



# sigma

No. 1/2003

The picture of ART

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Published by:  
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This issue was completed on 9 December  
2002.

*sigma* is also available in French, German,  
Italian, Spanish, Chinese and Japanese.

*sigma* is also available on Swiss Re's server:  
<http://www.swissre.com>  
(under "Research & Publications",  
"sigma insurance research")

Layout: Swiss Re Logistic/Media Services

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# Summary

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## **The ART market includes alternative carriers and products.**

There are two segments to the alternative risk transfer (ART) market - risk transfer through alternative carriers and through alternative products. The market for alternative carriers consists of self-insurance<sup>1</sup>, captives, risk retention groups and pools and registered premiums of about USD 88 billion in 2001, of which over half was in self-insurance. The use of captives has increased dramatically with the hardening non-life insurance market. Average premium growth should be close to 10% per year through 2005. Since most multinational corporations already have a captive, the number of captives is not expected to rise appreciably, though some growth in captive formation will arise from rent-a-captives and protected-cell captives, which primarily serve medium-size corporations.

## **There is a wide variety of ART products to meet the needs of companies.**

Alternative risk transfer products include finite risk reinsurance, run-off solutions, committed capital, multi-line, multi-year products, multi-trigger programs, structured finance and new asset solutions, and capital market solutions for weather risk. These products provide a variety of solutions to meet the financial and risk transfer needs of corporations. For example, finite reinsurance provides a risk financing mechanism for near certain events. For a corporation, this might be for payments on a known set of uninsured losses or for a plant that is known to break down every five years. Committed capital, often referred to as contingent capital, is a form of prearranged financing provided to a company after it experiences a financially stressful event. Through their underwriting expertise, insurers and reinsurers have also been able to provide structured finance solutions, including asset-backed securities for non-standard income flows, such as franchise fees.

## **The ART market will focus on increasing capacity.**

The hardening of the commercial insurance market has changed the focus of the ART market towards increasing capacity. Now, with insurers' capital bases being tight, many limits are being placed on traditional insurance covers and the demand for ART solutions has shifted towards products that provide solutions for risks that are difficult to transfer. The market for these innovative solutions is growing rapidly, though often from a very small base. The prospects for some solutions, particularly finite reinsurance, have shifted due to the recent accounting scandals.

<sup>1</sup> The term self-insurance is used for so-called qualified self-insurance programs in the US.

# Introduction

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Companies face an increasing array of risks.

Companies, both financial and non-financial, face an increasing array of risks - earthquakes, fire, business interruption, product recalls, directors and officers liability, asbestos litigation, terrorism, financial volatility, credit risk, market risk, political risk, weather volatility, and many more. How companies manage these risks has a great impact on their market value, their risk of bankruptcy and financial distress, their ability to invest in projects with the necessary amount of funds and in a timely manner, and even their tax liability. Insurance and reinsurance companies are in the business of assisting corporations in managing risk. The solutions (re)insurers provide run the gamut from traditional insurance - such as commercial property insurance - to alternative risk transfer products (ART), such as finite reinsurance, committed capital and multi-line/multi-year products. Both traditional and ART products complement each other and provide a wide range of solutions to meet the risk transfer needs of corporations. The traditional products tend to be generic in nature, with standard contracts, while the ART products tend to be customized for the individual client's needs.

To insure or not to insure, that is the question.

Given the diversity of risks that corporations must mitigate, the decision to transfer risks or retain them is continually addressed. Some risks are a part of the core business of the company and are sensibly retained, while other risks come from the external environment and are well suited for transferral to the insurance or capital markets. The cost of transferring risks is, of course, a part of the decision and as the prices change for various risk transfer products, the decision to retain or transfer risk needs regular evaluation. With an ever-changing risk landscape, the solutions employed to mitigate risk require constant assessment.

The next question is: traditional or ART?

If corporations decide to insure, rather than retain risks, they then choose either the traditional or alternative markets, or a mixture of both. During a soft market, when insurance rates are low, corporations tend to prefer the traditional commercial insurance market. However, when rates harden, the ART markets often prove more advantageous. Global commercial lines' direct premium volume - written by traditional carriers - was about USD 370 billion in 2001, while the premium volume for various types of ART carriers was about USD 88 billion. Premiums for both commercial insurance and ART are expected to grow rapidly over the next few years. Premium growth for commercial insurance will be driven by price increases, while the increasing need for customized solutions and alternatives to highly priced and scarcely available traditional commercial insurance capacity will drive demand for ART-carriers and products.

This *sigma* focuses on large corporations and their appetite for risk transfer, in addition to analyzing ART solutions for insurance companies and banks.

This *sigma* focuses on risk transfer by large non-financial corporations, but also includes ART solutions that are used primarily by insurance companies and/or banks. Some ART solutions used now by insurers may ultimately serve a purpose for corporations. Therefore a wide range of ART products are covered in order to show their full spectrum. For example, insurance-linked securities such as catastrophe bonds - that transfer insurance risks to capital markets - are currently a product for insurers, but could also someday be used by corporate clients. A bond triggered by a "catastrophic" drop in vehicle sales would be of interest to auto manufacturers. Similarly, portfolio default swaps are a product for banks, however, they also deal with the type of credit risk faced by large corporations.

## Why does risk transfer matter to companies?

**Risk management reduces costs associated with financial stress.**

There are three main reasons why companies manage their risks and purchase insurance - all related to stabilizing revenues and profits.<sup>2</sup> First, risk transfer can provide funds when companies need them most, reducing the risk of bankruptcy and financial distress costs. These financial distress costs include: poorer terms on loans, strained relationships with suppliers and clients, departure of key personnel or a need to pay a high retention wage, and a fall in the company's stock price which would curtail raising equity or leave the company vulnerable to takeover.

**Risk transfer safeguards future earnings.**

A second reason why companies manage risk is to minimize the disruption of investment plans by reducing cash flow volatility. Companies purchase insurance to improve financial stability and to signal to the market that the company is using a mechanism to lower volatility. With more stable cash flows, companies avoid underfunding investment projects which require a stable injection of cash.

**Stable profits can lower taxes.**

Finally, another motivation for stabilizing revenues and profits arises from various tax regimes. First, the asymmetrical tax treatment of profits and losses can increase taxes for companies with volatile profits. Loss carry-forwards are frequently limited and always incur opportunity costs as they do not yield any interest. Second, if corporate taxes are progressive companies will have an incentive to avoid the higher tax brackets, which could be reached with highly volatile earnings. Finally, reduced volatility could allow a company to increase its leverage, boosting its interest write-offs.

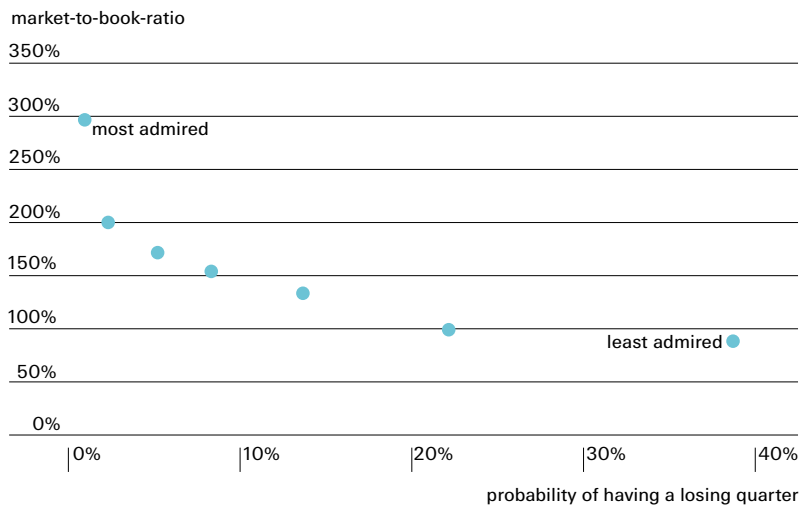
**Stable earnings and high stock valuations are correlated.**

Earnings stability is a good predictor of corporate reputation. Using financial data and Fortune's annual list of "America's most Admired Companies" Antunovich and Laster showed that companies that earn quarterly profits with great regularity tend to be among the most admired firms in their industries.<sup>3</sup> Stable earnings also go hand in hand with high stock market valuations (price book multiples) and high credit ratings. Figure 1 shows this relationship for a set of companies grouped into seven classes, ranked by the degree of admiration:

<sup>2</sup> Hereby we mean the stabilization of the true economic picture of corporations and not mere balance sheet engineering as seen in the recent accounting scandals.

<sup>3</sup> See: Antunovich and Laster, "Do investors mistake a good company for a good investment?", Federal Reserve Bank of New York Staff Report, August 1998.

Figure 1  
**Most admired firms combine stable earnings with high valuations.**



Source: Antunovich and Laster

**The cost of insurance is small compared to the benefits.**

Risk management creates shareholder value if the benefits outweigh the costs. This relates to the dimensions of expected losses as well as to the volatility of results. Our analysis, coupled with the work of others, indicates that the cost of insurance is very low in cost-of-capital-terms compared to the benefits. The average cost of insurance purchases by the Fortune 1000 companies is only about 4 basis points of total capital (see Box: Insurance costs and the cost of capital). This is substantially below benefits from managing risks. For example, according to a study by Allayannis and Weston,<sup>4</sup> exchangerate hedging, using forex derivatives, can increase the market value of a company by nearly 5%, which is equivalent to reducing the cost of capital by 57 basis points (assuming a 12% return on equity for an unleveraged firm).

<sup>4</sup> Allayannis, George and Weston, James P. "The use of foreign currency derivatives and firm market value," *Review of Financial Studies*, 2001, pp. 243-76.

## Insurance costs and the cost of capital

Earnings stability can reduce a company's capital costs and bolster its bond market rating. The calculations below indicate the cost of equity and debt financing of Fortune 1000 companies and compare it with the net cost of purchasing insurance cover. Most of a large corporation's compensation for risk taking flows to shareholders, the providers of risk capital. The equity risk premium is an extensively discussed issue with a wide range of results. Here we use a low (4.3%) and high estimate (7.4%) for the equity risk premium.<sup>5</sup> With a market capitalization of the Fortune 1000 companies of about USD 11 trillion in 2000, the equity risk premium to shareholders ranged between USD 473 billion and USD 814 billion.

A second major category of risk compensation flows to the lenders of capital. Investors in corporate bonds get compensated for the insolvency risk they bear. Corporate bonds pay a spread, depending on their credit rating, over risk-free government bonds. In 2000, Aaa rated corporations paid an average spread of 1.6% over risk-free bonds and Baa rated corporations paid a spread of 2.3%. Given the total volume of corporate bonds is USD 7.8 trillion, this provides an estimated range of USD 125 billion to USD 180 billion for risk premiums to investors in US corporate bonds. Risk premiums on bank loans and risk-hedging derivatives are not included due to insufficient data.

The insurance premiums paid are small compared to the equity and debt capital costs. Premiums of USD 25 billion were paid for commercial insurance, or only 13 basis points of the total market value, USD 18,790, of the Fortune 1000 companies' outstanding stocks and bonds. The figure is even smaller if the value of claims payments is taken into account. The average expected net present value of each premium dollar paid to commercial lines insurers is about 67 cents, which means the average net cost of each dollar of risk transfer is 33 cents, or 8 billion in net premiums. The aggregate purchase of insurance by the Fortune 1000 companies creates shareholder value if the earnings stabilization reduces the weighted average cost of capital by only 4 basis points.

Table 1  
Various costs of risk taking for Fortune 1000 corporations

2000 <sup>6</sup>	Market capitalization USD bn A	Risk premium low estimate in % B	Risk premium high estimate in % C	Risk Premium low estimate USD bn D=AxB	Risk Premium high estimate USD bn E=AxC
Equity market & equity risk premium	10995	4.3%	7.4%	473	814
Bond market value & bond risk premium	7795	1.6% (Aaa)	2.3% (Baa)	125	179
Insurance premiums		n.a.	n.a.	25	25
Total	18790			623	1018
Net cost of insurance (33% of premiums)		n.a.	n.a.	8	8

<sup>5</sup> Source for the low estimate is Eugene F. Fama and Kenneth R. French "The Equity Premium" in The Center for Research in Security Prices Working Paper No 522, April 2001. Source for the high estimate is Ibbotson.

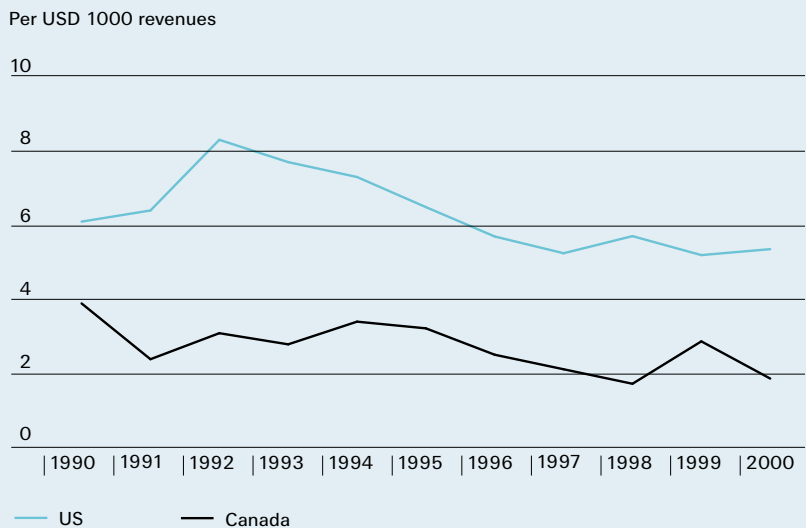
<sup>6</sup> Sources: Fortune for market capitalization, BIS for amount of outstanding corporate bonds, Moody's for corporate bond rates and spreads, Marketstance for insurance premiums. The face value of outstanding corporate bonds is for the entire corporate sector. We assumed a high overlap with the Fortune 1000 segment, however, as the corporate bond market is only available to large corporations.

### The cost of risk in US and Canada

The cost of risk is a concept developed by RIMS (Risk and Insurance Management Society),<sup>7</sup> integrating the costs associated with an organization's management of risk. It aggregates insurance premiums, retained losses, risk control and loss prevention expenses and administrative expenses. RIMS has standardized the variables and conducted regular surveys in the US and Canada.<sup>8</sup> The results are expressed in USD per USD 1000 revenues for better comparability.

The average cost of risk declined during the soft market, as can be seen in Figure 2. Falling insurance rates and low self-insured losses drove this trend.<sup>9</sup> It is estimated that the current hardening of the market has increased the average cost of risk by about 50% since 2000. The cost of risk is significantly higher in the US than in Canada, which is mainly due to the private funding of worker's compensation insurance in the US and higher liability costs.

Figure 2  
Cost of risk in US and Canada



Source: Ernst & Young, RIMS

<sup>7</sup> RIMS represents nearly 4000 industrial, service, nonprofit, charitable, and government entities.

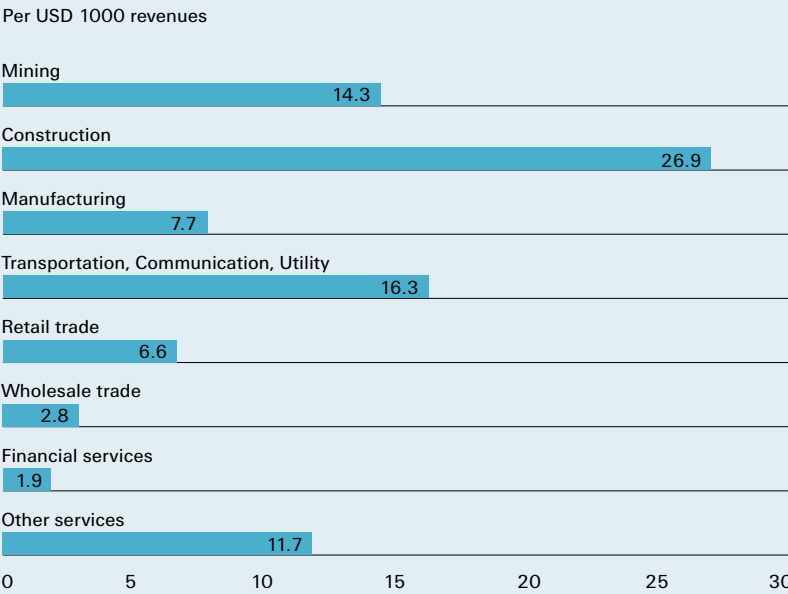
<sup>8</sup> The survey has been conducted since 1998 by Ernst & Young on behalf of RIMS.

<sup>9</sup> The survey panel changed over time, which may have distorted the over-time comparisons.

The cost of risk for a company is inversely proportionate to its size. In the RIMS sample, US companies with less than USD 50 million revenue paid USD 26.8 per USD 1,000 of revenue, or more than seven times the cost of risk per dollar of revenue than the largest companies in the sample with over USD 10 billion in revenue and which paid only USD 3.5 per USD 1,000. The same pattern was evident for Canadian companies, albeit to a lesser extent.

Another source of information on corporate insurance purchase patterns is MarketStance. This data quantifies the market size and the relative cost of risk for different industry segments and risk categories (lines of business) within the group of Fortune 1000 companies. Figure 3 indicates the average cost of insurance and alternative risk transfer (including self-insurance) per USD 1000 of revenue. Unlike the RIMS cost of risk figures, risk management expenses are not included.<sup>10</sup> Mining, construction and the transportation, communication & utilities sector have the highest cost of risk transfer in relation to their revenues. The financial services and trade sectors have the lowest cost of risk transfer.

Figure 3  
**Cost of risk financing for various industries**



Source: MarketStance

<sup>10</sup> The Marketstance cost of risk financing can diverge significantly from the cost of risk tracked in the RIMS survey, as MarketStance models the premium carriers would charge to cover risks currently handled through ART mechanisms rather than the cost actually borne by the insured.

The hard insurance market will increase demand for ART solutions that focus on expanding capacity.

Changes in the risk landscape challenge the limits of insurability and stimulate new product development.

Asbestos is back.

Rising litigation settlements are also increasing demand for liability coverage.

## Trends in the risk landscape affecting demand for risk management

The severe bear market since 2000 and record losses in 2001 have reduced global insurance capacity by about 25%, compared to early 2000.<sup>11</sup> The reduction in capacity has increased non-life insurance prices substantially, hardening the market. The hardening of the market is expected to last longer than in previous cycles, given the global shortage of quality capital, increased risk exposures, uncertain investment returns, and growing concerns regarding reserve adequacy.<sup>12</sup> During this time of capacity shortage, ART products which boost insurance capacity will be in heavy demand.

Companies face a shifting risk landscape from structural changes in the economy, changes in the legal environment, and the emergence of new risk classes due to, for example, new technologies, globalization, deregulation, and geopolitical changes. These alterations to the corporate risk landscape lead to shifts between traditional lines of business, a steady push forward in the limits of insurability, and the development of new products. Many ART products are better suited to manage new risk classes that are not (yet) dealt with by traditional insurance markets.

Asbestos is old news, receiving new attention recently. One reason is a new wave of legal actions against corporations that were not manufacturing asbestos, but distributed or dealt with asbestos products in other ways. Another reason for the increased publicity is recent settlements of cases. The exposure is very unevenly distributed among a few players. The recent acceleration of payments is alarming as it is attracting waves of new claimants. The insurance industry's asbestos and environmental reserves shortfall is estimated to be around USD 55 billion.<sup>13</sup> It is expected that insurers will not rush to fund recognized shortfalls, but rather continue to use a pay-as-you-go approach to funding. Uncertainty in relation to asbestos claims remains a significant issue for the manufacturing industry. The recent case of ABB losing about two-thirds in market capitalization following the announcement of new asbestos exposure estimates from a US subsidiary, illustrates the extent to which asbestos can influence stock market valuations.<sup>14</sup>

Apart from asbestos, there are also liability exposure hot spots developing rapidly. In the US, liability claims inflation continues for medical malpractice, directors and officers (D&O), errors & omissions (E&O), employment practices, various professional lines, and nursing home covers. The recent strong increase in liability claims in the US is due to their rising frequency and severity. From 1995-2000, the median jury award in medical malpractice cases doubled to

<sup>11</sup> See *sigma* 4/2002 "Global non-life insurance in a time of capacity shortage."

<sup>12</sup> Morgan Stanley recently speculated that the figure for the core reserves (non-asbestos & environmental reserves) shortfall of US non-life insurers is about USD 64 billion. This is at the high end of the range of estimates, Fox-Pitt, Kelton quantifies the core reserves shortfall around USD 30 billion.

<sup>13</sup> A.M. Best estimates the asbestos reserve shortfall to be about USD 33 billion and the deficiency of environmental pollution reserves claims prior to 1984 to be about USD 24 billion. Morgan Stanley estimates the asbestos & environmental shortfall to be around USD 55 billion.

<sup>14</sup> The company announced another increase in its estimate for asbestos-related claims and is considering filing for Chapter 11 bankruptcy-court protection for its US unit, Combustion Engineering, which is under pressure from mounting asbestos litigation. However, some analysts doubt whether this move would insulate the parent company from claims.

USD 1 million during a period when overall inflation was low. Other lines of liability show a similar development and out-of-court settlements follow the trend.<sup>15</sup> Extreme severity verdicts have also escalated in the US. In 1998, there were 17 verdicts involving awards of USD 100 million or more. In 1999, there were 18, and in 2000 the number was up to 27.<sup>16</sup> While the severity of this type of settlement is not as high in Europe, anecdotal evidence indicates it is also increasing there.

**The accounting scandals have increased the risk associated with D&O liability.**

One of the consequences of the recent stress in financial markets and accounting scandals is a rise in the frequency of D&O claims. Particularly problematic have been some of the more spectacular bankruptcy cases, in which top executives benefited substantially from stock price increases, while many employees and investors lost large amounts of money. This has stimulated the efforts of lawyers to recover some of the lost money for employees and shareholders. In addition, disappointed investors are filing professional liability claims in an attempt to recoup some of their losses. Litigation efforts gravitate towards the deepest pockets, which puts D&O and E&O insurers on the frontline. Though this problem is most evident in the US, it is increasing in Europe and even Japan.

**Corporations are increasingly dependent upon financial markets.**

Another trend is the growing dependence of corporations on financial markets. There are many aspects to this exposure:

- The higher amount of corporate bonds outstanding has increased corporations' exposure to the credit cycle and bond ratings.
- The recent trends of focusing on shareholder value, privatizations of government-owned enterprises, and initial public offerings (IPOs) of smaller corporations has increased the dependence of many corporations' cost of capital on stock market valuations and stock analysts.
- The shift of many European countries toward International Accounting Standards (IAS) or US Generally Accepted Accounting Principles (GAAP) has created more volatility in reported earnings. The current bear market, for example, has forced many companies to write down equity investments for other-than-temporary decline in value, which would not have been necessary according to some older accounting regimes.
- This trend has been confirmed by the adoption of a quarterly reporting frequency by many European corporations, exposing the bottom line to more fluctuations from random loss shocks.

**The rise of new risk classes presents a challenge to the insurance industry.**

New risk classes frequently challenge the limits of insurability. Insufficient market data and loss experience complicate the underwriting process and result in high parameter risk: the uncertainty over the true value of expected losses. Also, many new risk classes are close to entrepreneurial risks and therefore generate moral hazard risks. Many traditional insurers feel uncomfortable assuming these types of risks. Hence, alternative solutions are frequently better suited to create a win-win situation for both transaction partners.

<sup>15</sup> 15 Source: Jury Verdict Research.

<sup>16</sup> See Thomas Tizzio, in "Bermuda Insurance Update" 41, Spring 2002

Large corporations are seeking protection for a variety of new risk classes:

- enhancement to facilitate financing in the capital market
- Protection of the value of non-liquid asset classes
- against commodity price volatility
- Transfer of large, complex risks, such as asbestos liability or environmental liability
- Protection against new risks like cyber risks and political risks
- Protection against terrorist actions, and
- Hedging market risks

### Why ART?

Traditional insurance had more of an isolated mono-line approach to risks. Increasingly complex risks and sophisticated risk management called for an integrated approach to corporate risks. ART solutions were developed to address such needs and reduce the cost of risk over time.

Good risks do not always get adequate recognition in traditional insurance policies.

Actuarial pricing is frequently based on average risk statistics. Due to asymmetric information between insurer and insured, good risks may not be able to obtain traditional insurance cover at rates reflecting their individual risk level, but the higher (average) market rates. As a result, companies with good risk characteristics, reluctant to subsidize bad risks, may turn instead to self-insurance (eg qualified self-insurance and captives) and risk financing solutions (eg finite risk solutions).

ART products expand the limits of insurability.

Insurance protection may alter the actions of the insured, since the incentive to prevent or contain a loss is reduced. This is one of the major obstacles to insuring business risks instead of hazard risks. To mitigate this “moral hazard”, elements of self-insurance can be introduced into risk transfer solutions - by increasing the component of risk financing and reducing risk transfer, or by defining triggers that are independent of the insured’s behavior. This type of mechanism facilitates, for example, the inclusion of financial and commodity risks into risk transfer solutions. Insurability is also often limited due to inexperience with new risks (eg cyber risks, the Y2K risk and now the new terrorism exposure). The commercial insurance market frequently becomes familiar with a new risk class through coverage via ART products. Later, traditional covers may emerge.

ART products add capacity.

Some risks are well understood, but considered uninsurable due to their sheer size. Some natural catastrophe scenarios range from USD 50 to over USD 100 billion, depending on the location and intensity of the event. Commodity risks and financial risks create aggregate exposures of magnitudes that challenge the capital strength of many commercial insurers. Securitization, for example, can supplement the capacity of the commercial insurance market by tapping directly into the capital markets. Other ART products shift the focus from risk transfer to risk financing and hence increase the scope of risk management solutions.

**ART products can reduce credit risk.**

An insurance contract subjects the insured to credit risk. Insurance claims may not get honored in the case of an insurer's insolvency. The rise in insurers' insolvencies in the early 1990s and the recent wave of downgrades by rating agencies illustrate the vulnerability of insurers' capital strength to catastrophic or financial market risks.

**A hard insurance market presents opportunities for new risk transfer solutions.**

The commercial insurance market is characterized by a strong cyclical pattern. Periods of high premium rates and limited availability of cover alternate with periods of low premium rates and easily available cover.<sup>17</sup> From the insured's point of view, this partially contradicts the primary purpose of the insurance purchase: exchanging uncertainty regarding a variety of risks against predictable, stable premium payments. ART products can partially insulate corporations from the volatility of the underwriting cycle by means of increased self-insurance, multi-year contracts, substitution of risk transfer with risk financing, or using capital markets as risk carriers.

**Large corporations dominate demand for ART products.**

Table 2 shows the volume of premiums paid to commercial insurance carriers and alternative carriers, estimates based on MarketStance US data on the largest 1 000 corporations and Fortune 500 data on the 500 largest corporations worldwide. The US data was extrapolated to estimate the market size for the largest 2500 corporations worldwide. Some adjustments regarding the relative cost of risk were made to account for US-specific high liability costs and the private market for workers' compensation. The US dominates this market of 2500 global companies: about 40% of corporate revenue, about 52% of insurance premiums to traditional insurance carriers, 60% of captive insurance premiums, and 100% of self-insurance and other carriers premium-equivalent originate in the US (see Box: Details on risk transfer in the US). Large corporations account for most of the captive market. While the 2500 largest corporations account for about 13%, or USD 49 billion, of the global market for risk transfer written by commercial insurance carriers, they account for 80% of the captive market and 45% of other alternative carriers, including self-insurance solutions.

Table 2  
**Global market for large corporations' risk transfer**

2001 direct premiums written or premiums equivalents	Total	Largest 2500 companies' premiums	
	Commercial lines	USD bn	in % total
Traditional carriers	370	49	13%
Captives	38	31	80%
Self-insurance and other alternative carriers (US)	49	22	45%
<b>Total</b>	<b>457</b>	<b>102</b>	<b>22%</b>

<sup>17</sup> For a thorough discussion of the underwriting cycle, see sigma 5/2001 "Profitability in the non-life insurance industry: it's back-to-basics time".

### Details on risk transfer in the US

Due to data availability, the US corporate market can be examined in detail. Since it is the largest market for corporate risk transfer, the information provides an insight into the global market, though it cannot necessarily be extrapolated to the rest of the world.

*sigma* analyzed the volume of the traditional commercial insurance and ART market estimates for the largest 1 000 US corporations based on MarketStance data. In 2000, the 1 000 largest US companies had a total risk transfer or absorption of USD 65 billion. About USD 30 billion of insurance and reinsurance premiums were transferred to (re)insurance carriers. Another USD 35 billion was managed through self-insurance and captives. Special lines of risk such as D&O, E&O, employment practices or credit & surety are not part of the data set.

The MarketStance data provide information on the following risk categories: property, liability, workers' compensation and commercial auto. The ART premium equivalent, which includes captive premiums, outweighs insurance premiums for all risks except property. Table 3 shows the respective shares of traditional insurance premiums and ART premiums/premium equivalents for the major lines of business. This statistic shows the large fraction of workers' comp. and liability risks of the total ART solutions. Together, these long-tail risks represent 69% of the entire ART market.

Table 3  
**US traditional and ART premiums, by line of P/C business**

Fortune 1000 US corporation Line of business	Traditional premiums		ART premiums equivalent	Total cost of risk financing		
	USD bn	in %	USD bn	in %	USD bn	in %
Property	8.8	35%	8.4	21%	17.1	26%
Liability	9.0	36%	11.5	29%	20.5	31%
Worker's compensation	5.7	23%	15.8	40%	21.5	33%
Commercial auto	1.8	7%	4.3	11%	6.1	9%
<b>Total all lines</b>	<b>25.3</b>	<b>100%</b>	<b>39.9</b>	<b>100%</b>	<b>65.2</b>	<b>100%</b>

Source: MarketStance

Table 4 provides the size in revenue and employees of several US industries and the total value of their insurance premiums and ART solutions. The Fortune 1000 risk transfer segment is dominated by a few industry groups. Manufacturing and transportation, communications and utilities - account for 66% of premiums, while creating about 50% of total revenues and employing about 45% of the workforce. Both industries are large in size and insurance-intensive.

Table 4:  
**US: traditional and ART premiums, by industry**

Fortune 1000 US	companies	employees millions	revenues USD bn	Traditional premiums USD bn	ART premiums USD bn	total USD bn
Mining	21	0.5	187	0.6	2.0	2.7
Construction	10	0.2	37	0.3	0.7	1.0
Manufacturing	408	12.7	3577	11.7	15.7	24.4
Transport, Comm, Utility	88	4.1	927	5.1	10.0	15.1
Retail Trade	102	8.0	989	2.0	4.6	6.6
Wholesale trade	68	1.1	768	0.8	1.4	2.2
Financial	206	3.9	1609	1.4	1.7	3.0
Services	97	7.1	604	3.3	3.7	7.1
<b>Total</b>	<b>1000</b>	<b>37.6</b>	<b>8698</b>	<b>25.2</b>	<b>39.8</b>	<b>65.1</b>

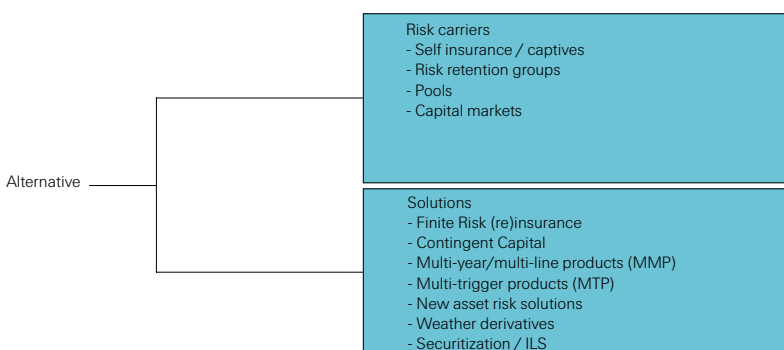
Source: MarketStance

# Risk transfer through alternative carriers

Initially, ART primarily referred to the transfer of risk via alternative carriers, such as captives.

Initially, “alternative risk transfer” primarily referred to mechanisms for corporations to insure their own risks, by means of captives, risk retention groups, pools, etc. This dimension of the ART market will be addressed in this chapter. More recently, the term has acquired a broader definition and includes customized risk transfer and risk-financing solutions that may offer some integrated form of multi-line and multi-year cover. Alternative solutions embrace products with an emphasis on financing rather than transferring risks (finite solutions, committed capital) or which offer integrated solutions for enterprise-wide risk management (multi-line/multi-year or multi-trigger products). The alternative solution dimension of the ART market will be covered in the next chapter.

Figure 4:  
Classification of the ART market



The traditional market is still the main channel for risk transfer, followed by self-insurance, captives and other ART solutions.

There are basically four types of alternative carriers: self-insurance and captives; pools; risk retention groups; and the capital markets. This chapter will only examine the captive market in depth. Various capital market solutions are discussed in the next chapter. In 2001, the size of the global ART carrier market was estimated at about USD 88 billion (see Table 5). Many of the alternative carriers discussed in this section are specific to the US. The narrowly defined “self-insurance” is largely a US regulation-driven construct (see Box: US Self-insurance). State pools and risk retention groups were other solutions to the US liability and workers’ compensation crisis of the 1980s. Captives, on the other hand, are a global phenomenon, which are increasingly being used by non-US corporations. Finally, the capital markets are an alternative carrier of insurance risks. For example, insurance-linked securities (ILS) - such as catastrophe bonds - are used to transfer risk to the capital markets. The capital market’s role as risk carrier is still relatively small. Insurance-linked securities are covered in the next chapter of this *sigma*.

Table 5:  
Size of alternative markets/carriers

Alternative carriers	2001 in USD bn	GPW	real GAGR 98-01
Self-insurance (US*)		44	2%
Captives		38	10%
Risk retention groups (US*)		1	4%
Pools (US*)		5	31%
Total		88	7%

\* Self-insurance and RRGs are US-specific products. Comprehensive data was not available for the size of the non-US pools. Real CAGR = compound annual growth rate, after inflation.

### Pools cover a wide variety of risks.

Pools are arrangements between corporations or insurers to mobilize sufficient capacity for very large risks. They are mostly organized in a similar way to mutual insurers with companies as the policyholders. Some commercial pools can assess their policyholders in case of underfunding and hence can provide capacity that exceeds the paid-in capital. Pools are typically organized on a national basis to cover a specific risk class. Sometimes they operate as a reinsurance pool, with the individual members ceding the risk and their premiums to the pool. US State pools, writing USD 5.4 billion direct premiums in 2001, insure mostly workers' compensation risks. Many of the non-US pools cover personal lines risks like the natural catastrophe pool in Spain- which covers homeowners - and the auto pool in Japan. There are also other commercial pools, for example, the nuclear risk pool in Germany, Pool Re for terror risks in UK, and aviation pools.

### Risk retention groups are US-specific liability carriers based on mutually shared interests.

Risk retention groups (RRGs) are a US phenomenon introduced in 1986 as alternative mechanisms for US corporations to access liability insurance.<sup>18</sup> RRGs are specialized liability insurance companies incorporated as mutuals, writing USD 0.9 billion direct premiums in 2001. As insurance companies, RRGs retain risk and need to be capitalized by their members. The business is dominated by the professional services (45%) and healthcare industry (37%).

## US Self-insurance

The largest segment of the US alternative market consists of self-insurance, representing about three-quarters of the total alternative market. Common coverages for self-insurance include workers' compensation, general liability, product liability, auto liability and property. Workers' compensation, which accounts for the greatest area of self-insurance, and auto liability can only be self-insured as regulated programs. Strongly regulation-driven, qualified self-insurance is a US phenomenon.

To receive self-insured status, employers must qualify through application processes, meet specified financial requirements, and be approved by a supervising authority. A qualified self-insured is usually required to cover loss reserves through cash, letters of credit and/or bonds. Non-regulated self-insurance offers significantly more flexibility than a regulated program, with the corporation determining the loss reserves.

The primary benefits of self-insurance are cost effectiveness and increased loss control. The insured avoids paying the cost component of premiums for the retained part of high probability risks. Retention of substantial parts of risk are an important factor in controlling moral hazard risk and also enhance the insurability of risks.

Self-insurance, by definition, does not provide any risk transfer. It is important to be aware of this solution, however, since it constitutes a substitute to the traditional market for workers' compensation and professional liability risks. Depending on prices and availability, corporations are substituting traditional workers' compensation insurance with self-insurance, slowing the growth of the traditional market.

<sup>18</sup> Risk retention groups are restricted to commercial liability lines of business, including all types of third party liability, such as general liability, errors and omissions, directors and officers, medical malpractice, professional liability, products liability, etc. Excluded are workers' compensation, property and all personal lines.

## Development of captive markets worldwide

**A captive is an insurer with restricted access to its services.**

Narrowly defined, a captive is an insurance or reinsurance company owned by a corporation or group of companies which are not active in the insurance business themselves. The primary business purpose of a captive is to insure the risks of its parent(s). In recent years, a captive has been more usefully described as an insurer that writes risks whose origins or access are restricted.

**There are many types of captive.**

Single-parent captives only underwrite the risks of related group companies. Diversified captives underwrite unrelated risks in addition to group business. Association captives underwrite the risks of members of an industry or trade association. Liability risks, such as medical malpractice, are frequently insured by association captives. Rent-a-captives are insurance companies that provide access to captive facilities without a corporation needing to create its own captive. The corporation pays a fee for the use of the captive facilities and must provide some form of collateral so that the rent-a-captive is not at risk from any underwriting losses suffered by the corporation.

**Captives can be set up as primary writers and as reinsurers.**

Captives may be established as direct-writing companies issuing policies to, and receiving premiums from, their insured clients, but the insurance industry is generally highly regulated and, in many jurisdictions, certain risks may only be written by an admitted insurer. In the case of smaller captives, it is frequently easier for the captive to operate as a reinsurance captive, accepting the risks of its parent, which have been insured by a fronting company<sup>19</sup> and then ceded to the captive.

**There are various reasons for forming a captive insurance company.**

Captives were originally developed because corporations questioned the efficiency of risk transfer via the traditional commercial lines insurance. At the captive boom toward the end to the 1960s, tax and financial considerations played an important role. Since 1970, the tax benefits of captive insurance have been reduced substantially through legislation and regulation and only play a secondary role now. Some of the reasons for captive insurance are summarized below.

**Captives can increase the efficiency of insurance.**

Captives can increase the efficiency of insurance by retaining high-frequency risks. Insurance premiums are calculated to cover the present value of expected claims, the insurer's acquisition costs and overhead expenses plus a profit, which should compensate the investors for their cost of capital. The non-claims portion of the premium can represent as much as 30% to 40%. In establishing a captive, the corporation retains the cost component of highly predictable cash-flows, rather than pay it to an insurer. In addition, low-risk companies can capture the benefit of their better-than-average risk profile, which may not be adequately recognized by the insurance market.

<sup>19</sup> Fronting is a specialized form of reinsurance frequently employed in the captive insurance marketplace. In its most common form, a commercial insurance company ("fronting company"), licensed in the state where the insured risk is located, issues the insurance policy. That risk is then fully ceded to the captive through a reinsurance contract, known as a fronting agreement. Thus, the insured obtains a policy issued on the paper of the commercial insurance company. However, economically, the risk of that coverage remains with the captive insurance company.

**Captives retain within the parent corporation(s) the cash flow of insurance premiums.**

Underwriting results only partially capture the economics of insurance. Insurance premiums are paid in advance of the coverage period, while claims randomly occur and are paid with a lag in time, which is necessary for the settlement. This creates a negative expected cash-flow for the client. By utilizing a captive, the underwriting cash-flow remains within the corporation. This is beneficial for corporations when the cost of cash-flow is lower than external financing. In addition, investment income may be untaxed in certain offshore captive domiciles, increasing the cash-flow advantage to the corporation.

**Captives provide direct access to the reinsurance market.**

Being incorporated as insurance companies, captives have access to the global reinsurance market. This creates several advantages. First, large commercial risks end up in the global reinsurance market anyway. By using a captive to access the reinsurance market, the buyer can substitute the cost layer of the primary insurer with the lower costs of the captive. Second, the reinsurance market may be more flexible in structuring risk transfer programs and may grant a better reward for variations in risk retention levels. Third, usually the better risk diversification of global reinsurers' portfolios reduces the capital cost component of the price for pure risk transfer and allows for more capacity. Finally, reinsurers may benefit from lower levels of regulation, allowing more flexibility in product offerings and reducing regulatory/frictional costs.

**The tax efficiency provided by captives has diminished in recent years.**

In the earlier years of the captive boom, premium payments to captives were in general tax deductible for the parent company, therefore offering a tax advantage compared to self-insurance within a corporation's balance sheet. Nowadays the tax advantage has been greatly reduced in most industrialized countries. In the US, for example, only premium payments to captives with a substantial third party business are tax deductible.<sup>20</sup> In most European countries, the company has to prove the involvement of substantial risk transfer. Premiums have to be commensurate to the underwritten risk to avoid transfer-pricing issues. Some European countries consolidate any profit of the captive into the tax base of the parent corporation. Table 6 gives an overview of the framework for the utilization of captives by corporations, located in some of the major insurance markets.<sup>21</sup>

<sup>20</sup> In the US the issue of whether a company will get a tax deduction for premium payments is subject to case law. Court decisions found a minimum of 30% of third party business of a captive sufficient to qualify its premiums as deductible.

<sup>21</sup> See "Best's captive directory, 2001 edition."

Table 6  
**Captive treatment and usage by major domiciles**

	<b>US</b>	<b>Canada</b>	<b>UK</b>	<b>Germany</b>	<b>France</b>	<b>Sweden</b>
Deductibility of premium for corporate taxation purposes?	No	Yes	Yes	Yes	Yes	Yes
Taxation of captive income at parent level?	Yes, in year earned, US tax accounting	Yes, except for non-Canadian risk written on Barbados	No, if most of the profit flows back to UK as dividends, UK tax accounting <sup>22</sup>	Yes, local accounting acceptable	Yes, tax havens subject to penalties (eg Luxembourg)	No
Exit tax on premiums?	Federal excise tax <sup>23</sup>	10% (up to 50% in Alberta)	No	No	No	No
Restrictions for direct writing captives without local license/carrier?	Yes, restricted to non-admitted (residual) market	Yes, fronting is generally used	No	Not within EU	No	No
Underwriting restrictions	Direct personal lines and workers' compensation. RRGs limited to liability	Direct auto and personal lines	None	None	Direct auto and post-retirement coverages	None
Specific domestic captive legislation?	Yes, in 14 states, also national Risk Retention Group charter	Yes, in two provinces	No, but some domestic captives	No, but some domestic captives	No	No, but some domestic captives
General regulatory attitude?	Unfavorable; sometimes discriminatory	Higher loss reserves required	Neutral with regards to foreign-based captives	Wary but tolerant	Neutral	Favorable to domestic captives
Favorite domiciles	Bermuda (913), Cayman (414), Vermont (347), BVI (157), Barbados (108)	Barbados (85), Bermuda (32), British Columbia (13)	Guernsey (233), Isle of Man (108), Bermuda (82)	Luxembourg (19), Ireland (11), domestic (10)	Luxembourg (65)	Domestic (39), Luxembourg (32), Ireland (16), Bermuda (13)
Discrimination against domiciles	Offshore	No	Non-EU	Ireland	Non-EU	No
Number of captives	Single 1630, Group 1075	Single 133, Group 24	Single 436, Group 60	Single 47, Group 3	Single 93, Group 3	Single 109, Group 3

**The captive market has grown enormously since its beginning in the 1920s.**

The captive insurance industry originated from the formation of mutuals and co-insurance companies in the 1920s and 1930s. However, the market only grew rapidly in the early 1950s when parent companies established their captives offshore. The captive boom continued in the late 1960s and early 1970s largely driven by tax considerations. Another wave of growth occurred during the late 1980s in response to the limited availability of liability coverage.

**The captive market continues to expand rapidly.**

In 2001, captives wrote about USD 25 billion gross premiums worldwide (10% of the global commercial lines business), ceded USD 8 billion to the global reinsurance market, and invested USD 138 billion in assets. Since 1998, the captive market has grown by 10% per year on average, at the expense of the traditional commercial lines business, which stagnated during the same period.

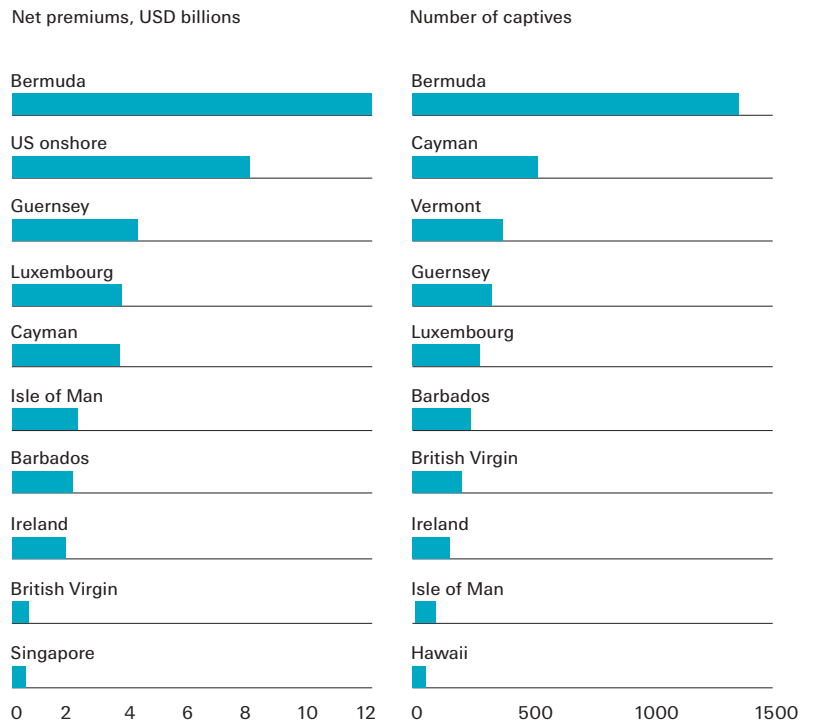
<sup>22</sup> Captives income will not be taxed at the UK parent level if the acceptable distributions requirement is fulfilled, which requires the captive to pay at least 90% of the after tax profits to the UK.

<sup>23</sup> Insurance premiums sent by a US insured to an offshore insurer are subject to U.S. federal excise tax. For direct premiums the rate is 4% and for reinsurance it is 1% of the premium.

**Bermuda is the leading location for captives.**

At present, there are around 4560 captives worldwide and the number is growing rapidly. Bermuda is the leading location, whether measured by number of captives (1336) or by premium volume (USD 12 billion). US and Guernsey follow in the ranking by premium volume with USD 8 and 4 billion respectively, while the Cayman Islands are second by number of captives (500). Cayman's captive market showed a surge in demand in the first half of 2002 with 37 new captive licenses and another 20 under review.

Figure 5  
**Major captive locations**



Source: A.M.Best, Swiss Re Economic Research & Consulting

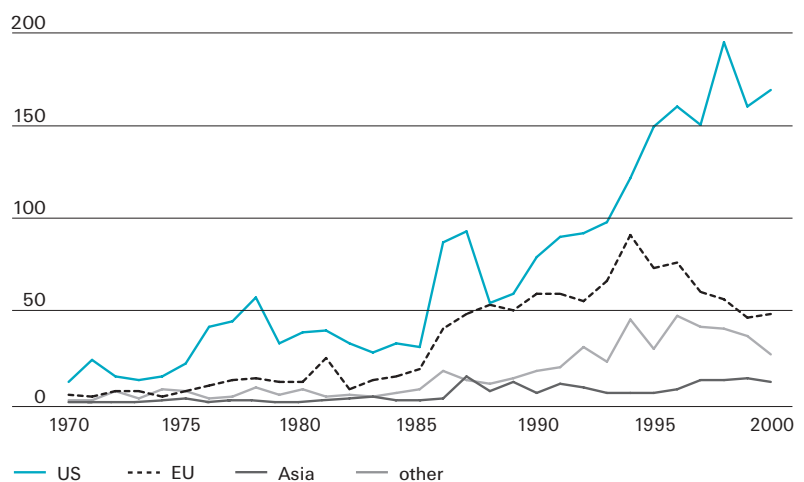
**Many of the world's largest companies have their own captive.**

The captive market shows a wide overlap with the large corporations' segment. Fortune 1000 companies have a large fraction of single-parent captives. Single-parent captives represent 70% of captives worldwide. The remaining 30% are written by multi-parent captives, which particularly serve the needs of medium-sized corporations.

**The growth potential for captives is in Europe and Asia.**

A large fraction of captive business originates in the US. Captives are 59% owned by US corporations, 25% European, 3% Canadian and 13% by other countries' sponsors.<sup>24</sup> The European countries show a much lower captive penetration than the US. This implies that there is still significant growth potential in Europe. This hypothesis is supported by the continuing increase in the number of captive domiciles. On the other hand, deregulation of insurance markets - particularly in the commercial sector - has reduced one motivation for captive business. Figure 6 shows a decline in captive formations in Europe after 1994, when major steps of the deregulation became effective.<sup>25</sup> It is expected that European and Asian corporations will increase their utilization of captives because of rising sophistication in risk management and improved self-insurance techniques as well as an expanded choice of captive domiciles.

Figure 6  
**Split trend in captive formations**



**Many new captives are group captives for mid-sized corporations.**

Captive growth during the soft market was fueled by US corporations (see Figure 6). Currently, the number of new captives and the capacity provided through captives is accelerating worldwide, fueled by the hardening commercial insurance premium rates and the limited availability of capacity in some lines. Interest in ART solutions saw a similar surge during the last broad hard market in the mid-1980s. Current growth in the captive market is fueled both by the more intensive use of existing vehicles and by a new wave of captive foundations. The middle market companies will most likely use the options of group captives and segregated cell companies.<sup>26</sup>

<sup>24</sup> Source: A.M.Best.

<sup>25</sup> Source: A.M.Best. The number of captive formations in earlier years as shown in Figure 6 only refers to currently active/licensed captives. Hence, the data understates the actual number of captive formations in those earlier years, as our database does not include captives that are no longer in operation. This effect becomes less relevant for more recent years.

<sup>26</sup> Guernsey, Cayman Islands and Bermuda provide segregated cell legislation, which allows the separation of risk-bearing capital within one legal entity. This concept is particularly beneficial for rent-a-captives. Segregated cell captives have enjoyed rapid growth since 1999.

# The ART gallery: alternative risk transfer products

Alternative products include finite reinsurance, multi-year contracts, multi-trigger products, committed capital, structured finance and solutions for new asset classes, credit solutions, insurance-linked securities and weather risk solutions. Some typical features of ART solutions are:

- Customization to meet a client's specific needs.
- Multi-dimensional coverage: multi-year, and/or multi-risk.
- Substitution of pure risk transfer with risk financing, facilitating the insurance of traditionally uninsurable risks.
- Assumption of risk by non-(re)-insurers.
- Incorporation of financial tools, such as derivatives.
- Inclusion of a large component of finance.

Table 7 summarizes key characteristics of the different ART products and captives for comparison.

**Table 7 Features of ART products**

	Captives	Finite solutions	Multi-line, multi-year products	Multi-trigger products	Contingent capital	ILS, derivatives	Portfolio default swaps
Reduces moral hazard?	yes, increased retention	yes, participation in own loss experience	yes, increased retention	yes, 2nd trigger is frequently index-based experience	yes, participation in own loss	yes, depends on trigger	yes, through the size of the equity layer
Optimizes risk retention?	yes	yes	yes	yes	yes	some	yes
Expands limit of insurability?	yes	yes, spread over time	yes, can include risks that are not covered individually	2nd trigger is frequently financial risk	yes, risks gets financed	yes, adds high layer capacity	yes
Substitutes risk transfer with risk financing?	yes	yes	no	no	yes	no	no
Increased utilization of insurance capacity?	yes, higher retention and access to reinsurance market	yes	yes	yes	yes	yes, adds capital markets as risk carrier	yes, adds capital markets as risk carrier
Elimination of counterparty risk?	no	no	no	no	reduced	yes	no
Reduces dependence on insurance cycle?	for the self-insured part	yes, multi year contracts	yes	yes	yes	yes	yes

## Finite risk reinsurance

Finite covers provide financing along with risk transfer.

Finite covers shift the main value proposition from traditional risk transfer towards risk financing. Finite covers are multi-year contracts reducing the client's cost of capital by means of earnings smoothing. The year-to-year earnings volatility is reduced while limiting the total amount of risk transfer over the contract period. It is somewhat difficult to provide a general definition of finite reinsurance, but the products typically have the following features:<sup>27</sup>

- Risk transfer and risk financing are combined and the time value of money is emphasized in the contract;
- Limited assumption of risk by the (re)insurer;
- Multi-year contract term;
- Explicit inclusion of investment income in the contract; and
- Sharing of the results with the insured/cedant.

Spreading risks over time is an important tool of risk management.

One basic principle of (re)insurance is spreading risks over time - in addition to spreading risks geographically and over lines of business. In "the old days" of gentleman's agreement (re)insurance, the relationships were long-term and it was understood that temporary imbalances in the results would be recouped in future years via adjustment of rates, terms and conditions. Today, these informal agreements must be formalized and legally binding, given global competition and frequent entries and exits by companies from markets.

Finite reinsurance can be pre-funded or post-funded.

Finite deals can be structured as pre-funded (prospective) or post-funded (retrospective). In pre-funded deals, the client pays either annual or single premiums into an experience account. These funds earn a contractually agreed investment return and are used for eventual loss payments or "flow-back" to the customer. In post-funded deals, clients must pay back the claims payments of the reinsurer over a defined period of time. One basic difference between the two types of deals concerns the allocation of credit risk. The reinsurer bears the risk of the client's default in a post-funded deal, whereas the client bears the risk of the reinsurer's default in a pre-funded deal. The credit ratings of the contractual partners affect the economic benefits of the two types of deal.

Finite (re)insurance is used in a variety of circumstances.

Apart from its smoothing functions, finite (re)insurance has become an instrument that can be used in many different circumstances. For example, loss portfolio transfers are used to unload long-term liabilities from companies, which enhances the comfort level of prospective buyers during mergers and acquisitions.

The main standard types of finite (re)insurance contract are:

- Time and distance
- Loss portfolio transfer
- Adverse development cover
- Spread loss cover
- Financial quota share

<sup>27</sup> See Swiss Re, *sigma* no. 5/1997, "Alternative risk transfer via finite risk reinsurance: an effective contribution to the stability of the insurance industry".

**Finite (re)insurance started out with Time and distance covers.**

Time and distance deals were the initial standard type of finite (re)insurance. They were designed to discount loss reserves for the time value of money. Thus, they bring the accounting principle of nominal reserving closer to the economic reality. The reinsurer agrees to pay a certain agreed schedule of loss payments in the future, without assuming the risk of losses being higher than expected. The ceding company agrees to pay specified premiums in return, representing the net present value of the future loss payments. As there is only very limited risk transfer involved, these contracts are no longer recognized as insurance contracts in the US and do not provide the intended balance sheet effects anymore.

**Loss portfolio transfers capitalize the time value of loss reserves.**

With loss portfolio transfers (LPTs), the policyholder transfers outstanding claims to the insurer. This makes LPTs a retrospective form of (re)insurance. The policyholder pays a premium corresponding to the net present value of the outstanding claims plus a loading for administrative expenses, risk capital and profits. Long-tail lines lend themselves particularly well to LPTs as timing risk is their key element.<sup>28</sup> The insurer assumes the risk of unexpectedly rapid claims settlements. A faster than expected claims settlement implies a lower earnings potential via investment income on the cash-flow. The ultimate total nominal amount of claims indemnification is usually contractually limited. The main benefits of LPTs are:

- Settlement of self-insured claims and possibly the acceleration of the closing down of a captive.
- Facilitation of mergers or takeovers, since claims settlement risk does not need to be assumed by the acquirer who might feel uncomfortable with evaluating and/or assuming this type of risk.
- The ability to exit from a discontinued line of business.
- A mechanism for transferring risks, freeing up risk capital to support the writing of new business. This type of redeployment of capital is particularly important in the current, low capacity market. In a low capacity market, capital is reserved to support old unprofitable business, while the writing of new, more profitable business is starved of capital.

**Adverse development covers lock in the maximum liability from old claims.**

Adverse development covers offer a broader spectrum of cover than LPTs, since they usually also include incurred but not reported (IBNR) losses. Hence, the insured does not retain the risk of incurred but unreported claims that he is liable for, but passes it along to the (re)insurer. Unlike LPTs, there is no transfer of claims reserves. Instead the policyholder pays a premium for the transfer of losses exceeding the level that already has been reserved. This can be arranged by either a stop loss treaty or as a working or catastrophe excess of loss treaty. The main benefit of adverse development covers is that they facilitate mergers and takeovers since the insured can offload both the timing and the reserves development risk. The acquiring company can assess the target company without an actuarial due diligence process and the adverse development cover improves the view of analysts and rating agencies of the acquisition by reducing volatility.

<sup>28</sup> The client is exposed to the credit risk of the (re)insurer as he prefunds the risk transfer. Hence, credit risk must be carefully assessed in today's volatile financial markets.

**Spread loss covers recognize the policyholder's loss experience.**

For spread loss covers, the insurer pays annual premiums or a single premium to the reinsurer for coverage of specified losses. These premiums - less a margin for expenses, capital costs and profits - are credited towards a so-called "experience account," which serves to fund potential loss payments. The funds earn a contractually agreed investment return. The balance of the experience account is settled with the client at the end of the multi-year contract period. The reinsurer limits the payments for each year and/or over the entire duration of the contract. The reinsurer holds the credit risk of the insurer, if the balance on the experience account turns negative. Usually these types of contracts involve very limited underwriting risk but provide the insured with the liquidity and security of the reinsurer. The reinsurer assumes the (contingent) credit risk of pre-financing losses. The amount of risk transfer is frequently low but must meet the requirement necessary to qualify the arrangement as a reinsurance contract.

**Finite deals help to cover new risks that face limitations in traditional capacity.**

With finite solutions, corporate clients benefit from a better than average loss occurrence even in cases where there is insufficient loss history for beneficial treatment in the actuarial pricing tools for pure risk transfer. This provides corporations with a risk management tool for new risks or situations of substantially changed corporate risk landscapes - for example, after a merger, a spin-off, or any other change of business. New risks like Y2K, cyber risks, or terrorism after 11 September, can be handled in such a structure even if there is no, or very limited, capacity for pure risk transfer. Also, risks that are closer to business risks - and therefore more prone to moral hazard - can be treated in such structures without leaving the insurer with an unbalanced risk-return profile.

**Financial quota share combines risk financing and risk transfer.**

The financial quota share, which is a quota share agreement with implicit financing via commissions, is one of the oldest types of finite risk (re)insurance. Policies are usually prospective and cover underwriting risks in current and/or future underwriting years. Depending on the nature of the commission arrangements, these types of treaties provide financing and/or risk management. Financing can be achieved by overcompensating in the initial period(s) and under-compensating over a prearranged period of time.

## Run-off solutions

### *The situation*

The term run-off is used to refer to a special segment of managing retrospective liabilities. Unlike retrospective finite solutions, which usually substantially limit the amount of underwriting risk transfer, run-off solutions focus on the full-scale risk transfer of reserve development risks. Run-off solutions are tools to address a firm's earnings volatility arising from past activities. There are a number of factors that can cause a company to choose a run-off solution:

- Corporate restructuring
- Mergers & acquisitions
- Closing lines of business
- Economic changes in the value of a liability
- Regulatory, accounting or tax changes
- Legal developments, for example, court decisions

The biggest run-off transactions to date in the US have involved either asbestos & environmental (A&E) or workers' compensation liabilities. Most transactions have involved insurers, but the economics also work for corporations and captives.

### *The solution*

A discontinued book of business is sold to a (re)insurer. All the (remaining) premiums and all the risk are assumed by the (re)insurer. The claims reserves are transferred from the client to the (re)insurer.

### *Benefits*

Capital relief via discounting of reserves is not a driving force since US GAAP no longer allows capital relief for retroactive transactions. Mutuals can still gain capital relief based on statutory accounting, however. The key objectives of run-off deals have shifted from capital relief to risk transfer and removing uncertainty from a company's balance sheet by minimizing the insured's exposure to:

- The default of co-insurers and reinsurers
- An adverse development of judicial / loss inflation
- Peaks in losses due to exogenous factors (eg exchange rate changes)

The global market for finite re is about USD 27 billion.

The global market size for finite (re)insurance is estimated to be around USD 27 billion for both corporate and insurance clients. There is only a small number of deals each year and hence the market size fluctuates annually. The market grew exponentially in the late 1990s and leveled off in 2000 and 2001. The majority of prospective finite deals are now credit-risk driven. There are higher market-size figures cited in the trade literature, but these usually include retrospective finite deals. Many retroactive transactions are M&A driven. With the current low level of M&As, there are few retroactive deals. However, the current critical capital position of many players is expected to result in another wave of consolidation. This would heat up the market for finite re and run-off solutions.

Clients for finite re solutions tend to be insurers, but corporations also use this form of financing/risk transfer.

For retroactive re, the clients tend to be insurance companies, or captives, with loss portfolio transfers. The largest global companies with a liability, such as payments for asbestos and environmental claims, may also seek an adverse development cover. For prospective re, clients tend to be insurers, but also include large corporations. Finite re covers that qualify as insurance reduce taxes and smooth earnings.

An expected increase in M&A activity will revive the retroactive finite re market.

M&A activity is expected to increase again soon, fueling retroactive finite re. There is large potential for loss portfolio transfers (LPT) in the privatization of state-owned pools or insurance companies. There is political momentum among many state governors and legislators to transfer government liabilities to the private sector. In 1997, Swiss Re became the first reinsurer to privatize a state-sponsored workers' compensation pool. With these two drivers, medium-term growth is expected to be high (around 10%). Long-term growth will be about 7%, slightly above the general market growth of 4-5%.

The profits from finite solutions come primarily from investment returns.

With a limited underwriting risk, the profitability of finite reinsurance is primarily driven by investment results and credit defaults. A sample of Bermuda finite (re)insurers revealed a sharp decline in profitability after 1999. This period of low profitability will continue until investment yields recover from their current poor performance.

MMPs provide several advantages over traditional products.

#### **Multi-line, multi-year products, multi-trigger programs**

Integrated multi-year/multi-line products (MMP) are more recent developments in alternative corporate risk transfer. They provide several advantages for clients. First, MMPs allow clients to take advantage of the risk consolidation within their own portfolio of risks. Second, they combine uncorrelated risks into an insured portfolio, allowing for efficient risk transfer and avoiding over-insurance. Finally, MMPs provide an alternative to traditional insurance during a hard market. However, the availability of multi-year products is limited during hard markets.

Multi-trigger programs combine two separate events to trigger a payment by the insurer.

In a multi-trigger product (MTP), payments for losses from an insurance risk are only made if a second event or risk is triggered. This second condition for the payment is frequently linked to a metric or index outside the influence of the policyholder to avoid moral hazard. However, there should be a high correlation of the trigger variable with the policyholder's financial interests to create an effective cover.

Often the products combine a traditional insurance risk with a market risk.

These products are attractive to corporations whose earning power is heavily affected by fluctuations in commodity prices, exchange rates or interest rates. MTPs are especially suited for large well-capitalized corporations with a relatively high risk appetite. Insurance risks, which usually would be retained by the company, could become a severe financial problem if coupled with another adverse economic event. A hedge for the combined risk can be provided by defining a trigger which is highly correlated with the company's profits.

Ideally, the two risks are uncorrelated.

The (re)insurer offering the MTP is interested in using triggers that are uncorrelated with each other. The joint exposure is substantially different from the exposure of the individual risks. This creates a competitive advantage in pricing the products as less risk capital needs to be set aside.

### Examples of dual trigger policies

#### *Electric utility company*

A dual-trigger policy pays for the actual losses caused by the following two events occurring simultaneously: (1) a power outage resulting from equipment failure or storm-related damage, and (2) the spot market price for power exceeding a preset threshold during the storm or equipment-failure period.

Another type of dual trigger policy combines the credit exposure of a major client with the price for electricity. A drop in price, coupled with bankruptcy of a major client, would cause major financial stress for an electric utility company.

#### *Hospital*

A dual-trigger policy pays (1) actual medical malpractice claims above a specified level only if (2) the value of the hospital's equity portfolio falls below a specified level during the same period.

#### *Iron ore mining company*

A dual-trigger policy pays (1) a specified level of workers' compensation claims (not to exceed actual claims) if the claims exceed a specified level at the same time (2) iron ore prices decrease below a specified level.

Committed capital provides capital when most needed.

### Committed capital

Committed capital, often referred to as contingent capital, is a relatively new type of convergence product, connecting insurance and capital markets. It is based on a contractual commitment to provide capital - in the form of senior debt, surplus notes, preferred shares, subprime debt, etc. - to a company after a specific adverse event occurs that causes financial distress.

Committed capital can be viewed as a put option on the corporations' securities.

The corporation that purchases the committed capital option has the right to sell its own securities at a pre-set price for a fixed period of time, after the specified event has occurred. The insurance component of committed capital is a trigger, which represents a different risk than the asset underlying the option. However, it is important to note that committed capital is not an insurance product, but a product that is structured and priced using a combination of insurance and capital market techniques.

Committed capital can lower the client's borrowing costs.

The economic motivation of the insured corporation is to have access to less expensive capital than it could obtain through capital markets or bank loans after the occurrence of a financially stressful event (defined as the trigger). The client purchases an option to issue his securities at a predetermined price in the case that the defined situation occurs. The price for regular funding in the capital markets would be much higher after such an event.

### Committed capital solution based on a GDP trigger

#### *The situation*

A large tire manufacturer would likely face severe financial stress if demand for tires in Europe and North America fell dramatically. Once sales fall, the credit-worthiness of the company deteriorates and borrowing costs rise.

#### *The solution*

The company signs a committed capital deal providing it with access to capital, if a specified event is triggered. To avoid moral hazard, the event is defined as low growth in Gross Domestic Product (GDP) in both Europe and North America, which is highly correlated with tire sales. If a weighted average of the growth rates for the two regions falls below a certain rate, the (re)insurer and a syndicate of banks agree to provide USD 1.1 billion of capital, in the form of a loan at a pre-agreed price, to the tire manufacturer.

#### *Benefits to the tire manufacturer*

The commitment provided the following benefits to the manufacturer:

- 1) A long-term commitment of capital from insurance companies and banks at a competitive price that is substantially lower than the price of insurance. The price is lower because the syndicate has agreed to lend the capital, not pay the full amount as in an insurance contract after a loss.
- 2) The manufacturer can continue to fund acquisition opportunities without issuing dilutive equity.
- 3) The tire company could also receive the assurance that an additional layer of non-dilutive capital would be available should it face a prolonged cyclical downturn.
- 4) The manufacturer received a private and flexible commitment from its usual financial institutions that could not be duplicated in the public markets.
- 5) The use of a GDP trigger allowed the (re)insurers and banks to charge a significantly lower price than banks offering similar loan commitments, because the company could not call upon the money at its discretion.

#### *Benefits to the (re)insurer*

The (re)insurer receives an annual fee for committing to provide capital at a pre-agreed price, prior to the event. Moral hazard is mitigated by the use of the GDP trigger.

**The market is still small, but shows great potential.**

The market for committed capital has existed since about 1995 and consists of about 16 deals so far, totaling USD 6 billion. The market tracks the banking market for lines of credit, but is stronger during a hard insurance market. When (re)insurance rates are high, self-insurance is more attractive. Committed capital bridges the gap between full insurance and full self-insurance, since it provides capital for a price, not full coverage for a loss. The market is fairly small so far, but shows great potential. In 2000, there were several committed capital deals, totaling nearly USD 1.5 billion. This was followed by a decline in 2001, but the market has improved in 2002 due to the hardening insurance market.

### **Credit securitization**

Credit securitization includes collateralized debt obligations (CDOs), synthetic CDOs, repackaging and portfolio credit default swaps. The CDO market encompasses all the rated transactions within credit securitization. Insurance companies have been active in the credit enhancement of senior and mezzanine tranches of the CDOs. Also, insurance companies provide capital relief to banks by insuring loan portfolios. Finally, insurance companies have been active in providing credit protection to corporations for their trade receivables or their exposure to other companies for a variety of reasons. The ART solutions use derivative products available in the capital markets, in addition to variations on traditional trade credit insurance.<sup>29</sup>

**Credit default swaps compensate buyers for defined credit events.**

The building block of credit securitization is the single-name credit default swap (CDS). A CDS is an agreement between two parties, one a seller of credit protection, the other the buyer of protection. The seller agrees to compensate the buyer if a particular company experiences a credit event - a default on a loan, bankruptcy, etc. The buyer pays an annual premium, expressed in basis points of the value of the underlying reference credit asset, to the seller for this protection. Unlike in insurance, neither counterparty needs to have a direct interest in the reference asset, which is typically a bond or a loan. The actual exposure could be the value of trade receivables or other assets.

**Credit securitization structures a portfolio of credit risks into different layers.**

Credit securitization involves a portfolio of loans, bonds or other credit assets. The loans, for example, are bundled together and structured as a single portfolio into many tranches or layers, each with a credit rating. The credit ratings range from the lowest layer, equity, to the highest, "super-senior" layer, which is rated above AAA. The equity layer is the first loss layer and is usually held by the buyer of credit protection. This minimizes moral hazard. The super-senior layer is the most remote from the default risk, above the AAA layer. The value of losses on the portfolio would have to be more than the cumulative value of all the AAA layers, and those below AAA, before the super-senior layer incurs a loss.

**Investors benefit from the diversification of risks in the portfolio.**

The advantage of these securitized portfolios is that they diversify the credit risk across many single-names, industries, and geographic locations. As a consequence, a well-structured portfolio can be easily sold on the capital markets. Hence, the structurer of the portfolio has the option of retaining or offloading the credit risk. If the risk is retained, there is no need for a special purpose vehicle (SPV), the credit risk can be transferred directly to the protection seller, or insurer via a portfolio credit default swap. If the risk is to be sold to the capital markets, for a typical collateralized debt obligation (CDO), an SPV is created to hold the bonds or loans. Alternatively, the SPV retains the credit risk through credit default swaps, in a so-called "synthetic" transaction, which does not involve the transfer of the bond or loan portfolio to the SPV. CDOs come in two basic forms, collateralized bond obligations (CBOs), a portfolio of bonds, and collateralized loan obligations (CLOs), a portfolio of bank loans.

<sup>29</sup> See David Rule, "The credit derivatives market: its development and possible implications for financial stability," *Financial Stability Review*, June 2001, pp. 117-40.

### Portfolio credit default swap

#### *The situation*

A commercial bank with 70 high-quality loans seeks capital relief from capital regulation relating to the Basel Accord, which require 8% reserves for corporate loans, regardless of the quality of the loans. The total value of the loans is USD 1 billion.

#### *Structured solution*

A portfolio credit default swap provides protection on cumulative losses in a portfolio of loans with 70 names. The bank retains the equity layer, or first loss layer, of USD 20 million, while the (re) insurer assumes the credit risk of the remaining portfolio. Some of the credit risk may be subsequently swapped out to the capital markets, via single-name credit default swaps. The protection is confined to the upper 98% of the total value of the loans.

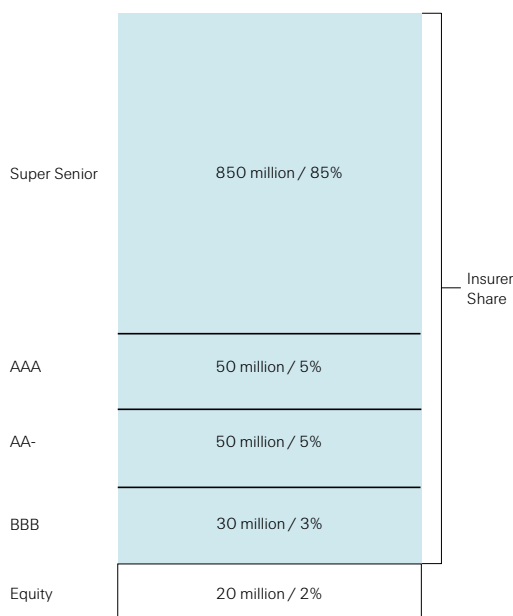
#### *Benefits to client (buyer of protection)*

The bank receives credit protection from a highly rated financial company.<sup>30</sup> The insurer provides risk transfer, generally through an intermediary, reducing the required capital of the bank.

#### *Benefits to (re)insurer (seller of protection)*

The insurer receives premium income, expressed as basis points charged on the underlying assets. The assumption of large books of high-quality commercial loan risk can help to diversify an existing book of credit risk from credit insurance and investments in corporate bonds. The bank retains the first loss layer, reducing moral hazard.

Figure 7  
Layers of the portfolio credit default swap



<sup>30</sup> In some jurisdictions, a 20% risk-weighted counterparty, ie another commercial or investment bank, may be required.

Collateralized debt obligations grew at a rapid pace.

Collateralized debt obligation (CDO) issuance rated by Moodys grew by a rapid 34% pa between 1997 and 2000, then fell by 16% in 2001. The decline occurred despite the fact that the number of deals increased. The decline appears to be a result of increasing defaults and downgrade in the US. There is also a trend of changing the composition of CDOs from fully funded to synthetic, which requires a lower portion of the transaction to be rated (the unrated portion is not counted by Moody's in the value of the CDOs, thus lowering CDO "issuance".)

CDOs gain popularity outside the US.

CDOs issued outside the US have been gaining relative to the US issuance. The proportion of non-US transactions increased to 45% in 2001, compared to 29% in 2000. Default rates are expected to peak in 2002, improving the market for structured credit. The CDO market is expected to be fairly stable this year, resuming strong growth of about 20% from 2003 to 2005.

Basel II will facilitate the banks' retention of high-quality risks.

The market for capital relief for banks will be reduced when the new Basel II Accord is implemented, currently scheduled for 2006. The new accord is expected to allow banks to use an internal-ratings-based approach for capital charges, reducing banks' incentive for transferring high-quality/investment grade risks to insurance companies.

Corporate defaults usually peak about one year after the end of the recession.

The recession and the highly leveraged corporate sector have taken a toll on trade credit insurance and related products. Given that the recession ended late last year, the peak of insolvencies will be in mid-2002, with another twelve months of uncertainty, then there will be major improvement as corporate balance sheets are restored.

The market for CDOs has suffered some defaults and downgrades.

The credit crisis has affected the structured credit market and collateralized debt obligations have become less popular. In an economy of increasing default rates and credit rating reductions, defaults and downgrades of CDOs have hurt the reputation of the market. Some of these were poorly structured, resulting in a high level of downgrades and loss of confidence in the market. Despite this adverse experience, interest has remained strong for structured products, which can provide attractive risk-adjusted returns.

### **Insurance-linked securities**

Insurance-linked securities (ILS) are an innovative way of increasing insurance capacity. To date, most ILS issues have been either catastrophe bonds (CAT bonds) or life bonds, though it would certainly be possible to securitize other risks. CAT bonds are a mechanism for insurers to transfer catastrophic risk to the capital markets via a bond issue. If the specified catastrophic risk is triggered, the bondholders typically forfeit the interest and the principal on the bond to the insurer. Life bonds have tended to securitize the premium payments of traditional life insurance policies. As such, the life bonds, though some risk is transferred, have more of a financing component than CAT bonds.

**The market for CAT bonds emerged from the last property capacity shortage.**

The market for catastrophe bonds originated in the hard market of the early 1990s, post hurricane Andrew. Reinsurance capacity for catastrophes was limited and expensive. A solution to this problem was discovered in the issuance of a CAT bond. In a typical CAT bond structure, an insurer issues an interest-bearing bond to the capital markets. The payments received are turned over to a special purpose vehicle (SPV), which then issues a conventional reinsurance policy to the insurer. Typically, the funds held by the SPV are given to the insurer if the bond's specified event is triggered, the interest payments usually cease at this point.

**The focus of life bonds lies more on financing than risk transfer.**

Life bonds are typically based on the income flow of premiums from life and savings products. They tend to provide capital to the life insurer, rather than the capital being held by an SPV. In this sense, they have much in common with the securitization of income flows and asset backed securities, such as mortgage-backed securities.

**There are different types of trigger.**

There are three types of ILS trigger: indemnity, index and parametric. An indemnity trigger involves the actual losses of the bond-issuing insurer. The event is the insurer's losses from an earthquake in a certain area of a given country over the period of the bond. An index trigger involves, in the US for example, an index created from property claims service (PCS) loss estimates. A parametric trigger is based on, for example, the Richter scale readings of the magnitude of an earthquake at specified data stations.

**ILS are collateralized to eliminate credit risk for the investors.**

The ILS market enables insurance companies to transfer risk to the capital markets in times of capacity shortage. There is no counterparty risk as there is with traditional reinsurance. The funds are held in safe, bankruptcy-remote SPV. However, with an index or parametric trigger there is basis risk - the difference between actual losses and the losses implied by the index or parametric trigger. Investors tend to prefer index and parametric triggers because they mitigate moral hazard. For the insurers, these triggers eliminate the need to reveal details of their book of business to outside parties.

**Investors benefit from low correlation with other asset classes.**

Investors like ILS because they provide diversity for their portfolios - natural catastrophes and increases in mortality are not highly correlated with stock and bond markets. In the early years of the market, CAT bonds often paid a high novelty premium in excess of the reinsurance capacity price. The novelty premium may shrink over time as the market develops.

## Insurance-linked security

### *The situation*

A Californian insurance entity, which heavily reinsures its California earthquake exposure, seeks additional capacity coverage of USD 100 million for five years

### *Structured solution*

Capacity is available in the capital markets through a catastrophe bond. Unlike reinsurance, the catastrophe bond has no counterparty credit risk. The SPV set up for this transaction will hold the principal value of the bond in risk-free, interest-bearing assets - for example, five-year US Treasury notes. If the insured event, an index of losses due to an earthquake in Los Angeles, is triggered, the Californian insurer receives the principal from the SPV and ceases the interest payments on the bond.

The first part of the transaction is a reinsurance contract of USD 100 million with the Californian insurer. This ensures that the ceded risk will be viewed by regulators as a reinsurance contract. Second, the reinsurer cedes USD 100 million of California earthquake to investors in the capital markets in the form of an index-based CAT bond, using an SPV established specifically for this transaction.

The CAT bond pays a premium interest rate, depending on the amount, structure and term of risk transferred. The Californian insurer pays the reinsurance premiums to the SPV, which also receives investment income from the collateral bond portfolio.

### *Benefits*

The Californian insurer receives additional, secure reinsurance coverage at a long-term fixed price. There is no credit risk for the reinsurer, as the cover is fully funded. Hence, the reinsurer may prefer this to traditional retrocession. If the reinsurer has an excess amount of risk in California, then some of the risk can be passed to capital markets, increasing capacity at a reasonable price.

**CAT bond issuance has reached a plateau over the soft market.**

CAT bond issuance has remained flat, at about USD 1 billion, since 1997; however, life bond issuance got a boost from a USD 1.75 billion Prudential (US) offering in 2001. Rising reinsurance rates and constrained capacity have not yet produced an explosion in the supply of ILS securities, though the market improves with steady growth of outstanding bonds. Prices for issuing ILS are still high compared to standard reinsurance.

The demand for ILS securities has strengthened in the last few years:

- The first CAT bond mutual fund for retail investors was opened by Bank Leu in January 2002.
- Similar offerings will bring new investors, improving liquidity. Poor returns on other investments are attracting investor interest.

- The number of committed investors increased from 80 in 1999 to 100-150 in March 2002.
- Major investors are insurers and pension funds.
- Recent deals have been underwritten by Goldman Sachs, Swiss Re Capital Markets, and Lehman.

Though high issuance costs have slowed the growth in the supply of ILS, experimentation continues:

- New transactions will strive for higher credit ratings to broaden the base of investors.
- New risk classes, such as workers' compensation and auto insurance, are being explored for issuance.
- Life bond offerings have shifted focus from variable annuity fees to closed blocks of business of recently demutualised life insurers.
- CAT bonds' lower counterparty risk should attract issuers in light of insurers' difficulties post-9/11.

Experimentation in various types of ILS will continue as players seek winning value propositions. The market for new issuance is expected to double by 2005.

### Structured finance

**A structured finance solution creates a security for future cash flows.**

Structured finance is often used to refer to asset-backed securitization of future cash flows from credit card receivables, mortgages, automobile loans, etc. Whereas the markets for some asset-backed securities, such as mortgage backed securities, are highly developed and very liquid, there is also a market for less well-known asset classes. Corporations utilizing structured finance usually transfer their assets to a special purpose vehicle (SPV) created for this purpose. To pay for the assets, the SPV raises capital from the investors in the capital market.

**(Re)insurers are involved in structured finance to increase market capacity.**

(Re)insurers became involved in structured finance through their finite reinsurance businesses and the increasing need of financial guarantee insurers and investment banks for additional capacity. This involvement occurred when (re)insurers had excess capital and were looking for opportunities outside their traditional business areas.

**Structured finance is used to lower the client's borrowing costs.**

The typical financing solution provided by the (re)insurer is a credit enhancement in which the (re)insurer provides a financial guarantee or a credit insurance wrap to the institution borrowing from the capital market. Credit enhancements or financial guarantees lower the client's borrowing costs.

**Non-standard asset classes present an opportunity for (re)insurers.**

There is a special need for credit enhancement in the securitization of new, unfamiliar asset classes. These include asset classes such as residual value of leased equipment, mutual fund fees, and franchise royalties. The value added by insurers to securitization of these assets is their underwriting expertise. Insurers analyze the collateral and then, based on their analysis, insure the first loss layer for a premium. Insurance of the first loss layer allows the issuer to sell the other parts of the structure to the capital markets. In addition to the transferred risk, the insurance company also signals the quality of the credit-enhanced security to investors.

(Re)insurers prefer the assets to be uncorrelated with their other risk classes and to be in an industry in which they have some expertise.

New asset classes present opportunities to (re)insurers.

Insurers are interested in assets which have little correlation with their book of business and thus provide risk diversification. They are also interested in assets of industries in which they have underwriting experience, such as:

- Power and energy industries;
- Weather affected industries;
- Telecommunication;
- Intellectual property, movies, patents and royalties;
- Residual value securitization;
- Project finance

(Re)insurers participate in the structured finance market in a number of ways, including:

- Investing directly in the first loss layer, or tranche;
- Reinsuring the monoline insurer that is providing financial guarantees for the security;
- Providing financial guarantees through a licensed or offshore financial guarantee subsidiary;
- Selling protection to the first loss layer through credit derivatives;
- Providing a structured insurance product.

### **New asset class - royalty payments**

#### *The situation*

A fast-food restaurant chain would like to raise money from the capital market. Given an investment grade rating, it could do so only at a high cost.

#### *Structured solution*

The company sells its intellectual property rights and future royalty payments to a bankruptcy-remote SPV. These assets are then used as collateral to securitize a private placement of fixed-rate notes. A monoline insurer provides an insurance wrap to the structure, which is further reinsured by a top-rated reinsurer.

#### *Benefits*

With an insurance wrap and the reinsurance contract, the securitization can obtain an AAA rating, substantially lowering the restaurant's borrowing costs. The financial institution responsible for the structuring is paid a one-time fee, based on the value of the securitization and the cost of structuring it.

### **New asset class - lease payments and residual value**

#### *The situation*

An automobile leasing company needs financing for growth. It would like to securitize its lease payments to obtain as low a financing cost as possible.

#### *Structured solution*

The lease company sells the future cash flows of the leases to an SPV. The SPV raises finance in the capital market by issuing notes backed by lease receivables. An insurance company analyzes the pool of leases and then guarantees that the residual value of the pool will not fall below a particular amount. The guarantee makes investors more comfortable with investing in the notes, reducing the cost of financing to the leasing company.

#### *Benefits*

The leasing company receives finance at a low cost, while the (re)insurer receives a fee for structuring the deal. The capital markets absorb most of the financing risks, receiving a highly rated security because of the imbedded guarantees in this asset-backed security.

**Banks are not highly experienced at analyzing new risks.**

Banks have little experience in underwriting and hence participate in well-established assets classes such as collateralized mortgage obligations (CMOs), credit cards and student loans. Insurers, however, have more underwriting experience and can analyze new asset classes and price them accordingly.

**Highly rated institutions have an advantage in this market.**

Since investors are not comfortable with the collateral of these new asset classes, they seek financial guarantees from monoline and other insurers. In this market, issuers prefer to buy protection from highly rated institutions, since they have low credit risk. In addition, only the insurers with the skills to analyze the value of the collateral will make a sensible bid for the deal.

**Weather derivatives help mitigate the risks from fluctuations in the demand for energy.**

### **Weather derivatives**

The deregulation of the US energy industry was a major driver behind the development of weather derivatives. The increased earnings volatility made the industry demand innovations that would minimize vulnerability to weather. Initially, energy companies focused on reducing their earnings volatility by hedging their price exposure using energy forwards and futures. But by focusing only on price exposure, these companies were vulnerable to weather-related volume variability. Weather derivatives were introduced in August 1997 to deal with this problem. The derivative was used to protect the earnings of a utility company whose revenues varied with weather changes.

Weather derivative triggers are typically based on temperature, especially heating and cooling degree days.

Although weather derivatives can be based on several weather-related events such as precipitation, wind speed or humidity, most contracts are related to temperature. In temperature contracts, payment is normally based on heating degree days (HDD) or cooling degree days (CDD). In the US, an HDD is the number of degrees by which the day's average temperature is below 65° F. A day with an average temperature of 40° F would count as 25 HDD (65° minus 40°). Similarly a day with an average temperature of 80° F would count as 15 CDD. Payments of weather derivatives are based on the accumulated value of HDD or CDD over a period of time, usually from a month to a year.

## Weather derivatives

### *The situation*

The major portion of Wisconsin Gas's revenue comes from gas sold for heating homes and offices during the winter season. The company would like to protect itself from reduced earnings caused by a warm winter.

### *Solution*

Wisconsin Gas purchases a heating degree day (HDD) floor (put) with a strike of 5 000 HDDs and finances it by selling a ceiling (call) with a strike of 5 650 HDDs. The put limits the risk of very low revenues for the gas company, while the call limits the upside potential to a very cold winter. The normal winter temperature in the company's region results in 5 300 HDD. In this over-the-counter transaction, the gas company is able to enter into a contract with El Paso Electric, which agrees to pay the gas company USD 6 000 for each HDD below the put strike price level, but would receive USD 6 000 for each HDD above the call strike price. If the HDDs are within the range, no money changes hands. A cap was established at USD 2 million.

### *Benefits*

As it turned out that specific winter, 1997-98, was mild and the total HDD was 4 800 HDD, 200 HDDs below the 5 000 HDD floor and Wisconsin Gas received USD 1.2 million from the transaction, reducing its revenue volatility.

Source: Example discussed in "Whatever the Weather" by C. Smithson and C. Choe, Risk Magazine, September 1999.

Since its inception, more than USD 7.5 billion of capacity in weather risk solutions has been created.

Since inception in 1997, more than USD 7.5 billion in weather derivative capacity has been created. In the 2000-01 winter season, approximately USD 2 billion of capacity was created<sup>31</sup>. While there has been a rapid increase in the number of contracts over the past few years, there is no clear trend on the notional value of transactions. While the notional value of summer contracts has decreased slightly over time, the notional value of winter contracts increased until 1999 and then fell in 2000.

<sup>31</sup> Weather Risk Management Associations annual industry wide surveys, conducted by PricewaterhouseCoopers, 2001 and 2002.

**The usage of weather derivative transactions is increasing in Europe and Asia.**

While the US accounts for most of the weather derivative transactions, usage in Europe and Asia is increasing. In terms of the notional value of summer contracts, the non-US share rose from near zero in 1998 to 3% in 2000. In terms of winter contracts, the non-US share of deals increased from zero in 1997 to 5% in 2000. One reason the European market for weather derivatives is not as big as in the US, especially in the summer, is that air conditioning is used far less in Europe than in the US. Another reason for the European weather derivative market lagging behind the US is data access. In the US, weather data is readily available through federal agencies. In Europe, weather data is not easily available and is also quite expensive to obtain.<sup>32</sup>

**More participants are entering the market.**

The key market participants have become more diversified in the last four years. The largest players are Element Re, Entergy Koch, Hess Trading and Swiss Re. Aside from Element Re, other insurance participants are Renaissance Re, AXA Financial Group, and Chubb. Of the banks, Société Generale, Goldman Sachs and Deutsche Bank are key players. While insurers can leverage their experience in hazard risk management, banks have better relationships with the end users. Banks also have significant experience in marketing, pricing and trading risk management solutions to their clients. Other important participants in the market are the transformers. These companies, mostly subsidiaries of insurance companies, such as SCOR and XL, transform an insurance contract into a derivative contract or vice versa depending on the clients' preferences. The transformers are often located off-shore for tax or regulatory reasons.

**The market potential for weather derivatives is enormous.**

Though weather derivatives have primarily been used in the energy sector, the potential market for these instruments is enormous. Revenues in industries such as agriculture, construction, tourism, apparel, food and soft drinks are highly weather dependent. According to one estimate, 33% or 3.3 trillion of the US economy is weather sensitive.<sup>33</sup> As this market matures, more industries are likely to use weather derivatives to hedge against the adverse impact of weather variations.

<sup>32</sup> See Paul Lyon "Blame it on weather man," Weather Special Report, Risk, EPRM, August 2001.

<sup>33</sup> Source: BEA and John A. Dutton.

# The outlook for ART products

ART products have enjoyed robust growth over the last three years.

Recognition, acceptance and use of alternative risk transfer products has been growing over the past decade. The more well-understood and accepted products, such as finite reinsurance, tend to be the products that have been available for the longest period of time. Some of the newer products, such as committed capital and insurance-linked securities, are still gaining recognition and are not widely used by corporations and insurers. The more mature products have a large number of established players competing for business, while the newer products have only a few key players competing aggressively.

Table 9:  
**The global market for select alternative risk transfer products**

Alternative products	Market size 2001 in USD bn (notional <sup>34</sup> )	CAGR 98-01
Finite re	26.5	64%
Run-off	11.0	14%
Other financial solutions <sup>35</sup>	17.7	3%
Credit securitization	101	5%
Insurance-linked securities	4.8	24%
Weather derivatives	4.3	31%
Total	163.2	16%

Underwriting cycle and credit cycle drive the growth of ART products.

To a certain extent, all of the products are affected by cyclical factors. For example, insurers' demand for finite reinsurance increases in a hard market when insurance capacity is scarce. On the other hand, demand for committed capital and asset-backed securities increases when credit conditions are tight. In general, demand for ART products is expected to grow rapidly over the next few years. Only finite reinsurance could be considered to be a mature market, although we see strong medium-term growth potential. The other products are still in their development phase and could very well experience substantially higher growth rates than indicated in the table.

After the accounting scandals, corporate interest in some ART solutions wanes.

The accounting scandals in the US have altered the appetite of corporations for some ART products. Finite solutions, securitizations and credit derivatives often include a special purpose vehicle or create off-balance sheet assets/liabilities. The accounting scandals have tarnished the image of SPVs, off-balance sheet financing and income smoothing, making it more problematic for corporations to seek these solutions, even if they make good economic sense. Over time, the market will adjust, transparency will increase and corporations will again use these solutions if they have unambiguous economic advantages.

<sup>34</sup> The notional value is the face value of the bond, security or derivative. In the case of finite re, the notional value corresponds closely to the value of the premiums. In the case of the other products, the fees generated are substantially lower than the notional value of the transaction. The market size for ILS and credit securitization is based on the outstanding securities and derivatives. For finite re and run-off, the market size is based on annual premiums paid. For other financial solutions, the market size is based on the face value of the deals during the calendar year. For weather derivatives, the market size is based on the derivatives issued in 2001, but this is close to the outstanding issuance since the average duration is six months or less.

<sup>35</sup> Including committed capital, credit enhancement for structured cash flows, credit enhancement for project finance, and other.

**Insolvency of some of the players is reducing the supply of finite re solutions and dampening demand.**

Recent events in the global financial markets have altered the general attitude towards finite (re)insurance. Finite covers played a role in the collapse of Fortress Re; were the core business of the two Bermuda reinsurers, Overseas Partners and Scandinavian Re, which shut down operations early in 2002. Clients, reinsurers and regulators are likely to change their attitude towards finite deals. There will be more focus on risk transfer and more disclosure. In the UK especially, the Financial Services Authority (FSA) has expressed concern about the use of financial reinsurance for purposes of regulatory arbitrage. Transactions that are more geared towards regulatory and/or tax arbitrage will face more scrutiny, and also lose some attraction, due to the higher price of credit risks involved in some of the multi-year arrangements.

**Demand is increasing rapidly for transactions with unambiguous economic advantages.**

Demand is increasing rapidly for transactions with unambiguous economic advantages due to the current hardening of the commercial market. Clients are forced to increase their deductibles substantially because of capacity constraints in some lines of business (property, aviation). At the same time, clients also want to increase their deductibles in order to keep their total insurance premiums within their budgets during times of rising premium rates. Finite solutions are in demand to provide some cover for these increased deductibles, which can range up to hundreds of millions of dollars in some cases. Finite covers are well suited to cover these lower layers with some loss frequency.

**For the time being, accounting transparency is of primary importance.**

Corporate clients and banks are finding off-balance sheet earnings smoothing less acceptable, given the current climate for accounting transparency. Solutions will shift towards pure risk transfer or committed capital type of transactions. In general, prospective finite will become more focused on insurance clients.

The hardening of the insurance market - partially caused by weak equity markets, low interest rates, uncertain corporate credit conditions and losses stemming from 11 September - is fueling the trend toward the substitution of ART solutions for traditional commercial business. This is expected to continue through 2005, with revenue for the ART market increasing by about 15% per year.

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