

The World Bank Primer on Reinsurance

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A primer on reinsurance terms and concepts, covering the purposes of reinsurance, the nature of reinsurance contracts, the economics of risk transfer, the characteristics of reinsurance risk, and the market for, and regulation of, reinsurance.



Summary findings

Reinsurance is a mechanism the insurance industry uses to spread the risks it assumes from policyholders.

Through reinsurance, the industry's losses are absorbed and distributed among a group of companies so that no single company is overburdened with the financial responsibility of offering coverage to its policyholders. Catastrophes, unexpected liabilities, and a series of large losses that might be too great for an individual insurer to absorb can be handled through reinsurance. Without it, most insurers would be able to cover only the safest of ventures, leaving many risky but worthwhile ventures without coverage.

McIsaac and Babbel present a primer of reinsurance concepts, explaining such terms as ceding company, primary carrier, direct underwriter, cession,

retrocessions, ceding commission, and surplus relief reinsurance. There are separate sections on:

- The purposes of reinsurance (for example, underwriting capacity, earnings stability, reserve requirement reduction, and mechanism for exiting business).
- Methods of cession for reinsurance contracts (treaty, facultative, and automatic facultative).
- Types of reinsurance contracts (proportional, nonproportional, hybrid, and retrocessions).
- Prices and usage of reinsurance contracts.
- The economics of risk transfer.
- The characteristics of reinsurance risk.
- The reinsurance market.
- Reinsurance regulation.

This paper — a product of the Financial Sector Development Department — is part of a larger effort in the department to study pension funds and insurance companies. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Priscilla Infante, room G8-118, telephone 202-473-7642, fax 202-522-3199, Internet address pinfante@worldbank.org. September 1995. (21 pages)

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The World Bank Primer on Reinsurance

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OUTLINE OF TOPICS

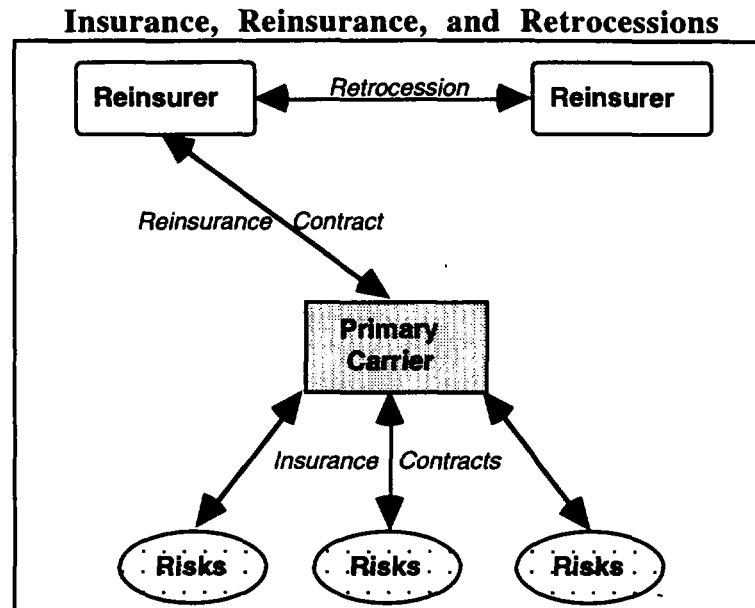
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BASIC CONCEPTS

Reinsurance is a mechanism used by the insurance industry to spread the risks it assumes from policyholders. Through it, the industry's losses are absorbed and distributed among a group of companies so that no single company is overburdened with the financial responsibility of offering coverage to its policyholders. Catastrophes, unexpected liabilities, and a series of large losses that might be too great for an individual insurer to absorb are able to be handled through reinsurance. Without reinsurance, most insurers would be able to cover only the safest of ventures, leaving many risky but worthwhile ventures without coverage.



A **reinsurance contract** is essentially an insurance policy issued by one company — the assuming insurer or **reinsurer** — to another company, usually called the **ceding company**, **primary carrier**, or the **direct underwriter**. The ceding company is the insurer that underwrites the policy initially, and then later shifts part or all of the liability for coverage to a reinsurer by purchasing reinsurance. This reinsurance provides reimbursement to the ceding insurer for claims payments covered by the reinsurance agreement. It does not alter the underlying reinsured policies or the obligations created by those policies. However, it does provide protection to the ceding insurer against frequent or severe losses. Nonetheless, the ceding company remains obligated to pay policyholder claims without regard to its reinsurer's performance or financial condition. Typically, the policyholder has no direct claim on the reinsurer — i.e., the policyholder does not "look through" to the reinsurer as the source of indemnification.¹

¹There is currently some debate over the "look through" treatment of reinsurance. When insolvency of an insurer occurs, claimants of the insolvent company may wish to be able to collect directly from the reinsurer rather than see the payments from the reinsurer in respect of their claims become part of the pool of assets of the failed company that will be distributed among all its creditors. Claimants feel they should have a first call on those reinsurance payments since they are occasioned by their claims. This is particularly true of professional risk managers working with very large risks, who may insist on a "look through" agreement with assent on the quality of reinsurers. For example, he may want to insure a building for \$7 million, but is aware that the insurer has capacity for only \$5 million. He also knows that the additional coverage will be obtained through "facultative reinsurance" (discussed later), that the facultative reinsurance will apply specifically to his building and no others, and that he will be paying for this facultative reinsurance as part of his premiums. Asking for a "look through" clause would seem to be a wise thing to do. In some countries, all such "look through requests" have been denied by the Courts. In response to such denials, some insurance clients have used an alternative mechanism that has similar effects by arranging for an "assignment" of reinsurance proceeds in favor of the ultimate beneficiaries. Insurance regulators have found that "look through" agreements and "assignments" pose serious questions of equity in the event of an insolvency. Instead of payments going to the insolvent firm, to be distributed equitably among the firm's

The quantity of insurance ceded to a reinsurer is called the **cession**. If more of the risk is shifted to the reinsurer than it desires, the reinsurer may in turn reinsure with yet another reinsurer a portion of the risk. This reinsurance purchased by reinsurers is known as **retrocessions**. The retrocession of risks often proceeds in a chain-like fashion, spreading exposure to risks throughout the international reinsurance community.

PURPOSES FOR REINSURANCE

A reinsurer, like any other commercial enterprise, is desirous of making a profit. It will price its contracts accordingly. Therefore, if a primary carrier buys reinsurance, presumably it is doing so by sacrificing some of its expected profits to the reinsurer. Why would it willingly do so? There are four reasons from the primary carrier's point of view:

- 1) Reinsurance enlarges the primary carrier's underwriting capacity
- 2) Reinsurance stabilizes the primary carrier's earnings and smoothes the fluctuations in loss ratios
- 3) Reinsurance reduces the primary carrier's unearned premium reserve requirement
- 4) Reinsurance creates a mechanism for the primary carrier to exit a particular segment of business

In addition, reinsurance provides some advantages in the broader economy-wide context:

- 5) It facilitates the geographic and intertemporal diversification of risks
- 6) It leverages the specific expertise of reinsurers in underwriting/pricing risks, particularly for non-standard risks (e.g., nuclear power plants, etc.)
- 7) It signals to customers and regulators the acceptance of the primary insurer's underwriting standards by a major international reinsurer

Below we will briefly elaborate on the first four of these purposes, which relate to the primary carrier's point of view.

Underwriting Capacity

The amount of business an insurer can underwrite is known as the insurer's **capacity**. This capacity is limited by a myriad of factors, but among the most important are the level of net equity² held by the insurer and the nature of its business. Some risks are too large for a given insurer to assume by itself, either because it is not permitted to do so or because it would be imprudent. Moreover, there is a level of aggregate risks, beyond which the capacity of the insurer is strained due to its limited net equity. Nonetheless, the insurer may underwrite these risk, knowing that it can pass along to reinsurers that part of the risks which it does not wish to retain. Thus, the insurer can acquire an interest in business that otherwise would not be available, and the consumer receives the convenience of being able to cover his or her insurance needs through a single company.

Earnings Stability

Insurance has always been a business characterized by variability in the frequency and severity of claims, year by year, particularly the property/liability sector. One of the contributing factors to this variability is the nature of risks assumed by insurers. When a natural catastrophe strikes, an adverse social or economic condition occurs, or a legal interpretation of liability changes or expands, massive losses can be generated. To the extent that the responsibility for indemnifying losses is shared via reinsurance among many insurers, loss exposure is diversified and loss ratios are stabilized. This is particularly true with excess of loss reinsurance, wherein a reinsurer assumes liability for losses that exceed some normal threshold. In this case, the reinsurer absorbs much of the variability of underwriting losses, leaving the primary carrier with a smoother pattern of loss ratios over time.

claimants, they are channeled directly to a favored few of the firm's clients who arranged to have "look through" or "assignment" provisions in their insurance policies. However, for some emerging countries facing very large risks, such provisions may be justified in order to develop commerce. Further discussion of this controversy is provided in the NAC Reinsurance Corporation's booklet entitled *Reinsurance Contracts: Content and Regulation*, pp. 38-41.

²In this Primer, we will use the term "net equity" to be the combination of paid in capital, shareholders' surplus, policyholders' surplus, subordinated debt, and surplus notes. This net equity serves as an important buffer to cover claims in the current and future years beyond those provided for in the insurance reserves. It should be of sufficient size to reduce the probability of ruin to a very small amount. See Stone [1973] for a discussion of capacity.

Reduction in Unearned Premium Reserve

In many countries, the expenses associated with issuing an insurance policy, such as agent commissions, administrative expenses, and taxes are charged against a company's current income, rather than amortized over the expected life of the policy. This results in a reduction of net equity. Moreover, the insurance premium does not flow through to the bottom line but is held in an unearned premium reserve (sometimes called "the reserve for unexpired risks"), to be released over time rather than fully recognized as an asset at the outset, thereby exacerbating the net equity situation. The more rapidly an insurer grows, the greater the drain on net equity, and capacity to write further business is diminished.

Reinsurance is able to remedy this situation somewhat, because a ceding insurer shares its expenses with its reinsurer. Indeed, the reinsurer will typically give the ceding insurer a **ceding commission** to reimburse it for expenses associated with writing the business being reinsured. The ceding commission can then be added directly to the ceding company's net equity. Because ceding commissions are generally considered to be fully earned when paid, they may immediately increase the net equity of the primary carrier. Moreover, if certain regulatory requirements directed toward promoting insurer solvency have been satisfied, the primary carrier can generally take a credit for reinsurance on its accounting statements. The primary carrier is in effect transferring a block of business to the reinsurer along with a corresponding portion of written premiums. Hence, the insurer's net written premiums are immediately reduced. Thus, through reinsurance the ceding company can reduce its liabilities and loss reserves attributable to them, and thereby expand its capacity to write new business.

A variety of specialized reinsurance contracts has been developed specifically to enhance the reported net equity of ceding companies. Known as **surplus relief reinsurance**, the contracts differ from traditional reinsurance in that the latter focuses on the transfer of underwriting risk, whereas the former concentrates on the time value of money and caps the reinsurer's ultimate financial liability. Thus, the ceding company is responsible for paying all losses that exceed the cap. If losses are in excess of the cap, the reinsurer may pay them, but receive reimbursement from the ceding company in ensuing years. With surplus relief reinsurance, the reinsurer in effect lends a portion of its surplus to the ceding company, for which it charges a fee. Surplus relief reinsurance is sometimes abused, wherein virtually no commercial risk is transferred to the reinsurer.³

Mechanism to Exit Business

Once an insurance contract has been underwritten, the responsibilities of the insurer can extend far into the future. In the property/casualty sector, even when the contracts have a short time period of coverage, it can take years to discover a situation that led to losses, and it can take even longer before a claim is ultimately settled. In the life insurance sector, it is even more difficult to exit from the business because the contracts are long term and noncancellable. Therefore, an insurer becomes wedded to the old business, even if over time it decides to focus on other lines of business, or to liquidate its business entirely. Liquidation is often an especially unattractive option because the insurer forfeits built-in profits that otherwise would accrue to its benefit. Reinsurance proffers an opportunity for a company to disengage from certain lines of business or particular insurance contracts when it is no longer deemed in the strategic interests of the insurer to remain with them. Moreover, it allows a ceding company to receive some benefit from business written that would be lost if the business were simply liquidated. The liabilities are transferred to the reinsurer, and the policyholder's protection continues. Thus, an insurer's foray into a field is not necessarily an irrevocable choice when reinsurance markets are strong and active.

REINSURANCE CONTRACTS

Methods of Cession

Three methods of ceding risks or policies to a reinsurer are by reinsurance treaty, by facultative reinsurance, or by hybrid agreements. In a **reinsurance treaty**, a reinsurer will agree to assume the liabilities associated with a portion or all of the ceding company's business for one or more specific lines of business (e.g., casualty, marine, property) and the reinsurer is obligated to reinsure any policies the company issues within these categories.

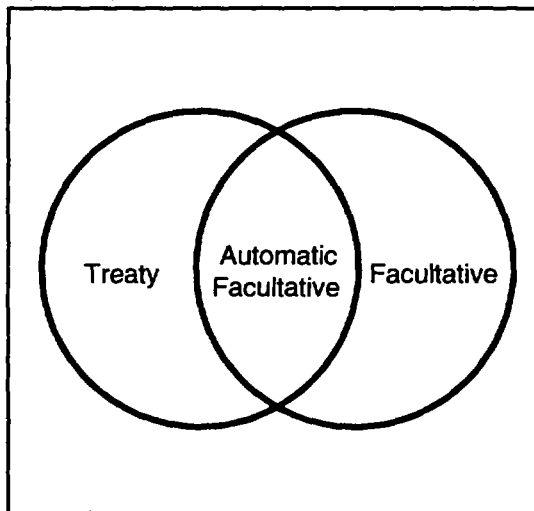
³Such contracts may be effected for the principal purpose of deceiving regulators as to the ceding company's financial condition. Nonetheless, the ceding company shows increased surplus (i.e., net equity) on its balance sheet as a result of purchasing such reinsurance and may appear to be safer as a result, even though the surplus gained is not really available to support the insurance risks absorbed by the company. Additional discussion of these kinds of contracts is provided in the NAC Reinsurance Corporation's booklet entitled *Reinsurance Contracts: Content and Regulation*, pp. 36-40.

Additional conditions and limits are often placed in the treaty dealing with the size of a single risk, type of risk, location of exposure, etc. Reinsurance treaties generally remain in force for long periods of time and are easily renewed. A reinsurer entering into a treaty typically will not review all of the individual risks being accepted; rather, it will review the underwriting philosophy and standards of the ceding company as well as its historical experience.

In a **facultative reinsurance** agreement, the ceding company cedes the risks associated with individual policies to the reinsurer, but not for all policies within a given business line. This kind of agreement is designed to reduce the exposure of an insurer to losses associated with a given contract, but not for all contracts within a line of business. The reinsurer is free to accept or reject the cession and the terms are set on an ad hoc basis. Facultative reinsurance is often used to cover catastrophic or unusual risk exposures. A reinsurer entering into a facultative agreement will typically expend substantial resources in examining the individual risks covered, because the contract often exposes the reinsurer to substantial risk. Underwriting must be carefully done in order to ensure adequate pricing.

Rather than enter into reinsurance on a contract-by-contract basis, a primary carrier and a reinsurer may enter into an **automatic facultative reinsurance** agreement. This kind of arrangement, encountered more frequently in the life insurance business than in property/casualty lines, is actually a hybrid of treaty and facultative reinsurance. Under this arrangement, a reinsurer accepts from a ceding company certain risks that conform to prespecified underwriting guidelines. The agreement may obligate the ceding company and reinsurer to share the conforming risks, or it may allow them to select which risks to include and exclude.

Methods of Reinsurance Cession



Types of Reinsurance Contracts

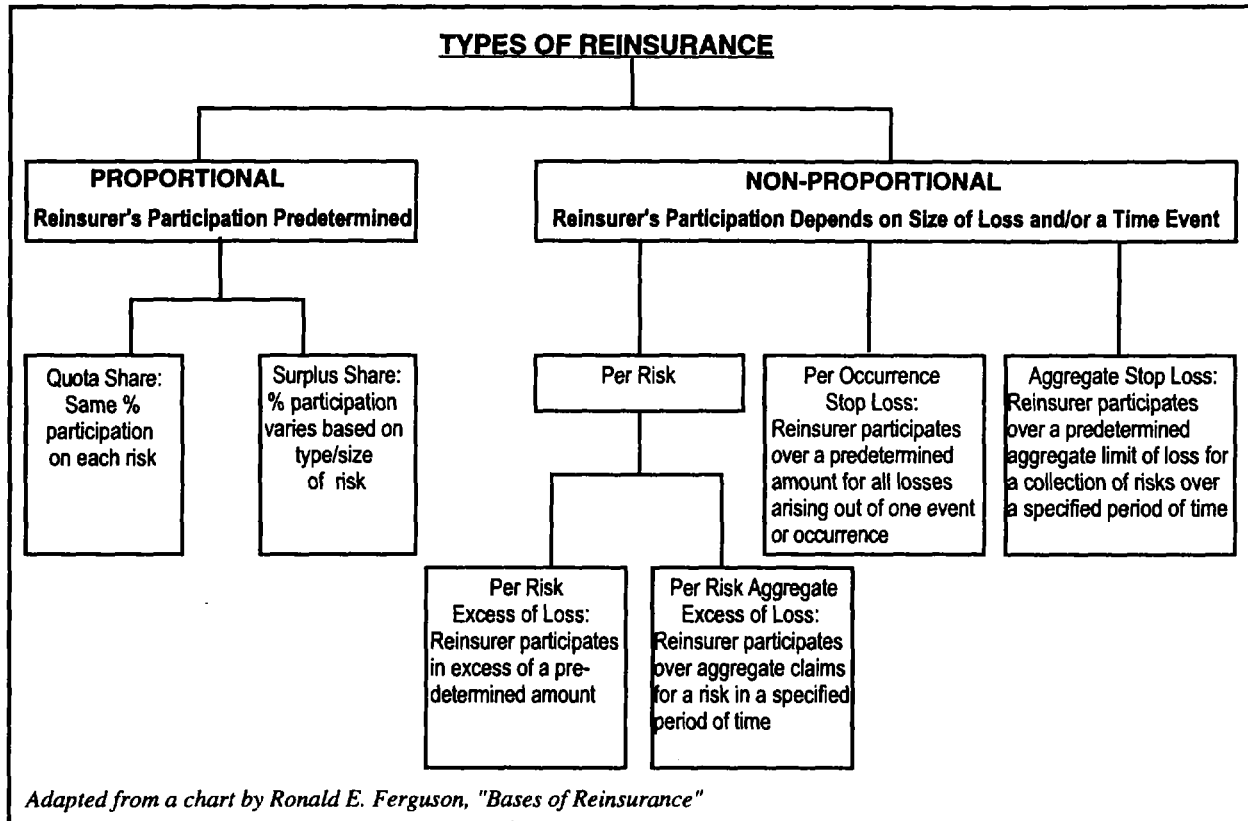
Reinsurance coverage is structured in two broad forms: proportional and nonproportional contracts. Each of these forms, in turn, has specialized variations, as shown in the exhibit on the page that follows. In this Section we discuss the forms and variations for structuring coverage provided by reinsurance contracts.

Proportional Reinsurance

The earliest reinsurance agreements were almost invariably made on a proportional basis. In proportional reinsurance, the ceding company and the reinsurer share risks and premiums on a proportional basis of some sort. Proportional reinsurance agreements are used extensively in property insurance. Two varieties of proportional reinsurance are in common use today — quota share and surplus share.

Quota share agreements are a type of proportional reinsurance that indemnifies the ceding company for a specified percentage of loss on each risk covered in the agreement, in return for receipt of a similar percentage of net premium paid to the ceding company. These agreements are the simplest type of proportional reinsurance, because each policy is shared in fixed proportions. Settlements at the end of a quarter can be determined by applying the proportions to the aggregate premiums and aggregate losses. The drawback is that the ceding insurer will be left with the same proportion of even the smallest risks. They can be administered through a treaty or on a facultative basis. If administered through a treaty, the ceding company and reinsurer each share premiums and responsibility for losses

on a fixed percentage basis for all policies in the covered classes that have been issued by the primary carrier. If administered through a facultative agreement, the sharing is similar, but on an individual risk rather than an entire line of business. This kind of contract can be particularly helpful to new, small firms that would otherwise have very limited underwriting capacity. An example of quota share agreements is where an insurer and reinsurer agree to split premiums and losses equally on an entire line of business, such as auto physical damages.



Surplus Share agreements are another type of proportional reinsurance. With surplus share, a ceding company decides what level of liability it wishes to retain on a given risk and then reinsures multiples of that level through the reinsurer. For example, a ceding company may wish to retain a \$100,000 liability for a given policy, and by contract is allowed to cede up to 10 times its retention, or \$1 million, to the reinsurer. If the ceding company elects to retain more liability, it may cede the same multiple of its higher retention to reinsurers. In a surplus share agreement, it is not unusual for there to be a maximum dollar limit on the amount of liability that can be ceded to the reinsurer for any given risk. Administered primarily through treaty arrangements, the surplus share form of risk sharing is more flexible than the quota share form. It allows the ceding company to better manage its retention, bringing a level of homogeneity to its exposures. But it can also be used by the cedent as a further underwriting tool, whereby it retains a much smaller share of undesirable risks. To this extent, a surplus share agreement allows for some degree of anti-selection. Obviously this opportunity cannot be abused or the reinsurance facility might disappear on renewal.

Ceding Commissions are common in reinsurance. In proportional reinsurance agreements, a reinsurer often will agree to split the net premium (as opposed to the gross premium) and losses according to a fixed percentage basis. The net premium has removed from it the marketing, administrative, and sales commission costs as well as premium taxes incurred by the primary carrier in writing the policy. In this way the primary carrier is reimbursed for its additional costs. Other adjustments may be made, as discussed in the Prices and Usage section.

Nonproportional Reinsurance

Nonproportional reinsurance contracts have also been known for a long time, but these forms of reinsurance became widely used only after World War II. The two most common forms include excess of loss contracts, which are the oldest nonproportional reinsurance contracts, and stop loss contracts. Below we describe each.

Excess of loss contracts require the ceding company to pay all losses associated with an insurance claim up to some maximum amount. If losses exceed that amount, the entire excess will be paid by the reinsurer, up to the limits of the contract. Excess of loss contracts are sometimes purchased in layers. In this arrangement, a primary carrier may purchase reinsurance from several reinsurers, with each of the reinsurers obligated to assume a particular layer of losses. Then when a claim comes due, the reinsurers respond in a predetermined order until the total loss is covered. Through layering, the primary carrier may secure the type and amount of reinsurance protection desired, and not be restricted to the willingness of a single reinsurer to provide it.

Stop loss contracts are similar to excess of loss contracts, except that stop loss contracts apply to a portfolio of insurance contracts. This kind of contract is simple to administer and in some sense better meets the needs of most insurers, because it is the total of all losses that is typically of greater concern, not the loss payments under a single contract. Stop loss contracts are used by the newly established company and by subsidiaries from a foreign parent company. Such a company may have a quota share treaty as its first line of defense against major claims problems. Using this part of their reinsurance package, it could protect itself against the probability of a single very large claim. However, it remains exposed to the risk that the number of claims would become excessive. It is just as bad for an insurer to have to pay 10 claims of \$100,000 each as it is to pay one claim of \$1 million. This is where stop loss contracts, as a supplement to quota share treaties, can be most helpful. For certain lines of business, such as hail insurance or extended warranty, variance in severity is not a problem. However, significant variance in frequency can easily overwhelm an insurer. The stop loss contract is the only effective way of providing reinsurance protection in these cases. If the treaty is at arm's length, then many conditions will apply.⁴

Hybrid Contracts

Reinsurance contracts that involve some combination of proportional and nonproportional reinsurance are known as **hybrid** contracts. For example, a reinsurer may accept liability for losses exceeding some threshold, but only up to some upper limit. Beyond that upper limit, the reinsurer may pay a proportion of further losses, or indeed nothing at all. Alternatively, a reinsurance contract may provide for reinsurance payments to begin if losses exceed some threshold, but where the reinsurer may pay only a portion of losses above that threshold, but without an upper limit on total losses. Numerous other arrangements are made, but most are some variation on these themes.

Retrocessions

Reinsurers face risks similar to that of primary carriers. They too have limited capacity to retain risks and prefer to achieve a balance in the portfolio of risks that they do retain. Accordingly, reinsurers often seek to buy reinsurance from other reinsurers. Such reinsurance is known as **retrocessions**. By utilizing this vehicle, the risks can be spread among a large enough group of insurers and reinsurers that a single catastrophe or a series of large losses can be absorbed better without causing insolvencies among the risk carriers. The same proportional and nonproportional forms of contracts described above are used for retrocessions.

An alternative to retrocessions for reinsurers, and perhaps even primary carriers, is to hedge their risk in the newly established insurance futures markets at the Chicago Board of Trade Exchange. While dealing in exchange traded insurance and catastrophe futures eliminates the counterparty risk that prevails in retrocession arrangements, it does introduce "basis risk" because the risk covered in the futures contracts, based on some aggregate index, may not correspond to a given company's pattern of exposure.

Prices and Usage

All proportional reinsurance is negotiated in terms of the ceding commission. Typically, the ceding commission is at a flat rate, at approximately the level of internal expenses of the cedent. Then, the reinsurer is said to "follow the fortunes" of the ceding company. Both will make profits or losses in proportion to each company's share.⁵ However, many proportional treaties now contain some sort of sliding scale commission, pegged to the loss ratio under the treaty. In many cases, this allows for a better fine-tuning of the treaty, providing more protection as the loss ratio increases. In extreme cases, the ceding commission will vary on a one-to-one basis over a very broad

⁴In the late 1980's, a North American insurance company had obtained a stop loss cover at such a low level that it was guaranteed profits no matter how bad the business was. The reinsurer claimed that the cover was obtained by fraudulent means and refused to pay on all its treaties. Cardinal had to be liquidated.

⁵In some sense, the ceding commission serves as a pricing mechanism in proportional reinsurance. On good business, the ceding company will expect a larger ceding commission than its acquisition expenses. On bad business, the reinsurer will offer less.

range. This has the effect of providing an almost certain profit to the reinsurer and no effective protection to the ceding insurer.

For excess of loss treaties, the cost is negotiated directly, as the rate based on some measure of exposure, usually direct premiums. For low level excess treaties (known as working covers), some losses are expected to affect the layer each year. Therefore, minimum and maximum rates are specified along with a formula that determines the rate between the two extremes. If no losses reach the layer, the minimum rate applies; if many losses occur, the maximum rate applies. In addition, or as an alternative, an aggregate deductible may apply. The ceding company must analyze the cost of its reinsurance protection, the effectiveness of this protection, and the balance between too little and too much reinsurance.

Stop loss treaties are not very common, and automatic facultative treaties are rare in the property/casualty business. These unusual types of treaties may be effective in special circumstances, but the most common treaties are proportional and per occurrence excess treaties. For normal casualty lines, small companies will combine quota share treaties (to increase the number of exposures) with per occurrence excess treaties in various layers. Large companies will forego the quota share treaties. For property insurance, surplus share treaties and catastrophe covers are the usual ones.

ECONOMICS OF RISK TRANSFER

In some sense, reinsurance can be thought of as renting capital. In this section we show through the use of diagrams how risk can be transferred to an insurer or reinsurer. We begin by considering the case of simple insurance contract designs. Then we introduce reinsurance to show how the risk covered under an insurance contract can be shared by the ceding company and the reinsurer.

We should note at the outset that the economics of risk transfer have been examined rigorously by a number of leading actuaries and economists. Three basic conclusions of this research are:

- 1) The form of reinsurance contract that will give the greatest reduction of the variance in the aggregate claim distribution *of the ceding company*, for a given net premium, is the stop loss contract. (See Karl Borch [1960], Paul Kahn [1961], and Jan Ohlin [1969].)
- 2) A proportional contract will give *the reinsurer* the smallest variance in aggregate claim distribution for a fixed net premium. (See S. Vajda [1962].)
- 3) Because there are at least two parties to any reinsurance arrangement, and a treaty can be called optimal only if all parties consider it as the best possible arrangement, the compromise reinsurance arrangement should be something between the stop loss and the proportional contracts. (See K. Borch [1974, Part 2].)

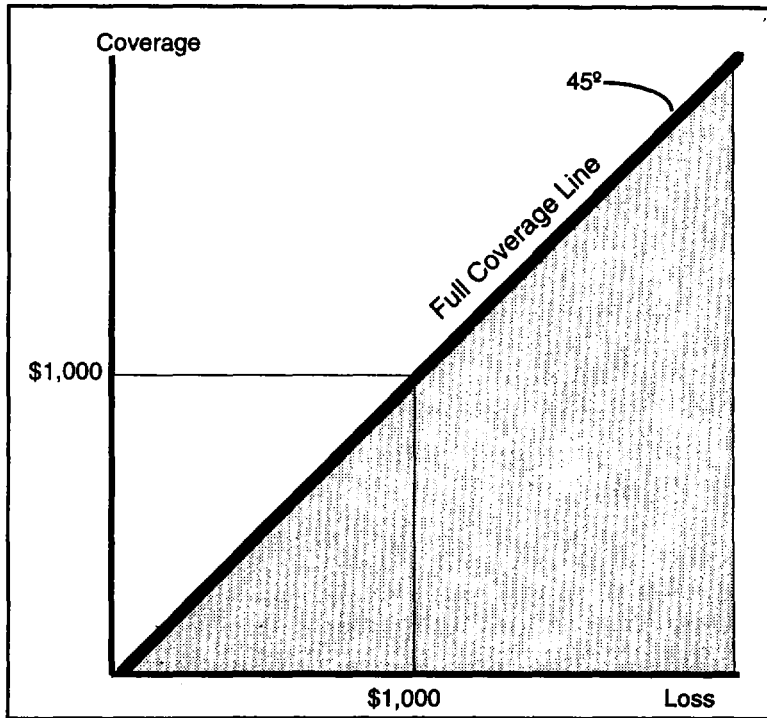
These conclusions can be narrowed if specific information is known about the risk aversion of the parties to a reinsurance agreement. If only general information is available regarding their risk aversion, then the methods of stochastic dominance can be used to determine which contract parameters are preferred. (See D. Babbal and A. Hogan [1992] for an application of the economics of stochastic dominance to the problem of insurance.)

Loss Coverage for Types of Insurance

Insurance coverage relative to losses can be displayed simply with diagrams. On the horizontal axis we show losses and on the vertical axis we show coverage levels. For the moment, let us ignore the sharing of risks between a reinsurer and a primary carrier, and focus our attention solely on the insurance coverage of losses. Because such a wide variety of reinsurance contracts exists, it would be impractical to discuss here all of their variations here. Differences in negotiated terms, premiums and limits are myriad. However, most contracts have some elements in common with the contracts described in this section.

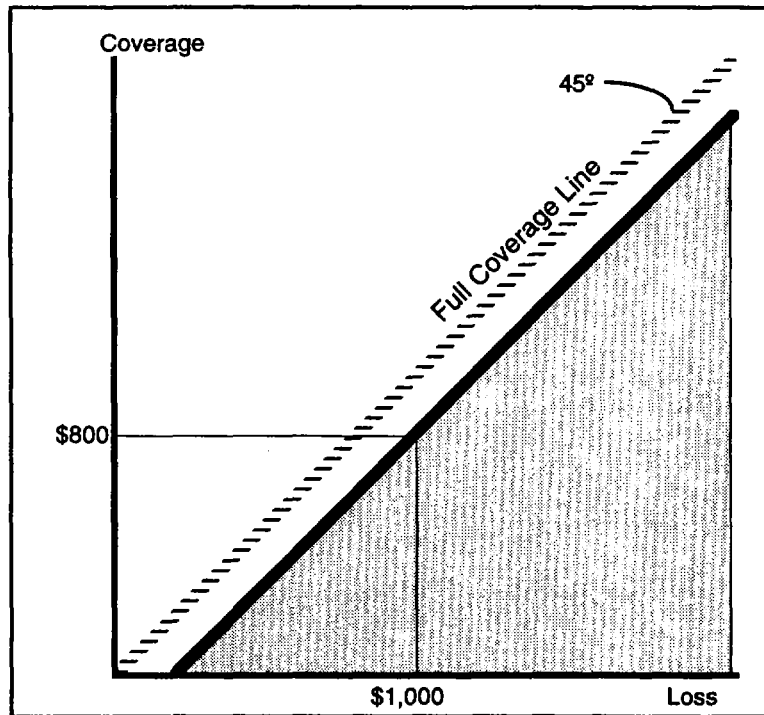
On the page that follows we present a diagram of full insurance coverage against all losses. The amount of coverage provided by the insurer, for any given loss, is shown by the vertical distance in the lightly shaded area. Whenever full coverage is obtained, it can be represented by a 45° line. For example, if a loss of \$1,000 occurs and the insurer pays the full amount of the loss, it can be represented as a point on the 45° line.

Full Insurance Coverage



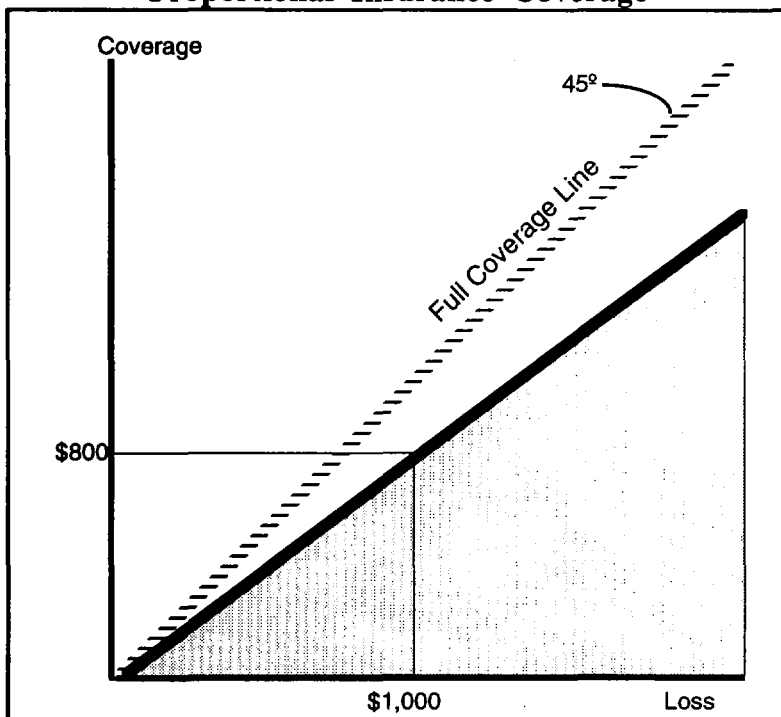
A situation in which there is full coverage beyond a deductible of, say, \$200, can be represented by the diagram below. A fixed deductible has the effect of shifting the coverage line downward by the amount of the deductible, yet it remains parallel to the full coverage line. If the insured suffers a loss of \$1,000, the insurer indemnifies the insured for \$800.

Full Insurance Coverage Beyond a Deductible



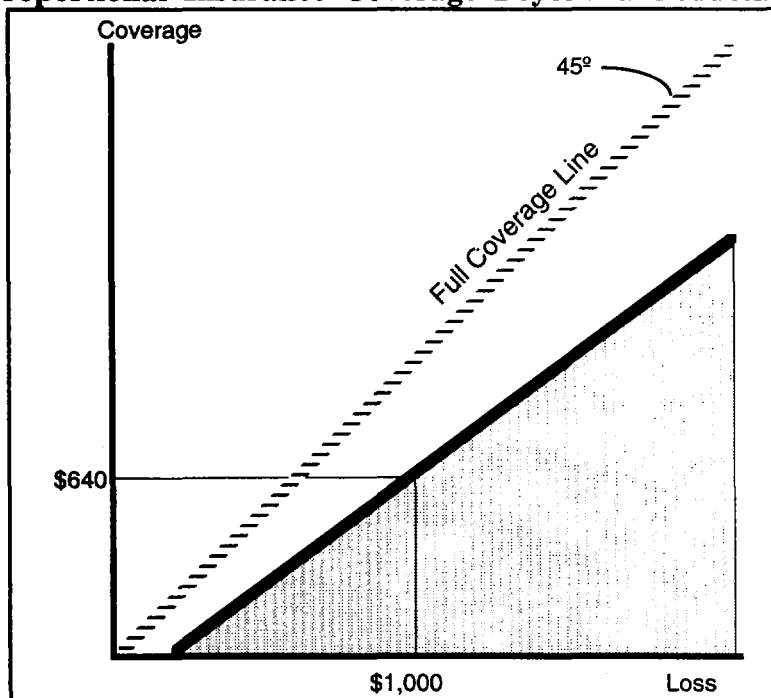
A contract which provides 80% coverage of any given loss could be represented by the diagram shown below. In the case of a \$1,000 loss, the insurer indemnifies the policyholder with \$800. Note that the angle of the coverage line is less than that of the full coverage line. In the diagram, the angle is 36°, which is 80% of 45°.

Proportional Insurance Coverage



Finally, we show an insurance contract that provides 80% coverage above a deductible of \$200. In our example of a \$1,000 loss, this would provide \$640 of coverage to the insured. Note that the coverage line has shifted to the right by \$200, yet the 36° angle is maintained.

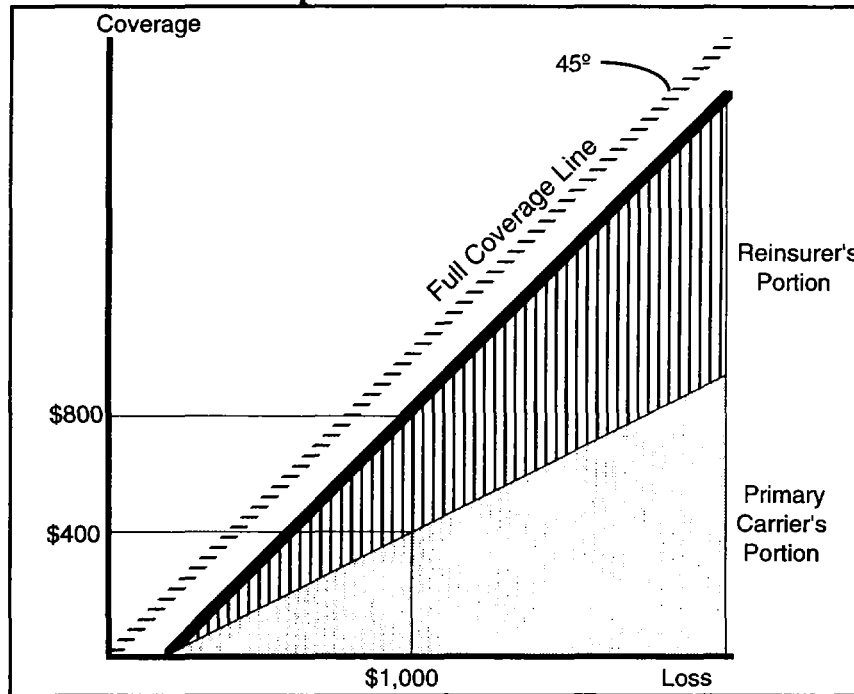
Proportional Insurance Coverage Beyond a Deductible



Loss Coverage for Types of Reinsurance

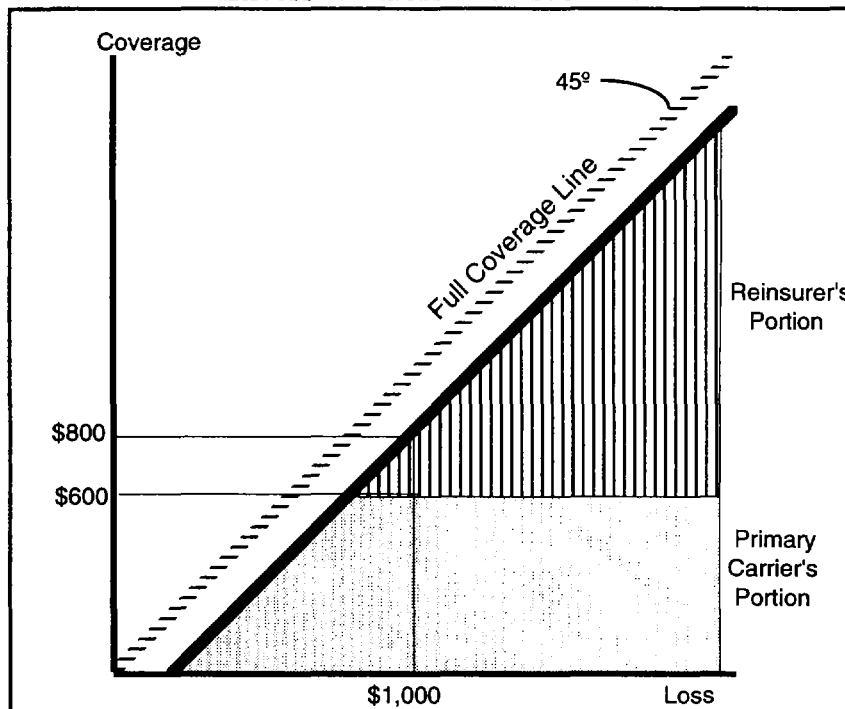
Next, we consider reinsurance contracts. The underlying insurance policy features full coverage beyond a deductible, but it is a straightforward adjustment to render the diagrams suitable for other kinds of underlying coverage profiles. We examine first the insurance and reinsurance coverage on a simple proportional reinsurance contract offering 50% sharing of losses between the cedent and reinsurer beyond a \$200 deductible

Proportional Reinsurance



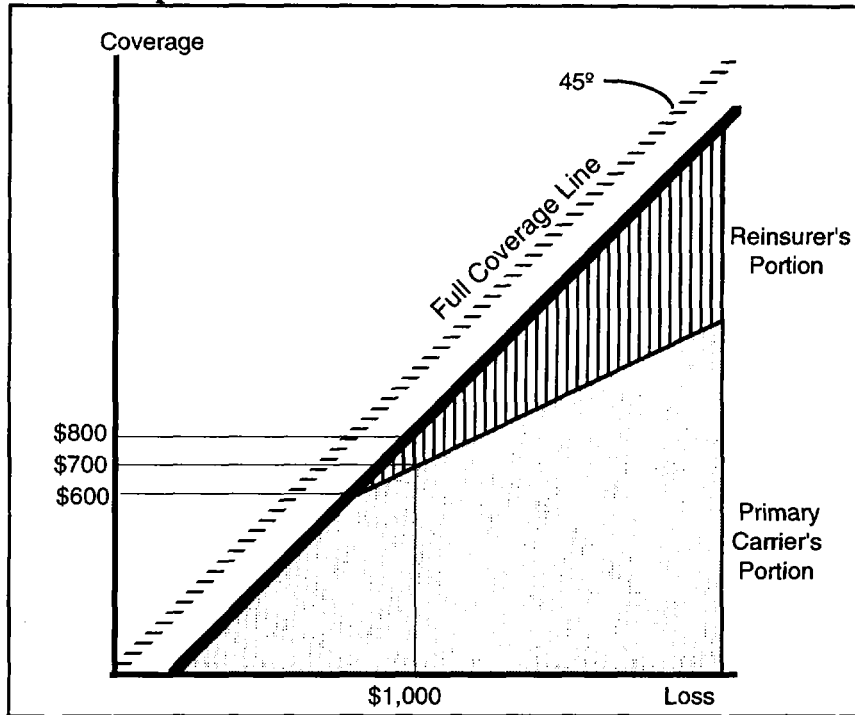
An excess of loss reinsurance arrangement has a pattern of coverage sharing that looks very different from a standard proportional reinsurance arrangement. Below we show such an arrangement with a \$600 level of retention.

Excess of Loss Reinsurance



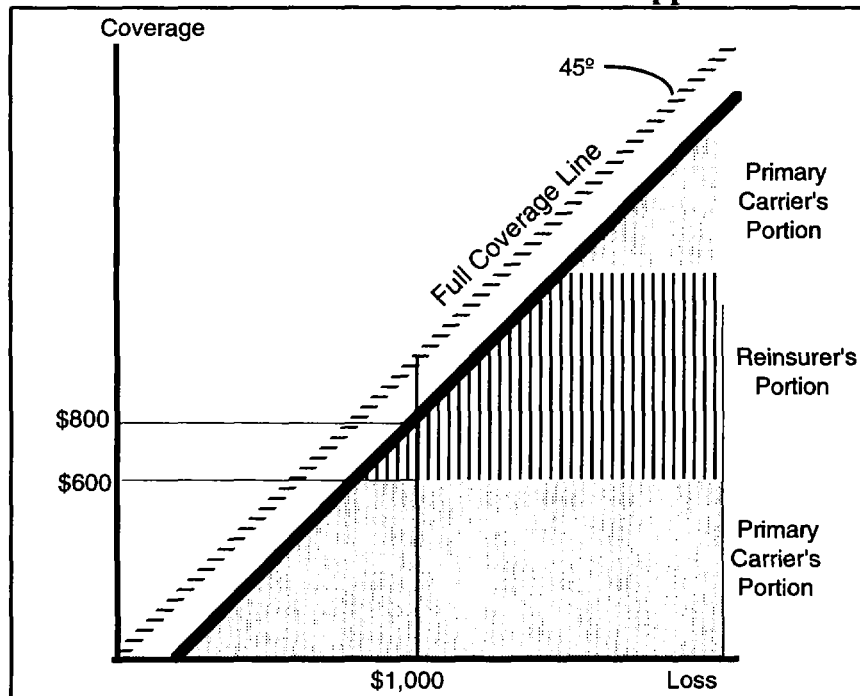
Next, we show a situation where the cedent retains \$600 of exposure beyond a deductible of \$200, but where the reinsurer assumes only 50% of the loss exposure above that level. Thus, with a loss of \$1,000, the cedent would pay \$700 while the reinsurer would be responsible for \$100 of the loss.

Proportional Reinsurance Above a Retention



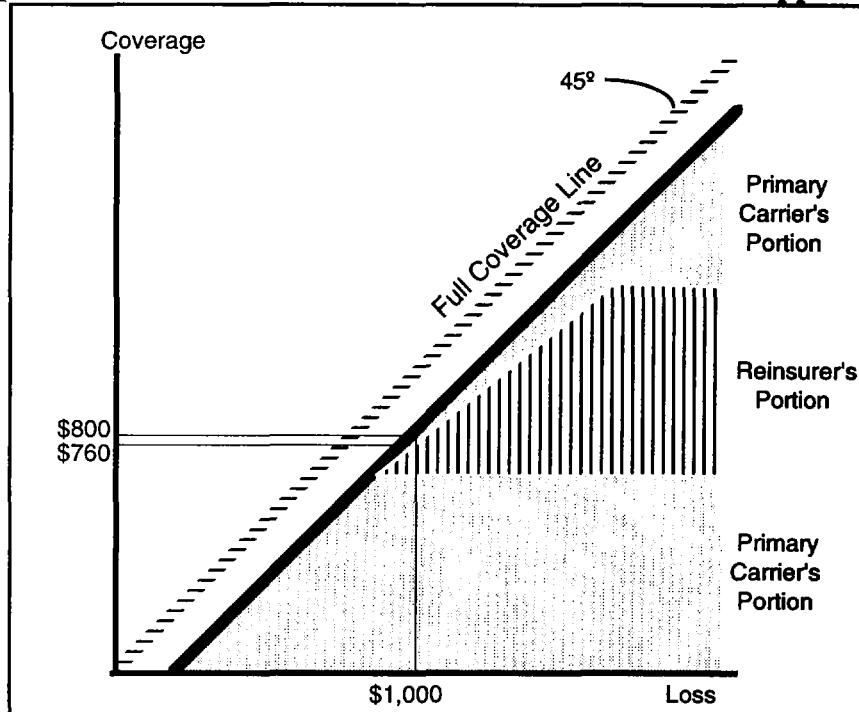
In the next example, we turn our attention to an excess of loss reinsurance contract featuring full coverage beyond the cedent's retention level, but only to an upper limit. In our example, the insured is responsible for absorbing the first \$200 of loss; the primary carrier covers the next \$600 in losses; the reinsurer covers the next \$625 of losses; and the primary carrier absorbs anything above \$1,425 in losses.

Excess of Loss Reinsurance with an Upper Limit



Our next reinsurance contract features proportional insurance coverage for 60% of losses above a cedent's retention of \$700. Note that above that retention, the cedent is also responsible for 40% of losses beyond their retention limit, and for all losses above \$1,425, after the upper limit of the reinsurer has been reached.

Proportional Reinsurance Above a Retention with an Upper Limit



The reader familiar with derivative financial instruments will immediately see a parallel between reinsurance contracts and options. For example, stop loss reinsurance can be modeled in an option framework as a call option; pro rata reinsurance above a retention can be modeled as half an option (if the proportion of coverage is 1/2); stop loss with an upper limit is a vertical spread for the reinsurer, involving a long position in a protective put plus a short position in an out-of-the-money call. The option framework is particularly helpful in examining the insurer's incentive to increase volatility⁶ of the underlying insurance portfolio, to delay loss payments (even if the eventual settlement amount is much higher), and to view the impact of inflation on the "strike price" — which in the reinsurance case is the retention level.

CHARACTERISTICS OF REINSURANCE RISK

The characteristics of reinsurance risk are related directly to the form of reinsurance contract. In proportional reinsurance contracts, the reinsurers share the same risks as the primary carriers; thus, there is nothing unique about the risk characteristics absorbed by reinsurers relative to that retained by the primary carriers.

In nonproportional reinsurance contracts, however, it is generally the case that the reinsurer's risk differs markedly from that retained by the primary carrier. This stems from the structure of the contract. With most non-proportional reinsurance, there is much uncertainty surrounding the risks transferred to reinsurers. Such risks are generally characterized by low claims frequency and high loss severity; moreover, neither the frequency nor severity of losses are very predictable. Another aspect of reinsurance that makes it particularly troublesome is the long time it takes before the nature of the reinsurer's liability is made manifest. This is particularly true of stop loss contracts, which only begin payments after the primary carrier has exhausted its retention. The problem is exacerbated with the "long tail" lines of coverage, where the losses take the longest to fully develop. Credible loss data needed to project

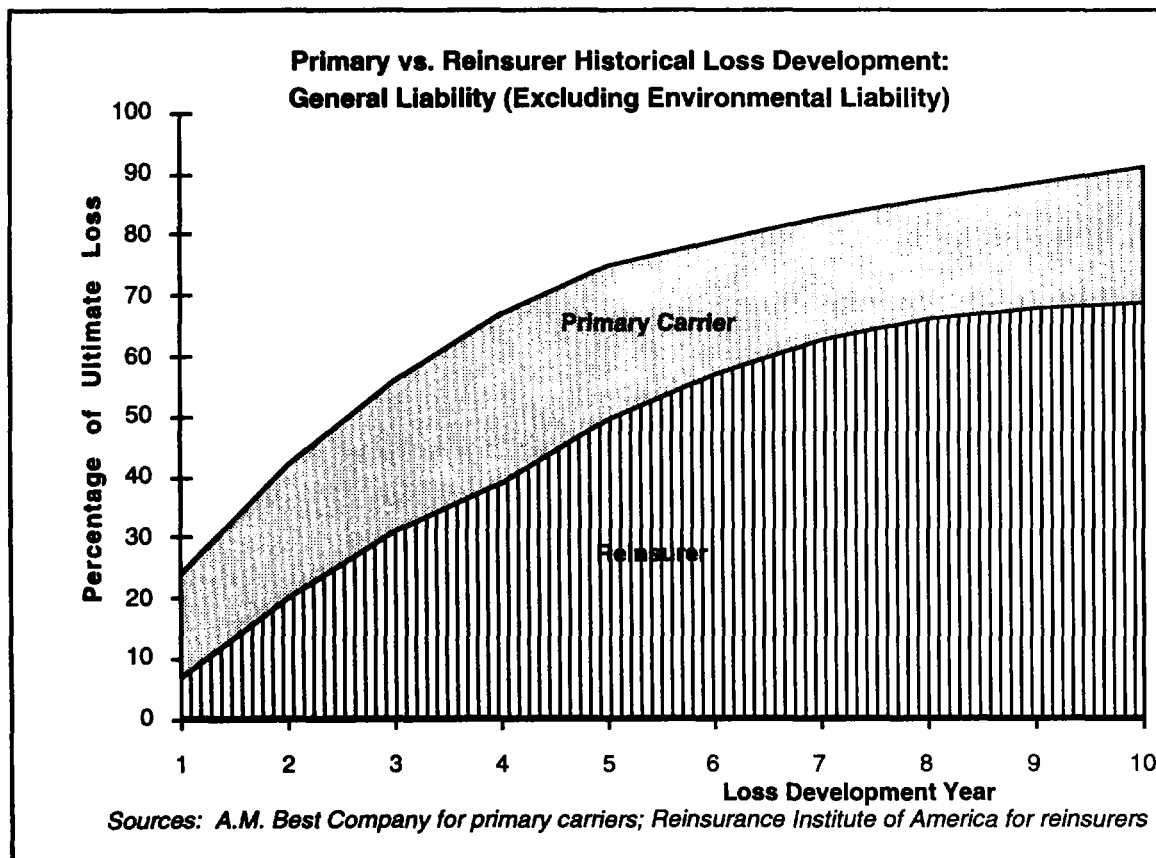
⁶In a limited company, the shareholders can lose no more than the equity. However, the potential for profit can be almost unlimited if the shareholders are willing to accept more risk (i.e., more variance). This asymmetry of risks/rewards is readily apparent in the options framework of analysis and sometimes give rise to a behavior known as "betting the company." For claimants, however, the upside is limited by the amount of their claims, while the downside can be much greater than the shareholders' equity. Because of the significant difference between the two, the role of the regulator becomes very important to limit the risks and preserve solvency.

future losses may be unavailable or scanty, and the reinsurer must depend much more on professional judgment and experience to evaluate the nature of an exposure.

Many insurance policies are written on an "occurrence" basis, rather than a "claims made" basis, particularly in the liability lines. With these kinds of underlying policies, claims may be filed years after a policy expires. Reinsurers are also subject to more reporting delays than primary carriers. The reason for this is that with excess of loss and stop loss contracts, if the primary carrier's reserves are set within its retention, no notification may be given to the reinsurer of claims that have been filed. But when the claims are ultimately paid, the retention may be exceeded. It is only at that time, which can be years later in some cases, that the reinsurer is notified.

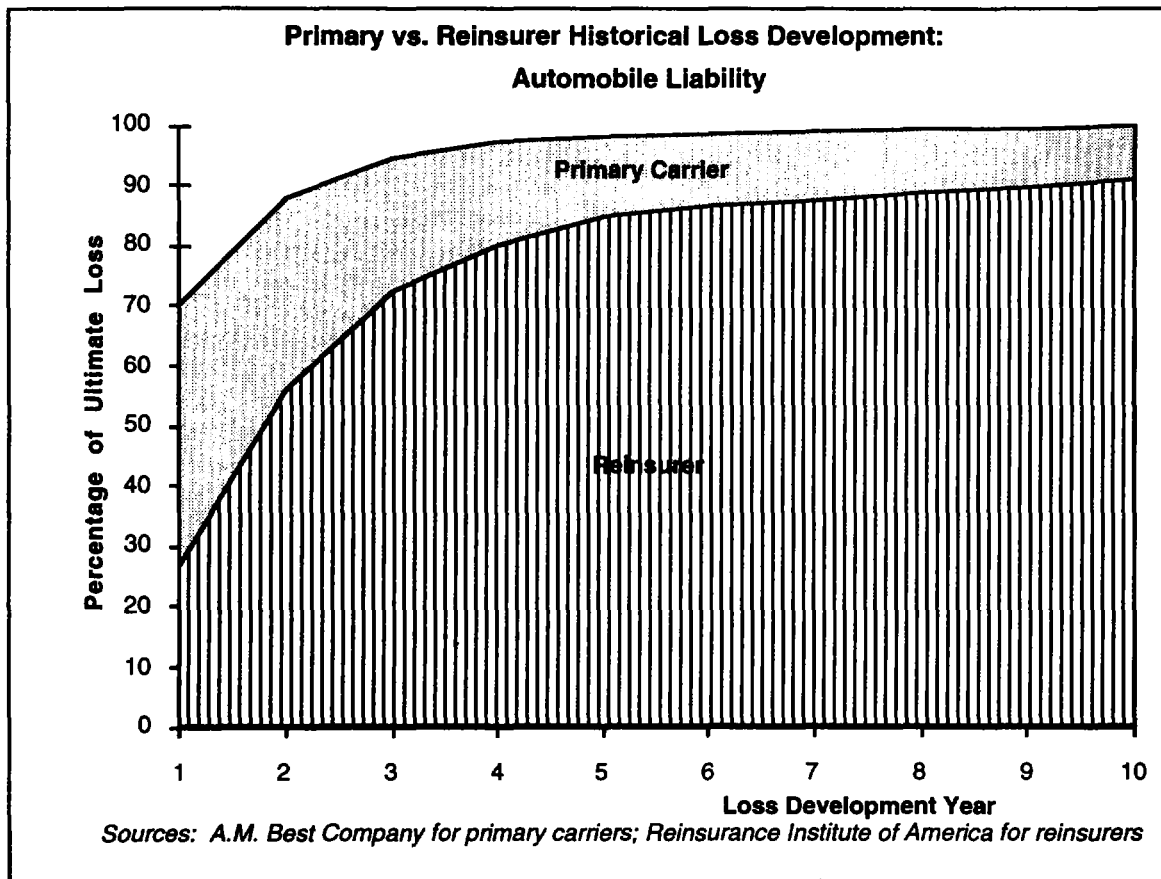
Another characteristic of reinsurance risk is that it is susceptible to inflation impact. Because the reinsurance portion of coverage is often paid last, it is far more subject to the impact of inflation on repair costs, litigation, and wages than is the primary carrier's portion of coverage, which is paid much sooner. The impact of inflation on reinsurers may be exacerbated where the reinsurer has no capped retention limits. When inflation is severe, reinsurers will require the use of an inflation clause, designed to allocate the impact of inflation more fairly among the contracting parties.

Below we show US industry average loss development patterns for general liability and automobile liability business lines. Notice that in both cases, much more of the ultimate loss is paid sooner by primary carriers vs. reinsurers. This is particularly pronounced with general liability insurance. As the exhibit below reveals, after four development years reinsurers have paid only 39% of their total ultimate loss, whereas primary carriers have paid over two-thirds of theirs. Ten years after a loss has occurred, reinsurers will have paid only two-thirds of their total ultimate loss, whereas primary carriers will have paid over nine-tenths of theirs. Thus, the reinsurer is subject to more claims inflation and uncertainties devolving from changing economic and social/legal conditions than is the primary carrier. Moreover, there is a wide range of experience surrounding these industry averages, that varies by reinsurer and also by year.



In the case of automobile liability, the disparity in payment patterns is similar to that in general liability lines, but less pronounced. As the exhibit on the next page reveals, after four development years reinsurers have paid only 80% of their total ultimate loss, whereas primary carriers have paid over 97 percent of theirs. Ten years after a

loss has occurred, reinsurers will have paid 91 percent of their total ultimate loss, whereas primary carriers will have paid 99.7 percent of theirs. The reinsurer is therefore again subject to more claims inflation and uncertainties from changing economic and social/legal conditions than is the primary carrier.



REINSURANCE MARKET

In its broadest sense, the reinsurance market would include the following:

- 1) Reinsurance treaties: transfer of risks to another insurer
- 2) Internal pools: sharing of risks among affiliated insurers
- 3) Industry pools: sharing of difficult risks (e.g., nuclear) among a large number of participants
- 4) Non-voluntary pools: required sharing of high risk business among all licensed insurers based on market share
- 5) Lloyds system: insurance with syndicates of independent individuals
- 6) Reciprocal insurance exchanges: mutual sharing of risks by participating entities

Much of the reinsurance coverage is available through German and Swiss reinsurers. Also, there are some large reinsurers located in America, France, Sweden, and Japan, while a few other key players in the reinsurance market are scattered about. Reinsurance can be obtained from professional domestic insurers, located in the countries of their respective clients, from reinsurance departments of primary carriers, and from foreign-based reinsurers located outside of the client's country. Reinsurance may be purchased directly from the reinsurer, or through a broker or other insurance intermediary, or through an insurance exchange, such as the ones at Rotterdam and Chicago. The advantage of going through a broker is that some of the large brokerage firms will provide advisory services about the nature of contract, the quality of the reinsurer, and will help negotiate the most favorable price for the contract desired. However, they do charge for their services, and some brokers do not offer and are not capable of offering these services. Rather, they act merely as an intermediary for a handful of companies with which they conduct virtually all of their business. Also, certain reinsurers, such as Swiss Re, routinely provide training services for their clients on

topics ranging from underwriting, claims reserving and handling, investments, and even general management. They view an educated client as a good client, and frequently run special seminars that are intended to enhance the professionalism in the industry.

The largest reinsurers operating in the US at the end of 1993, based on policyholder net equity, were General Reinsurance (\$3.8 billion), Employers Reinsurance (\$1.6 billion), American Reinsurance (\$1.1 billion), Munich Reinsurance (\$0.7 billion), and North American/Swiss Reinsurance (\$0.7 billion). The total net equity for reinsurers exceeded \$27 billion for that year. At the other extreme, there are numerous reinsurers who have almost no capital, and whose creditworthiness is very low. Many of these companies do not last through a business cycle, and are likely to become insolvent in the near term. Indeed, two of three insurance exchanges (New York, Miami) got into severe financial difficulties during the late 1980s and were closed.

In terms of the volume of net written premium, the largest reinsurers during 1992 are shown below. (Figures are given in US\$ billions).

Rank	Group or Company	Net Premium Written	Rank	Group or Company	Net Premium Written
1	Munich Re (Germany)	8,935	15	American Re (USA)	1,020
2	Swiss Reinsurance (Switzerland)	7,196	16	Winterthur Group (Switzerland)	820
3	Employers Re (USA)	3,101	17	Zurich Group (Switzerland)	798
4	Cologne Re (Germany)	2,362	18	Prudential Re (USA)	797
5	General Reinsurance (USA)	2,348	19	Toa Fire & Marine (Japan)	731
6	Hannover Ruck & Eisen U Stahl (Germany)	2,205	20	Yasuda Fire & Marine (Japan)	685
7	Assicurazioni Generali (Italy)	1,827	21	National Indemnity Co (USA)	677
8	Gerling Globale Re Group (Germany)	1,709	22	Axa Reassurances (France)	668
9	Lincoln National Group (USA)	1,662	23	Aachener Ruck Group (Germany)	627
10	Frankona Ruck (Germany)	1,588	24	Cigna Group (USA)	582
11	Mercantile & General Re (UK)	1,548	25	SA Francaise de Reassurance (France)	564
12	Scor SA Group (France)	1,533	26	Kemper Re (USA)	559
13	Tokio Marine & Fire (Japan)	1,211	27	Mitsui Marine & Fire (Japan)	539
14	Skandia International (Sweden)	1,156	28	Uni-Storebrand Int'l Group (Norway)	520

REINSURANCE REGULATION

Rules Applying to Cession

In any jurisdiction that has introduced a supervisory system for insurance, particularly one that has adopted a "solvency monitoring" approach, special attention must be given to the use of reinsurance and to the identity and financial strength of reinsurance companies receiving business from domestic companies.

When a company has reinsured a significant proportion of its business to a particular reinsurer, its financial strength can be said to depend on the strength of that reinsurer. In some cases, companies cede more than 50% of their business to a reinsurer and thus their basic survival depends entirely on the capacity and willingness of the reinsurer to honor any claims as they are presented and to do so in a timely fashion. In a number of cases where insurance company failures have occurred in North America, the cause of failure has been traced to unsound reinsurance of the company's business.

Regulators must address the following aspects when considering the soundness of the reinsurance practices adopted by the companies they supervise:

1. Proportion of business that is retained by the direct writing company. While it is quite appropriate for a company to cede a major portion, even 100% of certain risks that it accepts, the company should retain for its own account a reasonable proportion of its total premium receipts. It is recommended that this minimum retention level be set at 25% or higher.⁷ Regulators may choose to allow new companies to retain a smaller proportion in the first few years of operation but they should steadily raise the retention to the 25% level. If a company proposes to retain a lesser percentage, it is seeking to operate as a broker and not as an insurer.
2. Proportion of business that is ceded to unlicensed companies. For a variety of reasons, including cost of reinsurance, companies are frequently inclined to cede business to reinsurers that have not chosen to obtain a license to operate in the jurisdiction. The regulator may be faced with a problem in that it may be quite difficult to obtain information concerning the reinsurance company and its financial strength and there may also be a concern over the ability to enforce payment of claims in the event the regulator is obliged to assume control of the licensed direct-writing company. On the other hand, it cannot be presumed that all reinsurance ceded to unlicensed companies is unreliable. In fact, some of the largest and strongest reinsurance companies in the world solicit business actively in many countries where they are not licensed. There may be valid practical impediments to such licensing. The following approaches may be adopted by regulators in respect of cessions to unlicensed reinsurers:
 - a) Impose a maximum percentage of total company premiums that may be ceded to unlicensed companies (such as 25%)
 - b) Require licensed companies to file with the regulator financial statements and other pertinent information about such unlicensed reinsurers

The regulator could enforce these provisions by refusing to recognize the reinsurance in its calculation for the test of the domestic insurer's capital adequacy for any cessions that exceed the 25% level or whenever the information filed with the regulator fails to demonstrate that the reinsurer has the desired level of financial strength.

3. Dealings with reinsurance brokers. In many cases, companies arrange reinsurance through private brokers who act as agents for a reinsurance company or a pool of such companies. Such arrangements can pose problems for the regulator when information regarding the identity and financial strength of the reinsurance companies that will actually be on the risk is lacking. In such cases, the reinsurance may actually be placed outside the country with reinsurers who may not be licensed in the country. In order to deal with such cases, the regulator should require the local company to obtain complete information on the reinsurance companies that ultimately wind up on the risk for the business ceded. Subsequently the regulator will deal with the business as noted in points 1 and 2 above. We have encountered situations where

⁷Note: Retention rates among the developed countries average in excess of 80%. See *Sigma*, Economic Study No. 5/94, Swiss Reinsurance Company.

companies have not been informed by the brokers of the minimum details on the cession — not even the identity of the reinsurers. This should not be tolerated as the direct-writing company would be forced to rely on the integrity and financial resources of the broker to handle a claim. Often such brokers would not be in a position to pay the claims.

In some jurisdictions, there has been a concern over the loss of limited foreign reserves that occurs when reinsurance premiums are paid to carriers outside the country. In order to stem this tide, certain jurisdictions have created domestic reinsurance companies and occasionally mandated that domestic direct-writing companies cede a minimum proportion of their business to these reinsurers. In the majority of cases, these reinsurers have not proven to be successful. These companies often lack the kind of expertise that is usually found among the ranks of the employees of the major international reinsurance organizations and can contribute little to the underwriting and development of insurance in the local market. Despite this lack of expertise, such companies usually collect a uniform percentage of all the premiums written by local insurance companies, forcing companies to reinsure some business that they would have preferred to retain for their own account and also accepting as reinsured coverage some risks that the reinsurer may lack the capital to support.

When policy-makers in a country are concerned over the matter of reinsurance premium flows leaving the country, it may be possible to engineer a reciprocal agreement with the major international reinsurers whereby they cede other business, perhaps originating in other countries, back to the local companies in an amount that would replace some if not all of the premium revenue that is paid to them and is perceived to be “lost” by the local company (and, by extension, by the local economy). This arrangement may be impractical if the local reinsurers do not have the capacity, nor the technical ability, to take on retrocession from other countries.⁸ Moreover, the lack of foreign exchange capital to cover losses may be just as important to the underlying project economics when international reinsurance is denied. Some countries do not seem to grasp in trying to save “premiums” for the local economy that the more important issue is whether they can afford the losses that might occur. Another alternative would include asking foreign reinsurers to invest some portion of their premiums in local assets, providing that the economic situation in the ceding country is conducive to such investment. This probably is not practical for most countries.

Rules Applying to the Activities of the Reinsurer

In most countries, licensing of reinsurers is subject to the same standards and criteria that apply to the licensing of direct writers, although initial capital requirements may be somewhat higher, and more time may be allowed for filing annual returns. All insurance companies, including reinsurers, establish their capacity for accepting risk using actuarial principles that measure exposure to risk against the company’s capital. The identification of the size and nature of risk that a company is prepared to undertake, and the risk weights it assigns to those undertakings, vary by product line and many other considerations, including perhaps territory and currency. Once these matters have been determined, each company will then fix its maximum retention for a given risk in light of available capital. Any amounts of business that it chooses to accept (“underwrite” in insurance jargon) that involve exposures in excess of the maximum retention must be ceded or retroceded to another company.

Owing to the complexity of this process, only very few regulators have attempted to set statutory limits on maximum retention for either insurers or reinsurers. In a supervisory system that depends on monitoring of solvency as opposed to strict regulatory controls on operations, such retention limits would have no place. It is unlikely that the regulator would be better equipped to fix the retention limits than would the insurance company managers.

In order to provide effective assistance to the direct-writing companies, reinsurers will normally set higher retention limits for the risks they undertake than would a direct-writing company. By extension of the process just described, this implies a need for greater amounts of capital.

In Canada, a company may choose to be authorized to carry on reinsurance only. In such a case, the applicant would be expected to provide financial statements and forecasts to indicate that the capital it proposes to invest in the Canadian operation will be sufficient under reasonable scenarios to support the reinsurance business of the company for a number of years into the future. It is interesting to note that a company receiving a license to operate

⁸In the early 1980’s, some countries in Southeast Asia thought it was a good idea to encourage their local companies to seek reinsurance abroad. The basic idea was to balance the outflow of ceded reinsurance with the inflow of reinsurance assumptions. However, these companies were perceived as “naive capacity” and ended up on the worst treaties. Consequently, this resulted in a net outflow of claims payments over premium income, and only made matters worse.

as a direct writer is also, ipso facto, authorized to accept reinsurance business. In practical terms, the only consequence of licensing for reinsurance exclusively is the ability to delay periodic filings with the regulators to allow the reinsurer time to gather necessary statistics from its client companies.

In Uruguay, for example, if a reinsurer seeks to underwrite business it must obtain special authority to do so. The minimum capital required is defined to be 10 times the minimum capital for a direct writing company that would seek to do only one line of business. This 10-times rule is applied, no matter how many lines of business the reinsurer proposes to write.

Regulation and Contracts of “Utmost Good Faith”

Reinsurance has a very long tradition. In its origins it was described as a “gentleman’s agreement” done in utmost good faith. Reinsurance agreements were seldom committed to writing and there was rarely any dispute from the reinsurer when a direct writer presented a legitimate claim for payment. This poses considerable difficulty for a regulator. Without a written contract, it is impossible to verify the terms of the reinsurance.

In times of company failure, this has proven to be a very serious problem. When a direct writer fails, the reinsurers have every reason to want to question each and every detail of every claim that is presented to them for payment. The client company will produce no more new business and no new revenue for them and consequently, the reinsurers will not be interested in paying claims that are the least bit questionable. Instead of settling in utmost good faith, the reinsurer will require strict compliance to the letter of the reinsurance agreement and is also likely to want to be satisfied that the insurer applied and maintained sound underwriting standards when it placed business in the first place. Regulators and liquidators who have been faced with this situation have often been forced to accept compromise settlements on claims that would likely have been paid at their full value by a reinsurer that was dealing with a client company in good financial health.

For this reason, regulators are insisting that reinsurance treaties be committed to writing. The practice, at least in North America, is to renew reinsurance treaties at the end of the calendar year, with terms to be applicable for all business ceded during the following year. Because of the volume of negotiations that take place, there is often a delay in producing final written agreements. However, cover notes should be obtained immediately and must be signed by the reinsurer, not the reinsurance intermediary. The regulator should press for their execution as soon as possible.

GLOSSARY OF REINSURANCE TERMS

alien reinsurers: reinsurers located outside of the domestic country and not licensed domestically

assuming insurer: see reinsurer (synonym)

automatic facultative agreements: a treaty under which the primary carrier has the option to cede and the reinsurer has the option to accept or decline risks within a specific business line conforming to the contract

capacity: a measure, in monetary terms, of the amount of risk an insurer can prudently assume based on its net equity and the nature of the business written

catastrophe covers: excess of loss coverage designed to protect the ceding company on an occurrence basis against an accumulation of property and liability losses

ceding commission: a reimbursement from the reinsurer to the ceding company for expenses, such as marketing costs and sales commissions associated with acquiring the business being reinsured

cedent; ceding insurer: the insurance company that is purchasing reinsurance

cession: the amount of insurance coverage ceded to a reinsurer by a primary carrier

clash covers: excess of loss coverage designed to protect the ceding company on an occurrence basis against an accumulation of casualty losses

credit for reinsurance: a provision of statutory accounting enabling a ceding company to treat as assets or reductions in liabilities the amounts due from recognized reinsurers

direct underwriter: see ceding insurer (synonym)

excess of loss reinsurance: a contract whereby the reinsurer agrees to be liable for all losses exceeding a certain amount on policies of a given class of business during a specific period.

facultative reinsurance: reinsurance contracts that cover individual underlying policies and are written on a policy-specific basis, often used to cover catastrophic, very large, or unusual risk exposures

layering: the use of two or more reinsurance agreements to obtain a desired level of coverage; when losses occur, the reinsurers respond in a predetermined sequence, as necessary, to cover the loss

net equity: the combination of paid in capital, shareholders' surplus, policyholders' surplus, subordinated debt, and surplus notes, which serves as an important buffer to cover claims beyond those provided for in the insurance reserves

primary carrier: see ceding insurer (synonym)

professional domestic reinsurers: reinsurers located in the domestic country whose principal business is the assumption of reinsurance from insurance companies

proportional reinsurance: reinsurance whereby all premiums, losses and expenses are shared on a prorata basis between the ceding and assuming insurers

quota share: a type of proportional reinsurance that indemnifies the ceding company for a specified percentage of loss on each risk covered in the agreement, in return for receipt of a similar percentage of net premium paid to the ceding company

reinsurance contract: a transaction in which one insurance company indemnifies, for a premium, another insurance company against all or part of the loss that it may sustain under its policy or policies of insurance.

reinsurance departments: a department of a primary carrier that reinsures contracts written by other insurance companies

reinsurer: the company that specializes in underwriting reinsurance; company that accepts reinsurance

retention: the amount of insurance retained by the ceding company for its own account; a term used in connection with excess of loss reinsurance wherein the reinsurer is responsible for reimbursing the ceding company for losses in excess of the level of retention specified in the reinsurance contract

retrocession: process by which a reinsurer obtains reinsurance from another company

surplus: a term used in the insurance industry to denote the amount by which the assets of an insurer exceed its liabilities; see also net equity

surplus relief reinsurance: a form of reinsurance in which little or no insurance risk is transferred yet an enhancement to net equity is shown on the books of the ceding insurer

surplus share: a form of proportional reinsurance wherein the ceding company cedes the portion of its liability that exceeds its net retention, in return for which the assuming reinsurer receives a similar portion of the total premium

treaty reinsurance: a broad reinsurance agreement covering some portion of a particular class or classes of business; reinsurance treaties automatically cover all risks written by the insured that fall within their terms unless they specifically exclude exposures

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