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NATURAL DISASTERS: INSURANCE AVAILABILITY AND AFFORDABILITY

Blayne Haggart
Economics Division

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INTRODUCTION

The 2003 forest fires in British Columbia, expected to be the second-most destructive in Canadian history,(1) and the numerous forest fires in that province in 2004, are part of a worldwide trend of increasingly severe and frequent natural disasters. Furthermore, as the number of people living in vulnerable regions – such as coastal areas, earthquake zones, flood plains and areas at risk of forest fires – rises, the human and financial cost of disasters will continue to increase.

The often-severe financial costs of natural disasters extend beyond families and businesses to governments and insurance companies. According to estimates obtained by the House of Commons Standing Committee on Finance, three major natural disasters between 1996 and 1999 – flooding in the Saguenay (1996), the Red River Valley flood (1997) and the ice storm in Eastern Canada (1998) – cost Canadian governments an average of $500 million per year.(2) Meanwhile, according to the Insurance Bureau of Canada, the 1998 ice storm resulted in $5.4 billion in personal losses, while the Saguenay flood cost $1.6 billion in losses and the Red River Valley flood cost $815 million.(3)

Most analysts expect these weather trends to continue, meaning that the insurance industry will likely continue to face increased claims for payments, which could undermine their financial viability. This chain of events, in turn, will have important policy implications for Canadians, who could face – in some cases – stark rises in insurance premiums and an unwillingness by insurers to provide insurance to specific regions or against certain risks. While insurance products continue to be generally available throughout the country, evidence suggests

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(1) Doug Alexander, "Weird Weather Hikes Insurance," *Vancouver Sun*, 28 August 2003, p. D5.

(2) House of Commons Standing Committee on Finance, *Prevention Today … Savings Tomorrow*, 2nd Session, 36th Parliament, 31 May 2000, http://www.parl.gc.ca/InfoCom/PubDocument.asp?FileID=36427&Language=E.

(3) Insurance Bureau of Canada, "Natural Disasters in Canada – Facts," http://www.ibc.ca/ii_natural_foundation_facts.asp.

that insurance premiums are generally rising above the rate of inflation, and can be expected to do so for the foreseeable future.

Because insurance companies depend on investment income in addition to the premiums they receive from selling insurance, their situation is also complicated by the recent declines in the stock market and by near-record-low interest rates.

While natural disasters affect all types of insurance, this paper examines the effects of natural disasters on the property and casualty (P&C) insurance industry, specifically the property side of the business (though automobile insurance is examined where appropriate). The first section describes the structure of the P&C insurance industry. The second discusses the various issues facing that industry, including low interest rates and the effects of climate change. The third section examines potential consequences arising from these issues, including a lack of insurance provision and higher premiums, while the final section reports on what the industry and government are doing to mitigate these trends; it also suggests some other possible courses of action.

STRUCTURE OF THE INSURANCE INDUSTRY

Like many other parts of Canada's financial system, the P&C insurance industry is both federally and provincially regulated. As well, P&C insurers can choose to incorporate under either federal or provincial law. Federally incorporated P&C insurers account for about three-quarters of this industry's premium volume.(4) For reasons of data availability, this paper relies on data for the federally incorporated P&C insurers. The P&C insurance business in Canada is competitive, consisting of some 230 firms, the majority of which are foreign-based, employing (directly and indirectly) about 100,000 people.(5)

There are two sides to the P&C insurance business. The most obvious is the insurance of families, individuals and businesses against risk of loss or damage to property (with some other minor activities, including liability). By accepting a premium against the possibility of a ruinous expense, insurers spread the risk of loss associated with a single event (e.g., a family's house burning down) across a large number of individuals and areas. Pooling these

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(4) Coopers & Lybrand, "The Property/Casualty Insurance Industry," paper prepared for the Task Force on the Future of the Canadian Financial Services Sector, September 1998, p. 9, http://finservtaskforce.fin.gc.ca/research/pdf/rr15_e.pdf.

(5) Department of Finance, "Property and Casualty Insurance in Canada," October 2003, http://www.fin.gc.ca/toce/2003/property_e.html.

premiums and risks among many policyholders and across several product lines allows insurers to pay claims from their premium pool.

In 2001, auto insurance – which is required by law for all car owners – represented 54% of P&C insurers' business. Property made up another 29% of their total business (13% personal and 16% commercial), while other types of insurance accounted for the remaining 17%.(6) While this paper is mostly concerned with the property side of the P&C insurance industry, it is important to note that in Manitoba, British Columbia and Saskatchewan the province runs the auto insurance industry, while the Quebec government provides basic auto insurance coverage. According to Coopers & Lybrand, the nationalization of this product line in Manitoba, British Columbia and Saskatchewan has "greatly reduced the income of P&C insurers" and some insurers specializing in auto insurance have pulled out of those three provinces; but the company notes that "other full line writers [continue] to sell homeowners' and other coverages in these markets."(7)

Because of the nature of what they are insuring, P&C insurance premiums cover a short time horizon, usually of one year or less. As a result, P&C insurers have a high cash flow requirement. Consequently, compared to other financial institutions, they have a relatively small asset base and a substantial revenue base.

P&C insurers also make money through investments. Generally, the Canadian P&C insurance industry has run losses on the insurance side of its business: as a whole, P&C insurers have posted underwriting losses (net premiums minus claims) for every year since 1978,(8) except 2003. These losses, however, have been offset by investment gains, allowing the industry as a whole to post a profit. Effectively, P&C insurers have been subsidizing their underwriting losses with investment profits.

Because of P&C insurers' relatively short time horizon, government regulations require that P&C insurers' portfolios be conservative, consisting mostly of short-term, highly liquid investments to cover policies that are often subject to yearly renewal. Of these assets, about 44% are non-investment assets (real and fixed assets, investments in affiliates, accounts receivable, term deposits of less than one year, cash and miscellaneous); the remaining portion is invested "prudently," as required by legislation, in government and corporate bonds, common and preferred shares and mortgages.(9)

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(6) *Ibid.*

(7) Coopers & Lybrand (1998), p. 11.

(8) Insurance Bureau of Canada, *Facts of the General Insurance Industry in Canada*, 2002, p. 6.

(9) Department of Finance (2003).

A. Financial Data

The insurance industry is highly cyclical, linked to rates of return on investments and the level of insurance claims. When investment returns are high, insurers can provide more insurance at a lower price (because of the increase in their capital), and the highly competitive industry leads to a bidding-down of premiums to the point where costs cannot be covered. As losses mount, the process reverses.

As Table 1 indicates, in 2003 the P&C insurance industry realized $24.6 billion in underwriting revenue (including net premiums earned, services charges and other revenues), and paid $24.2 billion in claims and other expenses. As a result, for the first time since 1978, the industry as a whole posted a profit of $0.4 billion in underwriting income. Based on past trends, 2003 was an unusual year in that P&C insurers did not have to depend on investment income ($2.7 billion in 2003) to realize a net profit (after taxes and other expenses). Strong net underwriting income, combined with a strong rise in net investment income, allowed P&C insurers to post a $2.2-billion profit in 2003 and to reverse a trend of declining profits.

Table 1: Revenues and Expenses, Property and Casualty Insurers

	1996	1997	1998	1999	2000	2001	2002	2003
	$ billions							
Underwriting Operations								
Net Premiums Written	15.6	15.7	15.8	16.0	17.3	19.1	23.5	26.4
Net Premiums Earned	15.3	15.6	15.6	15.9	16.6	18.2	21.7	24.5
Total Underwriting Revenue	15.4	15.6	15.7	15.9	16.7	18.2	21.8	24.6
Total Claims and Expenses	15.9	16.0	17.0	16.8	18.2	20.4	23.1	24.2
Underwriting Income/Loss	**-0.5**	**-0.4**	**-1.2**	**-0.9**	**-1.6**	**-2.1**	**-1.3**	**0.4**
Investment Operations								
Net Investment Income	**2.8**	**3.0**	**2.6**	**2.4**	**3.0**	**2.6**	**2.0**	**2.7**
Net Income Before Income Taxes and Extraordinary Items	**1.8**	**2.2**	**1.2**	**1.1**	**1.2**	**0.6**	**0.5**	**3.1**
Total Income Taxes	0.6	0.8	0.4	0.4	0.4	0.2	0.2	1.0
Net Income	**1.0**	**1.2**	**0.8**	**0.7**	**0.7**	**0.3**	**0.2**	**2.2**

Source: Office of the Superintendent of Financial Institutions.

B. Managing Risk

P&C insurers cover their exposure to risk in several ways. Insuring many individuals, families and businesses over a large geographical area reduces the chance that any one disaster will bankrupt the insurer and increases the pool of capital available to cover any claims made. In the event that premiums do not cover claims (a common occurrence, as has been noted), investment income can make up the difference. As well, P&C insurers insure themselves against catastrophic risk (e.g., the huge claims resulting from events such as the forest fires in British Columbia in the summer of 2003, and the 1998 ice storm in Eastern Canada) by purchasing insurance against catastrophic losses from reinsurers, large transnational financial corporations. Reinsurers work much like domestic insurance companies, only on a larger scale, by insuring a pool of geographically diverse insurance companies against catastrophic risk. To take one example, the Reinsurance Research Council determined that, in relation to the 1998 ice storm, reinsurance companies based internationally and in Canada bore at least two-thirds of the amount paid or reserved by primary companies.(10)

C. Dealing With Catastrophes: The Role of the Federal Government

At the federal level, the Disaster Financial Assistance Arrangements (DFAA) program, which was designed in consultation with the provinces and territories and is administered by Public Safety and Emergency Preparedness Canada, details how the federal government should respond to a natural disaster. Provinces and territories are responsible for designing, developing and delivering financial assistance to the victims of emergencies and disasters as they see fit, with no restrictions placed on them by the federal government. (The federal government does not directly provide disaster relief funding to individuals or businesses.) It is up to the provincial or territorial government affected by the disaster to request assistance from the federal government, in accordance with DFAA guidelines.

Under the DFAA program, provincial/territorial governments can ask the federal government for disaster relief when eligible expenditures surpass $1 per capita (based on provincial/territorial population). The program sets out guidelines respecting what expenses resulting from a disaster qualify for relief, following a graduated funding formula based on the size of the disaster. Generally speaking, DFAA guidelines stipulate that the federal government will not provide funding to the province to cover costs already insured or *where insurance was*

(10) Reinsurance Research Council, News Release, “Brunt of January Ice Storm Borne by Reinsurers,” 11 September 1998, http://www.rrccanada.org/english/relices.html.

available at a reasonable price but was not purchased. There is nothing in the law, however, preventing the federal government from covering any cost it wishes.

From a theoretical perspective, the DFAA rule against providing aid to those who choose not to purchase insurance helps protect the federal government against the danger of moral hazard. In short, should the government agree to pay for all damages regardless of whether insurance was available, people would have a strong incentive not to buy insurance. Such a result would increase the cost of a natural disaster borne by the taxpayer. Moreover, it would also decrease the pool in insured risks, thus increasing the risk of insolvency for P&C insurers.

ISSUES AND TRENDS

Over the past several years, P&C insurers in Canada and elsewhere have experienced two mutually reinforcing negative trends. First, declining interest rates have reduced the profitability of P&C investments. Second, as shown in Table 1 above, the size of payouts has increased. Both have placed strong pressure on P&C insurers' profitability.

A. Low Interest Rates

Because of P&C insurers' tendency to post underwriting losses, investment income is crucial to those insurers' financial well-being. As a result, and because they invest most of their portfolio in low-risk (and thus, low-return) instruments such as government bonds, P&C insurers' profits are very sensitive to changes in the interest rate.(11) Low interest rates caused P&C insurers' investment income to fall 12% and 23% in 2001 and 2002, respectively, before rising by 35% in 2003. This recovery suggests that pressure on P&C insurers' investment returns, and thus on the industry's profitability, is easing.

B. Higher Payouts and Climate Change

Claims paid by insurance companies can be expected to continue to rise. As Global Change Strategies International has noted, "worldwide, since 1960, the number of large climate-related losses – i.e., losses causing damage equal to more than 1% of a country's GDP –

(11) Department of Finance (2003).

has increased 4 to 6 times."[12] The Insurance Bureau of Canada states that "Disaster recovery payments by insurance companies and taxpayers have been doubling every five to 10 years throughout the 1980s and 1990s – an alarming trend that must be addressed."[13]

Swiss Re, one of the world's largest reinsurers and a leader in addressing the effect of a changing climate on the insurance industry, calls the increasing insurance losses over the past 30 years "a clear trend." According to Swiss Re, several factors are causing the rise in insurance losses: "This increase is principally a result of higher population densities, a rise in insurance density in high-risk areas and the high vulnerability of some modern materials and techniques. Given these trends have been constant, we assume that natural hazard losses will continue to rise."

While Swiss Re notes that "the fact that losses are on the increase should not necessarily lead us to conclude that the number and/or intensity of natural catastrophes per se has increased," it remarks that "a growing body of scientific research would seem to support the view that the frequency and intensity of certain natural catastrophes can be expected to rise beyond the normal cyclical fluctuations … ."[14]

Echoing Swiss Re, most observers expect that, due to a combination of economic growth, climate change and (in areas prone to earthquakes) sheer probability of quake-related damage, these trends will continue, with even greater costs. As the House of Commons Standing Committee on Finance remarked, "these losses pale in comparison to even larger losses that could lie ahead. Vancouver, for example, is located in a region subject to significant seismic activity. A major earthquake would cause damages in the neighbourhood of tens of billions of dollars."[15]

Climate change can also be expected to affect auto insurance payouts, given that a large proportion of traffic accidents occur as a result of inclement weather.

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(12) House of Commons Standing Committee on Finance (2000).

(13) Insurance Bureau of Canada, "Natural Disasters," http://www.ibc.ca/ii_natural.asp.

(14) Swiss Re, "Natural Catastrophes and Reinsurance," 2003, p. 9, http://www.swissre.com/INTERNET/pwsfilpr.nsf/vwFilebyIDKEYLu/ESTR-5LUD5L/$FILE/Nat_Cat_en.pdf.

(15) House of Commons Standing Committee on Finance (2000).

C. Reinsurance Costs

Reinsurance – insurance for insurance companies – is an international business. Premiums written in 2002 by the world's top 40 reinsurance groups amounted to US$139 billion. According to Standard & Poor's, German reinsurers underwrote 23%, and U.S. companies 20%, of that total.(16) As a small country, Canada has been able to benefit from the existence of a large international pool of reinsurance capital by providing international reinsurers with an opportunity to diversify. Consequently, "Canadian primary insurers have traditionally been able to arrange reinsurance coverage at reasonable rates, considerably lower than rates they can obtain in the traditional capital markets."(17)

While being able to access the international reinsurance market has generally benefited Canadian insurers, it also leaves them exposed to international pressures resulting from very large payouts made elsewhere in the world. Over the past several years, increasing payouts and lower investment revenue have eroded the financial position not only of insurers – in Canada, as elsewhere – but also of reinsurers. According to the U.S.-based Insurance Information Institute: "Since the World Trade Center disaster, which is likely to cost reinsurers more than $20 billion, reinsurance has been in short supply and rates for high risk areas have been rising significantly."(18) The increasing costs of natural disasters have also increased the price and reduced the availability of reinsurance.

As a result, the cost of reinsurance has risen, particularly for some specific types of coverage. According to the Canadian Association of Mutual Insurance Companies (CAMIC), "In the past two years, the price and availability of reinsurance in general, and of catastrophe reinsurance in particular, has changed significantly as a result of a reassessment of risks (the *Maximum Probable Loss* related to terrorism has increased significantly since September 11) and as a result of a significant loss in reinsurance capacity due to a loss of capital (itself resulting from the downturn of the stock market, the drop of interest rates, the payment of claims related

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(16) Insurance Information Institute, "Reinsurance," January 2004, http://www.iii.org/media/hottopics/insurance/reinsurance/.

(17) Darrell Leadbetter, Paul Kovacs, and Peter Carayannopoulos, "Insurance Securitization: Catastrophic event exposure and the role of insurance-linked securities in addressing risk," Institute for Catastrophic Loss Reduction, January 2003, p. 7, http://www.iclr.org/pdf/securitization.pdf.

(18) Insurance Information Institute, "Catastrophes: Insurance Issues," http://www.iii.org/media/hottopics/insurance/xxx/.

to September 11 and the adverse developments related to other claims such as asbestos." Furthermore, the Association comments, "The reinsurance capital was eroded by 25%. The reassessment of risks and the reduction of capacity have forced reinsurers to increase premiums for any given risk and to offer less reinsurance in spite of the fact that the demand for insurance has increased. This imbalance in supply and demand has translated in reinsurance premium increases in excess of 50% over these two years."

The CAMIC raises the possibility that low returns, "in combination with a Canadian tax system not as capital-friendly as that of many other jurisdictions," could cause reinsurers to limit the reinsurance available to Canadian-based insurers.(19)

D. Capital Adequacy

There exists considerable debate as to whether insurers and reinsurers are adequately capitalized to deal with large natural disasters and climate change. Globally, reinsurance, according to certain analysts, "with approximately $100 billion in capital and surplus, is small relative to the potential exposures."(20) Insurers face a similar problem: "Recent history has shown that weather-related losses can stress insurance firms to the point of elevated prices, withdrawals of coverage, and insolvency (bankruptcy)."(21) In the face of increasing weather-related losses, these trends will likely accelerate unless compensatory measures are taken. The extent to which insurers and reinsurers are, in fact, undercapitalized will likely play a role in determining the extent to which insurance premiums will rise, and whether some form of government intervention will become necessary.

E. Population Location

Increasingly severe weather patterns only partly explain increases in insurance costs. Another significant factor is the geographical location of the claimants. As more families

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(19) Canadian Association of Mutual Insurance Companies, submission to the House of Commons Standing Committee on Finance, September 2003.

(20) Leadbetter, Kovacs, and Carayannopoulos (2003), p. 2.

(21) Pier Vellinga and Evan Mills, "Insurance and Other Financial Services," in *Climate Change 2001: Impacts, Adaptation and Vulnerability*, ed. James G. McCarthy *et al.*, Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, 2001, p. 427, http://www.grida.no/climate/ipcc_tar/wg2/pdf/wg2TARchap8.pdf.

and businesses locate in disaster-prone areas, the potential for even greater losses increases – an issue not simply for notoriously earthquake-prone areas such as California, but for many Canadian cities. While the Greater Toronto Area, Canada's most populous and important economic region, is not generally susceptible to natural disasters, Vancouver – the country's third-most populated area – faces risks associated with earthquakes and tsunamis, and vast tracts of British Columbia are susceptible to forest fires. As noted in a paper published by the Institute for Catastrophic Loss Reduction, "42% of Canada's 997.1 million hectares of land is forested. As the population of Canada increases, the infrastructure will move to greater degree into areas that are at risk. Fire risk will always be present, as there are both natural fires and controlled burns. It should also be noted that climate change will most likely increase fire frequency and severity. There is, therefore, a real danger of an increase in both the frequency and severity of this hazard."(22)

CONSEQUENCES OF NATURAL DISASTER TRENDS

P&C insurance companies are facing financial pressures in the form of rising claims, low investment income and more costly reinsurance. Since most observers expect that the trend toward more, and more costly, natural disasters will increase, these pressures will continue, exacerbated by the current low returns on conservative investments.

In such circumstances, insurance firms can take several actions to maintain their profit margins. Faced with rising claims, P&C firms may increase premiums in order to maintain their profit margins, or offer less coverage at the same price. Alternatively, in areas that are particularly subject to natural disasters, insurers might not want to offer insurance at any price, or might offer it at a prohibitively high price.

A. Rising Premiums

In Canada, the most obvious effect of the above-mentioned events is a rise in premium rates. According to Statistics Canada, Canadians spent an average of $487 on homeowners' insurance in 2001, up 4.3% from a year earlier and up 9.4% from 1997. In contrast, consumer prices as measured by the Consumer Price Index rose 7.9% between 1997 and 2001, and 2.6% between 2000 and 2001; in other words, homeowners' insurance premium

(22) Mark Baker, "Natural Hazards and the Canadian Insurance Industry," Institute for Catastrophic Loss Reduction, December 2002, p. 16, http://www.iclr.org/pdf/mark%20baker%20paper.pdf.

increases outpaced inflation. By province, the average spent on homeowners' insurance ranged from a low of $327 in Prince Edward Island to a high of $521 in Ontario.(23)

The Consumers' Association of Canada has asserted that large premium increases led to large profits in 2003 for insurance companies.(24) It should be noted, however, that according to data from the Office of the Superintendent of Financial Institutions, P&C insurers' net income had fallen steadily between 1996 and 2002. Although underwriting revenue increased, rising by 19% between 2001 and 2002, net investment income fell substantially in both 2001 and 2002, as would be expected from the general weakening of the investment climate at that time.

When analyzing the insurance industry, it is important to keep in mind its cyclical nature. As noted previously in this paper, the P&C insurance industry is very competitive and premiums may be bid down to a point where some companies are no longer viable. When losses outweigh premiums, the cycle reverses. Currently, the P&C insurance industry is in the second part of the cycle, often called the "hard" part (as opposed to the "soft"). Furthermore, the situation is complicated by the decline (until recently) in investment income, which has placed even more pressure on the industry's profit margin and ability to keep premiums low.

B. Insurance Availability

Insurance companies may also respond to increased financial vulnerability to losses, such as those associated with natural disasters, by refusing to renew existing policies and vacating a region or insurance line.(25) For example, following the 1994 California earthquake, which cost more than $12.9 billion in losses, insurers refused to provide homeowners' insurance in that area, or provided it only at prohibitively high costs.(26) Following Hurricane Andrew in

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(23) Statistics Canada, CANSIM II Database, Table 203-0003: Household spending on shelter, by province and territory, annual. Note that rising premiums affect regions in different ways. Insurance in rural areas, for example, is generally more expensive than in urban areas (reflecting, for example, the availability of firefighting equipment), though other household costs, such as property taxes, are often lower.

(24) Consumers' Association of Canada, B.C. Branch, "Consumers' Association Blames Big Profits By Insurance Companies For Skyrocketing Rates," 17 September 2003, http://www.cacbc.com/reports/Sept%2017,%202003%20Press%20Release.htm.

(25) Vellinga and Mills (2001), p. 435.

(26) Christopher H. Schmitt and Edward Hof, "Risky Business," *U.S. News and World Report*, 2 June 2003, p. 42.

1992, in 1996 the "fifth largest auto and home insurer in the United States … announced restrictions on sales in 17 coastal states from Maine to Texas."(27)

Some Canadian provinces' decision to nationalize auto insurance has also affected the number of insurers in these provinces. As indicated above, several P&C insurers vacated the markets of British Columbia, Saskatchewan and Manitoba, taking with them their other product lines (e.g., homeowners' insurance), when these provinces nationalized auto insurance.

POLICY QUESTIONS AND POSSIBLE RESPONSES

In short, the three issues surrounding P&C insurance with respect to property are: affordability and quality of policies; capital adequacy; and market presence. In the case of a major disaster, important policy questions must be addressed. As one analyst has remarked, in the context of the possible U.S. response to a crisis in California:

> What if, for example, the risk of an earthquake occurring along an old fault line in a working-class town suddenly surges? Charging the actuarially justified rate on homeowners insurance would result in reduced insurance purchases. Housing values would be hit with high homeowner's rates in addition to the hit from the initial earthquake risk. And what of the uninsured? What is the appropriate policy? Should the state or the federal government transfer taxpayer funds to subsidize insurance purchase? Should insurers be forced to bear the cost and spread the burden across all their policyholders by either raising general homeowner's rates or lowering the quality of their product? And, whatever the answer, how does it change if the affected area is not a single town but all of California?(28)

There are no easy answers to these questions. Traditionally, Canada and the United States have generally concentrated on prevention, spreading losses (e.g., through insurance) and reconstruction.(29) This section outlines some ways in which society can, or could, respond to the insurance problems created by an increase in natural disasters.

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(27) Rodney White and David Etkin, "Climate Change, Extreme Events and the Canadian Insurance Industry," *Natural Hazards*, 1997, p. 154.

(28) Kenneth A. Froot, "Introduction," in *The Financing of Catastrophe Risk*, ed. Kenneth A. Froot, University of Chicago Press, Chicago, 1999, p. 17.

(29) White and Etkin (1997), p. 149.

A. Disaster Prevention

The Insurance Bureau of Canada's (IBC) main response to rising claims – aside from increased premium rates – has been to promote a strategy of prevention. Over the past several years, it has lobbied the federal government to adopt the IBC's Natural Disaster Reduction Plan, which calls for the government to:

- invest in infrastructure a proportionate amount of the funds spent on disaster response and recovery, independently or in conjunction with a national infrastructure program;
- invest 15% of recovery costs in mechanisms to prevent the recurrence of specific extreme events; and
- include risk assessments in every project in which the federal government invests.(30)

In its May 2000 report on natural disasters and the insurance industry, the House of Commons Standing Committee on Finance made recommendations that generally echoed the Natural Disaster Reduction Plan. In response, in 2001 the federal government created the Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP), which was responsible for addressing many of the concerns raised by the Insurance Bureau of Canada. OCIPEP's mandate has since been folded into Public Safety and Emergency Preparedness Canada (PSEPC). This new organization is charged with, among other things:

- promoting dialogue among Canada's critical infrastructure owners and operators, and fostering information-sharing on threats and vulnerabilities;
- providing a focal point for the Government of Canada's own cyber-incident analysis and coordination efforts, and supporting federal departments and agencies in meeting their responsibilities for protecting their information technology systems and networks;
- promoting other areas of cooperation, such as raising awareness, enhancing education and training, and promoting research and development in the field of information technology security; and
- achieving an appropriate level of national civil emergency preparedness.

PSEPC is also developing a National Disaster Mitigation Strategy, which is "aimed at reducing or eliminating the personal, social, economic and environmental risks and impacts of natural and human-induced disasters."(31)

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(30) Insurance Bureau of Canada, "Natural Disaster Reduction Plan," http://www.ibc.ca/ii_natural.asp.

(31) Office of Critical Infrastructure Protection and Emergency Preparedness, "Backgrounder – Natural Disaster Mitigation Strategy," May 2003.

The IBC has also partnered with the Government of Ontario and the University of Western Ontario to create the Institute for Catastrophic Loss Reduction, which undertakes a research program to study how best to mitigate natural disasters. The Institute is helping to coordinate private, public and non-profit sector studies of extreme weather and earthquakes, and it has held workshops with government representatives, scientists and experts to examine Canada's increasing vulnerability to natural hazards.

White and Etkin argue that relying, as North America has, on loss prevention through technology, insurance (i.e., sharing losses) and restoration, is not sustainable in and of itself, because it is "based upon the debatable assumption that current loss rates are sustainable, and that social and other costs resulting from extreme events beyond design safety are not prohibitive."(32) This view on loss prevention seems to emerge from the fact that, "by design," the insurance industry's "actuarial outlook and disaster reserving conventions are based on past experience."(33) Such an approach does not adequately account for ever-increasing losses due to increasingly severe effects of climate change.

B. Insurance Coverage

As Vellinga and Mills remark, in North America "[l]ower income groups tend to live in more vulnerable housing and are least able to afford potential increases in insurance costs by insurers or cross-subsidies utilized to spread risks."(34) If premium rates continue to rise, more lower-income Canadians could choose not to buy insurance, on the grounds that the price is unaffordable. In the event of a disaster, the federal DFAA program, which covers only those items that could not have been insured *at a reasonable price*, might fail to meet their needs. The same is true for those homeowners without insurance.

Such cases – a perception that insurance costs are too high and/or insurance take-up is too low – could lead to calls for government intervention. The federal government, through the provincial/territorial governments, could choose to help these families, at a cost to the taxpayer. This option also raises the possibility of moral hazard, where people, expecting that the government will bail them out in the future, will not buy insurance.

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(32) White and Etkin (1997), pp. 148-149.

(33) Vellinga and Mills (2001), p. 775.

(34) *Ibid.*

C. Changing Activities (Addressing Climate Change Directly)

Despite evidence suggesting that climate change has a role – possibly a central one – in the continued worldwide increases in insurance costs, the Canadian insurance industry, unlike its European counterparts, has not advocated measures that might mitigate climate change. For example, only one Canadian company, the Dominion of Canada General Insurance Company, signed the United Nations Environment Programme's "Statement of Environmental Commitment by the Insurance Industry." This document is a statement of intent to address issues such as pollution reduction, the efficient use of resources, and climate change, recognizing "that economic development needs to be compatible with human welfare and a healthy environment. To ignore this is to risk increasing social, environmental and financial costs." The statement was signed by 89 companies in 25 countries. Most of the companies were based in Europe; European-based insurers have been leaders in advocating reductions in greenhouse gas emissions.

Liability is another issue. White and Etkin suggest that if man-made pollutants are the main contributor to global warming, and global warming is causing the increase in weather-related disasters, it will become difficult to argue that these disasters are "acts of God":

> As the implications of global warming become clearer, the victims of climate change and variability will find it difficult to put claims to their insurer on the assumption that the storms are both sudden and unpredictable. Indeed the mathematician, Fourier, predicted this outcome in the 1820s, while the physicist Arrhenius published the first paper on global warming in 1893, more than 100 years ago.(35)

White and Etkin point to a 1996 ruling in a California court that "found in favour of the insurers of a client (who had polluted the groundwater around several of its factories), on the grounds that the client 'should have known' that these actions would lead to contamination … ." This reasoning, they argue,

> opens up some very broad questions about the deliberate emission of greenhouse gases – the largest single act of pollution that human beings have contrived so far – at a time when the global scientific community has concluded that 'potentially serious changes have been identified, including an increase in some regions of extreme high temperature events, floods, and droughts, with resultant consequences for fires, pest outbreaks and ecosystem composition, structure, and functioning, including primary productivity'… .(36)

(35) White and Etkin (1997), p. 158.

(36) *Ibid.*

To deal with climate change, White and Etkin recommend:

- assisting "in educating the public and the politicians to understand the need to reduce greenhouse gas emissions as speedily as possible";
- supporting "monitoring and research activities that can enable us to adapt to the climate changes to which our actions have already committed us"; and
- accepting the proposition that climate change will increase (and is increasing) the level of uncertainty underlying actuarial calculations, which will require "traditional responses such as reserve accumulation, loss reduction, and so on."(37)

At present, mitigation as implemented by governments and the insurance industry involves addressing the structural soundness of Canada's infrastructure. Other steps that could be taken include the application of stricter building codes and town plans. Another way to address the problems associated with rising insurance payouts would involve advocating reduced use of fossil fuels, on the grounds that they represent the main human contributor to the global warming phenomenon.

D. Ensuring Capital Adequacy

Insurance companies (and society generally) face the prospect of continuing claim payment increases, as well as the rising frequency of potentially ruinous payouts associated with large-scale natural disasters. Furthermore, since the trend toward increasingly ruinous natural disasters is a worldwide phenomenon, reinsurers are also affected. Insurers, faced with rising costs, can be expected in some areas either to raise their premiums to the point where they are prohibitively costly, or to vacate a product line or region completely.

As noted previously, part of the problem currently facing the insurance industry is cyclical: investment returns have been relatively low in recent years, but can be expected to recover, boosting insurance companies' profitability. Indeed, investment income rebounded in 2003, leading to a sharp jump in industry profits. A "recovery" on the underwriting side of P&C insurers' business, however, is less likely, given the trend over the past 30 years, the continued build-up of wealth in disaster-prone areas and the expected increase in the frequency of natural disasters.

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(37) *Ibid.*

Several solutions aimed at keeping insurance available and affordable have been put forward. In line with its American counterparts, the CAMIC has asked the federal government for tax relief for funds placed in a catastrophe reserve, which would be used only to pay claims resulting from catastrophic events.(38) Currently, it is relatively difficult, for tax reasons, to set up reserves. Consequently, according to Baker, "sometimes money is transferred out of the country to allow the creation of reserves. There are many mechanisms to do this, often involving the setting up of captive companies."(39)

Since 1997, the OSFI has required that federally regulated insurance companies selling earthquake protection set up an "earthquake reserve" to ensure that they have adequate capital to respond to earthquake claims. This measure applies to insurers and reinsurers. The 1998 federal budget made part of these earthquake reserves, the "earthquake premium reserve," deductible for income tax purposes.(40) Similar programs operate in England, France, Switzerland, Germany, Japan and Italy.

In the United States, according to White and Etkin, it is estimated that it will take 20 to 25 years for such reserves to meet the market's needs. In response to this situation, American governments have created a supplementary local reinsurance pool through industry-wide contributions and a public guarantee. Furthermore, there are also markets for catastrophe options in the United States. These options would help maintain and rebuild insurance companies' ability to provide insurance at a reasonable cost in affected areas. White and Etkin remark, however, that "these proposals can be considered an adequate response only if these extreme events are viewed as an anomaly, and not as a long-term trend associated with an enhanced greenhouse effect."(41) In other words, should current trends persist, these responses would be inadequate to address the problems faced.

Baker agrees with this assessment. He predicts that the insurance industry will gradually shift away from "standard actuarial models" because of the high degree of uncertainty caused by climate change:

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(38) Canadian Association of Mutual Insurance Companies, Submission to the House of Commons Standing Committee on Finance, September 2003.

(39) Baker (2002), p. 6.

(40) Department of Finance, *Tax Expenditures: Notes to the Projections/Estimates*, 2000, p. 85.

(41) White and Etkin (1997), p. 155.

> The industry has always felt that the past is the key to the future. This is only true if conditions in future remain the same as in the past. With the many changes in society and the potential changes in climate, this will no longer hold true. Thus the industry may move to a more inductive set of models to create rates. This may be a more difficult "sell" to policyholders as the rate creation system becomes more complex and difficult to justify.(42)

Worldwide, insurance firms have engaged in insurance securitization "as a means for transferring these types of insurance risks to capital markets."(43) According to Leadbetter, Kovacs and Carayannopoulos, securitization – whereby insurers transfer underwriting risks to the capital markets through creating and issuing financial securities – is still in its infancy in Canada. They consider this to be

> a reflection of the slower development of all forms of securitization products in Canada and of a competitive reinsurance market with rates well below the costs of securitization. It is only since the mid-1990s that the securitization market in Canada moved beyond mortgages and into asset backed securities. This is partly due to the nature of the Canadian property and casualty environment, i.e., availability or reinsurance coverage at relatively low rates, a lower incidence and experience with catastrophic events, and uncertainty surrounding the regulatory environment with respect to the securitization of insurance risks.(44)

These comments suggest that, should reinsurance become more expensive and the intensity and frequency of natural disasters increase, Canadian insurance companies will increase their use of securitization.

E. Role for Government

Insurance companies can respond to the rising losses associated with the increasing frequency and severity of natural disasters in several ways: "raising premiums or deductibles, withdrawing coverage, creating systems for pooling risk among multiple insurers … and the use of capital market alternatives to finance risk."(45) As well, insurance companies can work to mitigate costs related to natural disasters – for example, through better building codes.

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(42) Baker (2002), p. 19.

(43) Leadbetter, Kovacs and Carayannopoulos (2003), p. 3.

(44) *Ibid.*, p. 7.

(45) Vellinga and Mills (2001), p. 775.

Governments, including the federal government, may, in some cases, be called upon to become involved. As has already been mentioned, the federal government is working with the insurance industry on disaster mitigation strategies. The federal government could also become active in helping promote the securitization of risk.

Looking toward the future, public pressure might compel governments to act in cases in which, due to increased liabilities, insurance companies vacate a region or product line, or increase premiums above a politically acceptable level. Provincial debates on the level of automobile insurance premiums, most recently in the 2003 New Brunswick election, demonstrate that there is a political upper limit to insurance rates.

Should insurance companies decide to vacate an area or product line due to increased liabilities, governments might be pressured to compel insurance companies to provide insurance to these areas. For example, "In some jurisdictions, regulators have restricted policy cancellations and nonrenewals following natural disaster losses such as Hurricane Andrew (in the United States) … Recent requests from Florida insurers to double rates to protect insurers from hurricane risks also have been resisted by regulators."(46) Furthermore, in areas in which governments believe that not enough people are buying insurance, they could encourage an appropriate amount of insurance take-up through such measures as tax rebates, or through the development of a supplementary insurance pool. Increasing the level of insurance coverage in this way could help mitigate the pressures on the public purse by reducing the level of funding the federal government would need to provide to a province or territory under the DFAA program, which covers only uninsured/uninsurable costs.

At the same time, Vellinga and Mills remark that "regulators can force insurers to withdraw from markets or otherwise change their business practices so they maintain minimum solvency requirements." They also note that policies surrounding pre-event (i.e., a natural disaster) accumulation and taxation of reserves represents another area in which governments can play an important role.(47)

(46) *Ibid.*, p. 435.

(47) *Ibid.*

CONCLUSION

For reasons of climate change, economic growth and population growth in areas prone to natural hazards, P&C insurers are likely to face rising claims for payments as the economic cost of natural disasters increases. This reality could have important implications for the viability of P&C insurers, the availability and affordability of insurance to consumers and businesses, and the cost to governments and society. In recent years, this long-term trend was exacerbated by P&C insurers' low returns on their investments, though these returns improved in 2003.

Governments and the insurance industry have already started to address the problems associated with the increasing severity and frequency of natural disasters, most notably through programs to mitigate the effects of natural disasters. If such risks continue to climb, however, they may translate into increasing public and political pressure to further reduce greenhouse gas emissions and to continue efforts to improve insurers' capital availability.