the interaction of a number of factors. The primary or proximate cause for the purposes of this study is defined as the factor that led to a winding-up order being issued. In most cases, the proximate cause was merely the final challenge following a set of other contributing causes that led to the insurer's failure.

Data

The main sources of the information utilized in this study was from MSA Research, Insurance T.R.A.C. Report (Canada), Canadian Insurance Statistical Issue, Canadian Underwriter Statistical Issue, General Insurance Register, OSFI's Annual Reports, PACICC, and A.M. Best. For the early impairments (prior to 1979), data lacks details and in some cases was not available. For companies showing signs of impairment after 1979 and especially after 1990 the data was available and highly detailed.

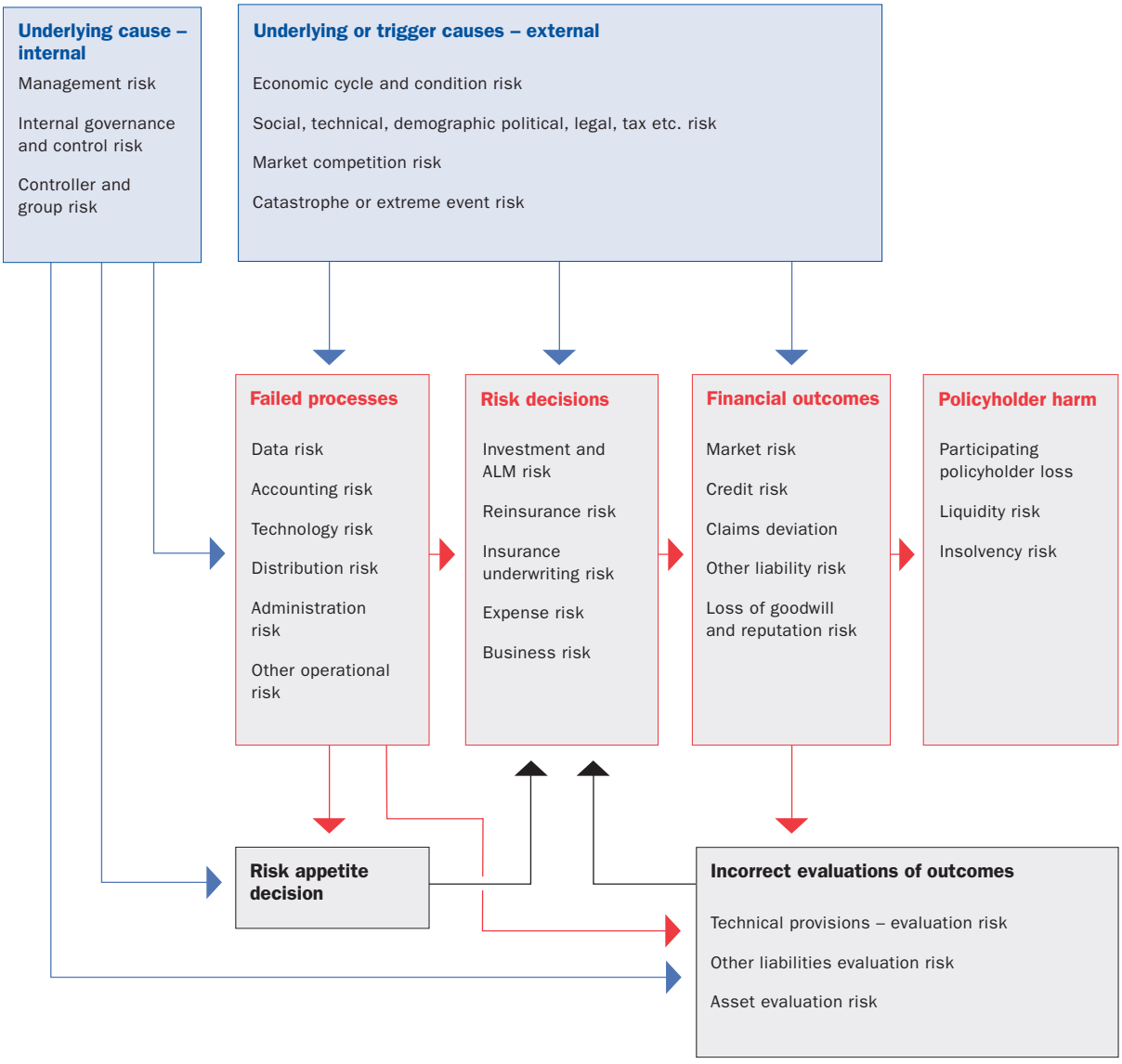
The data was supplemented with data from court documentation where it was available. This study, which is the most comprehensive insolvency study in the industry, covers financial impairments for the entire P&C insurance industry in Canada. Since insurers voluntarily file their financial data with MSA Research (1990-2005), T.R.A.C., Canadian Insurance and Underwriter Statistical Issue, some data may not have been available. In some cases, however, the data for provincial companies were provided from provincial superintendents annual reports.

A thorough financial analysis was conducted by looking at premiums growth, capital levels, assets and liabilities, liquidity level, investment performance, reinsurance arraignments. We performed statistical analysis concerning interest rates volatility, and correlation coefficients.

For the early impairments (prior to 1979), the data lack details and in some cases were not available. For companies showing signs of impairment after 1979 and especially after 1990 the data was available and highly detailed.

It is imperative to point out that this study does not include the "near misses" which are defined as companies that would have wound up if they hadn't been merged or acquired by another insurer

Risk map



Appendix B – Definition of terms

Branch – insurance company whose jurisdiction of incorporation is another country.

Capital – residual after all liabilities are deducted from assets. This is an insurer's net worth.

Combined Ratio – It is the sum of the loss ratio, loss-adjustment expense ratio, underwriting expense ratio and dividend ratio.

Cash Flow Underwriting – An underwriting practice where coverage is provided for a premium level that is actuarially less than necessary to pay claims and expenses.

Financially Impaired Company – insurer that has had an official action taken against it by its regulator.

Failure Frequency – Number of impaired companies as a percentage of the number of companies in a particular group (i.e., jurisdiction).

Federal Company – Insurance Company holding a federal insurance license issued by the Office of Superintendent of Financial Institutions (OSFI).

Guarantee Fund – Fund utilized to pay losses to impaired companies' claimants.

Hard Market – Phase in the underwriting cycle where insurance premium rates are increasing faster than the loss costs trends.

Involuntary Exit – An insurer exits the insurance market involuntarily because of a winding up order is issued against it.

Loss Reserves – Liability established to pay anticipated claims and expenses associated with settling claims.

Near Misses – An insurance company that would have wound up if it hadn't merged or been acquired by another insurer.

Policyholders' Surplus – Residual after all liabilities are deducted from assets. This is an insurer's statutory net worth.

Premium – Amount of money paid for insurance coverage.

Premiums, Net Earned – It is the portion of premium that has been earned by the insurance company, net of reinsurance.

Provincial Company – Insurance company holding an insurance license issued by one province. Prudential regulation for this type of insurer is the responsibility of the province.

Soft Market – Phase in the underwriting cycle where insurance premiums are decreasing and a period when underwriting criteria are often more lax.

Underwriting – Risk selection for insurance and determination of the amount of premiums and what terms that insurance company will accept the risk.

Appendix C – Primary causes of insurer insolvency by year

	I	II	III	IV	V	VI	VII	VIII	
	Inadequate pricing/deficient loss reserves	Parent failure	Rapid growth	Alleged fraud	Overstated assets	Reinsurance	Catastrophe losses	Failure of a Canadian affiliate	Total
1960	0	0	0	0	0	0	0	0	0
1961	1	0	0	0	0	0	0	0	1
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	2	0	0	0	0	0	2
1967	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0
1979	0	1	0	0	0	0	0	0	1
1980	0	0	0	0	0	0	0	0	0
1981	1	0	1	0	0	0	0	0	2
1982	0	0	0	0	1	0	0	0	1
1983	1	0	0	1	0	0	0	0	2
1984	0	0	0	0	0	0	1	0	1
1985	1	1	0	0	0	0	0	0	2
1986	0	1	0	0	0	1	0	0	2
1987	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0
1989	2	1	1	0	1	0	0	1	6
1990	0	1	0	0	0	0	0	0	1
1991	0	0	0	1	0	0	0	0	1
1992	0	0	0	0	0	0	0	0	0
1993	1	1	0	0	0	0	0	0	2
1994	0	0	0	1	0	0	0	0	1
1995	1	2	1	0	0	0	0	0	3
1996	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0
2000	1	0	0	0	0	0	0	0	1
2001	1	1	1	0	0	0	0	0	3
2002	1	0	0	0	0	0	0	0	1
2003	0	1	0	0	0	0	0	0	1
2004	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0
Total	**11**	**10**	**6**	**3**	**2**	**1**	**1**	**1**	**35**
Percent	31.4%	28.6%	17.1%	8.6%	5.7%	2.9%	2.9%	2.9%	100%

Appendix D – Minimum capital standards by supervisory jurisdiction

British Columbia	MCT (100% minimum)
Alberta	MCT (100% minimum)
Saskatchewan	Assets > liabilities
Manitoba	$4 million, with $1 million unimpaired
Ontario	MCT (100% minimum + 50% supervisory target + company target)
Quebec	MCT (100% minimum + company target)
New Brunswick	$3 million, with $250,000 unimpaired
PEI	$3 million, with $750,000 unimpaired
Newfoundland	$3 million
OSFI	MCT (100% minimum + 50% supervisory target + company target)

Source: Provincial insurance statutes and regulations